INTERNALIZED SLEEP CULTURE: A NOVEL CONSTRUCT, OR AN EXPANSION OF SLEEP ATTITUDES? CONSTRUCT CONCEPTUALIZATION, SCALE DEVELOPMENT, AND INITIAL VALIDATION

by

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ABSTRACT

ARIA R. RUGGIERO. Internalized Sleep Culture: A novel construct, or an expansion of sleep attitudes? Construct conceptualization, scale development, and initial validation. (Under the direction of DR. JANE GAULTNEY)

Sleep health is an important aspect of an individual's overall health; however, it is often overlooked. Despite the promotion of healthy sleep practices, many individuals have competing demands that interfere with sleep (e.g., work, socializing, school), contributing to poor sleep outcomes. This, in part, seems to be a result of having certain values about sleep. What is less understood, however, are how these values become embedded within an individual's system of beliefs, and, if they are related to sleeping behaviors. This dissertation first crafted a theory based on the pre-existing literature related to internalization to create the construct conceptualization for internalized sleep culture. Internalized sleep culture was intended to help explain the process of adopting ideas related to sleep into one's own belief system, ideas which are thought to be transmitted through cultural memes, messages, and social channels, and how this may predict subsequent behaviors related to sleep. Next, a measurement scale was developed to assess the degree to which individuals have internalized sleep culture, and the initial validation process was started. Two separate studies utilizing independent samples (N = 669 adults), as well as data from three subject matter experts were used to help develop a 12-item scale consisting of one higher order factor (global internalized sleep culture), and two lower order factors (sleep as a commodity versus a biological/psychological need, and sleep as a mechanism for bonding). Though the scale passed initial validation checks and was found to demonstrate convergent and discriminant validity through correlations with sleep attitudes, sleep hygiene, sleep outcomes (duration, quality, latency), and social desirability, further analyses demonstrated that

internalized sleep culture as it was conceptualized and measured was not empirically distinct enough than the pre-existing construct of sleep attitudes. Implications of these findings and future directions related to internalized sleep culture and sleep attitudes are discussed.

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The construct Internalized Sleep Culture started off as an abstract idea that I could hardly form into words outside of my own head when I first began graduate school. Through the help and guidance of faculty, mentors, colleagues, friends, and family, I have been able to take this once blurry vision and give it focus and direction. My research and clinical experiences within my six years of doctoral training have led me to this point, and I am immensely grateful.

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CHAPTER 1: INTRODUCTION

Insufficient and poor quality sleep are rising health concerns in the United States, with the cumulative effects of sleep loss and sleep disorders representing an under-recognized public health problem (Institute of Medicine, 2006). In fact, sleep health was deemed a public health priority for the first time in the Healthy People 2020 initiative, aimed at improving health in the United States, and continues to be a priority for the 2030 initiative (Office of Disease Prevention and Health Promotion, 2020; 2022). According to the National Sleep Foundation (2015), the recommendation for appropriate sleep duration for adults (ages 18-64) ranges between 7 and 9 hours; however, anywhere from 50-70 million adults experience chronic sleep loss that falls short of these numbers (Institute of Medicine, 2006).

Despite the extensive promotion of healthy sleep, most individuals fall short of the published recommendations for sleep, which can lead to serious and sometimes fatal consequences. Insufficient sleep has been linked to motor vehicle accidents, industrial accidents, and occupational errors (Institute of Medicine, 2006). Moreover, insufficient and poor sleep have been shown to have deleterious effects on a wide range of health outcomes, including increased risk for hypertension (e.g., Gangwisch et al., 2006), diabetes (e.g., Knutson et al., 2007), cardiovascular disease (e.g., Meier-Ewert et al., 2004), being overweight or obese (Jean-Louis et al., 2014), depression and anxiety (e.g., Babson et al., 2010), and declines in cognitive functioning (Ferrie et al., 2011).

Many individuals purposefully delay sleep due to competing demands (e.g., work, school, socializing, relationships), despite the negative outcomes associated with sleep disturbances, while others believe in the value of sleep to maintain overall wellbeing and strive to maintain healthy sleep hygiene habits. These different values about sleep appear to, at least in part, stem

from messages that individuals have received from society, peers, and even social media, which they have identified with and then internalized into their own belief systems. These messages center around a certain "culture" pertaining to sleep and may plausibly influence the choices people make about sleep. While this process of internalization has been demonstrated to occur for other social phenomena, such as the thin ideal, sexism, and racism (Bearman et al., 2009; Speight, 2007; Thompson & Stice, 2001), to date there has been no research conceptualizing a construct for the internalization of sleep culture, nor has there been a validated scale to measure this process of internalization of sleep culture.

Thus, the first aim of this dissertation was to create a construct conceptualization for internalized sleep culture, including theorizing its nomological network according to current theory and prior sleep research. The second aim was to develop and begin validating a standardized measurement device to assess the degree to which individuals have internalized sleep culture. The following literature review outlines the health risks associated with insufficient and inefficient sleep and the societal messages that exist about sleep. Pilot data collected for the present study were also highlighted, discussed in terms of implications for devising the picture of sleep culture in the United States, which informed the construct conceptualization of internalized of sleep culture that is modeled off of previous work on the psychological process of internalization. Next, the methodology of two separate studies consisting of 668 participants and four subject matter experts were used to develop and revise the Internalized Sleep Culture scale (ISCS) into a 12-item, two-factor scale. The total ISCS, as well as the two subscales, were associated with all constructs within the nomological network (sleep attitudes, sleep hygiene, sleep duration, sleep quality, sleep latency) in hypothesized directions. However, internalized sleep culture still demonstrated significant overlap with sleep attitudes,

highlighting that internalized sleep culture is not a distinct construct as it is currently conceptualized and measured. Implications of this attempted construct conceptualization and scale development were discussed in depth, highlighting strengths, limitations, and future directions.

CHAPTER 2: CONCEPTUALIZATION OF INTERNALIZED SLEEP CULTURE

Sociocultural Factors Influencing Sleep

Sleep researchers Dement and Vaughan (1999) argued that, "healthful sleep is the single most important factor in predicting longevity, more influential than diet, exercise, or heredity" (p. 1). Despite this argument and the abundance of negative health outcomes associated with poor and/or insufficient sleep, many individuals do not value sleep above the other demands in life. A poll conducted by the National Sleep Foundation (2018) found that only 10% of Americans prioritize sleep over other aspects of daily living, such as work, socializing, fitness, nutrition, and personal hobbies, with sleep being the second to last most important priority within the sample. Thus, a divide exists between knowing the health benefits of sleep and actually prioritizing sleep above other activities.

Interestingly, sleep, or the lack thereof, is also one of the most widely satirized topics, especially throughout social media. Though sleep is a biological need, it is also a choice, and humans often make the choice to forego sleep in favor of other activities. Scroll through social media, and one will inevitably come across posts with messages conveying that "sleep is for the weak" and glorifying sleep deprivation as a common human experience. Thus, this seems to reflect a culture where sleep loss is normalized and one that allows people to bond over this shared reality. Insufficient sleep is sometimes considered a "badge of honor" for individuals. Up until this point, the majority of research has focused on factors that interfere with the biological need to sleep (i.e., sleep disorders, neighborhood conditions); however, less effort has been spent elucidating the sociocultural factors that interfere with choices regarding sleep-related behavior. Specifically, a gap exists related to the influence of larger societal values about sleep and how that affects an individual's sleep. It is plausible that these values could broadly reflect the values

of much of our society (i.e., a Western, industrialized, technological culture) and the normalization of a fast-paced lifestyle where work and other activities come first at the expense of an individual's basic need for sleep that is crucial to maintain one's health. However, positive messages about sleep are also promoted. Organizations such as the Centers for Disease Control and the National Sleep Foundation have publicized the benefits of maintaining healthy sleep hygiene practices. Many researchers and celebrities published best-selling books touting the benefits of sleep (e.g., "Why We Sleep" by Matthew Walker, and "The Sleep Revolution" by Arianna Huffington). These competing messages, along with personal experiences and beliefs produce a mixed cultural narrative. On the one hand, healthy sleep habits are a current "trend," but the values of American society do not necessarily allow one to put sleep ahead of other responsibilities. However, no studies to date have examined the types of societal messages about sleep people have received. Thus, the present study describes a pilot study conducted to elucidate the types of societal messages people have received about sleep within the United States.

Preliminary Investigation of Societal Messages About Sleep

Therefore, given the relatively nascent state of empirical and systematic studies of the types of societal messages about sleep that exist within the United States, a pilot study explored this novel topic. This pilot study was a mixed-method exploratory investigation of the types of societal messages people have received about sleep, the extent to which individuals believe these messages to be true, the extent to which these messages influence their sleeping behaviors, and the extent to which they experience guilt if their behaviors violate the societal message(s) they endorsed (Ruggiero, 2020). Participants received both qualitative and quantitative questions, and each participant was able to write up to three societal messages about sleep they have personally received. A sample of 188 adults recruited from the University of North Carolina at Charlotte's

research participant pool served as participants in an online survey. The mean age was 19.74 years (SD = 2.75), 43.1% identified as male, 55.9% identified as female, and 1.1% identified as gender non-binary. Participants identified as White (54.2%), Black or African American (16.6%), Latino/a (13.3%), Asian (8.8%), mixed race (6.4%), Native American or Alaskan Native (.5%), and Native Hawaiian or Pacific Islander (.5%).

The qualitative data responses for the types of societal messages received about sleep were analyzed via inductive coding, which creates codes based on the use of inductive reasoning and is used when analyzing exploratory data (Miles & Huberman, 1994). Inductive coding does not involve hypothesizing any data codes prior to the data being collected, and instead allows the data to determine the conclusions made (Miles & Huberman, 1994). The process of inductive coding begins by chunking the overall sample into smaller subsets of data (e.g., starting with only the first 25 responses). These data were read through and general preliminary codes of "favorable" message and "unfavorable" message were created and assigned to individual data based on the valence of the societal message described. This process repeated for each chunked subset of data until all data points had received a preliminary coding. During this process, it was determined that a third code was needed for messages containing both favorable and unfavorable elements. This third code was then applied to all responses meeting these criteria. Preliminary codes were assigned based on each response as a unit. For instance, the message, "Sleep is very important to the human body," was coded as "favorable" using inductive reasoning based on the content of the message stating that sleep is important, therefore highly valued in respect to its function for the human body. Whereas, the message, "If you sleep a lot you are lazy," was coded as "unfavorable" initially using inductive reasoning based on the content of the message highlighting a negative moral judgment associated with the behavior of sleeping a lot. The third

preliminary code was assigned to messages containing both favorable and unfavorable elements. This third code was given to this response, for example:

> I have received societal messages about sleep being something people have to make time for, as in with life distractions such as work, school, relationships, and exercising, sleep is the last thing that people think about. However, I have never been to a doctor's appointment where my sleep habits weren't a topic of question. It is well known that getting the minimum 8 hours of sleep a night is vital to a fully functioning healthy body.

Once preliminary codes were assigned based on responses as a unit, more specific themes were then dissected within each response unit by reading through all responses again and writing down words and phrases that stood out or repeated across messages. Examples included health, social media, 8 hours of sleep, sleep is a luxury, society does not make sleep a priority, lazy, bragging right, bonding, outwork the competition, sleep is essential, and that sleep can be sacrificed. These words and phrases were examined using inductive reasoning to go from specific words and phrases to generalize and identify larger themes representative of the collective meaning of these words and phrases.

Three overarching themes were identified after examining responses at the specific meme level. These included 1) Sleep as a commodity vs. a biological/psychological need, 2) Sleep as a mechanism for bonding people, and 3) Sleep choices determining one's moral value. See Table 1 in Appendix A for example responses for each sub-theme identified. Intercoder reliability was used once the three overarching themes were identified to gain an independent perspective on the goodness of fit of these data to the codes given the exploratory nature of this pilot study. This involved intercoder comparison and discussion with one independent coder not yet familiar to the study or these data. This independent coder was provided with the three proposed themes to the data and was asked to match which responses, either as a whole, or components of a response unit, belonged to which theme. This individual was also encouraged to make note of any

suggestions for themes that could better capture these data. Ultimately, the independent coder found the three proposed themes to be representative of the responses recorded, and matched participant responses to codes similarly as the main researcher had.

This preliminary investigation also examined some additional outcomes related to the societal messages that participants endorsed (Ruggiero, 2020). On average, participants tended to believe the sleep-related messages they received from society to be true (M = 2.11, Range = 1-5, 1 = *very true*, 5 = *very false*), though those endorsing more favorable messages about sleep tended to believe in the message slightly more (M = 1.62, SD = .81) than those endorsing more unfavorable messages (M = 2.73, SD = 1.38). Additionally, participants endorsed that both favorable and unfavorable messages moderately influenced their choices made about their sleeping behaviors (M = 2.33, Range = 1-5, 1 = *strongly agree*, 5 = *strongly disagree*) and participants endorsed feeling neutral regarding whether they experienced feelings of guilt if the message was violated (M = 3.27, Range = 1-5, 1 = *strongly agree*, 5 = *strongly disagree*).

Interestingly, when Pearson correlations were run between these three outcomes for both those who endorsed more favorable messages and those who endorsed more unfavorable messages, there was a significant correlation (r = .39, p < .01) between the extent to which people believed the message to be true and the influence of the message on the choices they made about sleep. There was also a significant correlation (r = .43, p <.01) between the societal message influencing choices about sleep and the extent to which participants experienced guilt when engaging in sleeping behaviors that violated the societal message. However, only among those who endorsed more favorable societal messages about sleep was there a significant correlation (r = .32, p < .01) between the extent to which they believed in the message and the extent to which they endorsed experiencing feelings of guilt when violating the message.

However, this same correlation was not significant (r = .05, p =.66) for those who reported more unfavorable societal messages about sleep. Thus, there appears to be more guilt involved in violating a favorable societal message about sleep the more one believes that message to be true. There appears to be less guilt experienced when violating an unfavorable societal message about sleep.

Sleep Culture

These pilot data helped shed light on the types of societal messages held by college students that embody a sleep culture within the United States. Phrases such as "I'll sleep when I'm dead," have the potential to become individualized values, which represent a larger societal culture that exists pertaining to sleep. When discussing the construct "sleep culture," it is important to highlight the definition of culture since it can take on many divergent meanings depending on the context. According to anthropologists, culture can be defined as, "the shared values, norms, and codes that collectively shape a group's beliefs, attitudes, and behavior through their interaction in and with their environments" (Airhihenbuwa et al., 2015, p. 67). Culture, and the extent to which one accepts a certain cultural value, can have a substantial impact on health, health behaviors, and behaviors more generally, as has been previously demonstrated by other "cultures" that influence certain well-known behaviors and social phenomena. For example, diet culture and the thin-ideal exists within American society and highlights a system of beliefs that idealizes thinness in women and equates it to one's attractiveness, health, and moral virtue, although this ideal is often virtually unattainable and is well-below the weight of the average woman in this culture (Thompson & Stice, 2001). This type of culture surrounding eating and body image is associated with ratings of self-esteem,

negative affect, body dissatisfaction, eating pathology, and disordered eating behaviors (Stice & Shaw, 1994; Thompson & Stice, 2001).

The concept of "sleep culture" is modeled on previously established constructs that tap into systems of beliefs synonymous with the larger culture, such as the thin-ideal construct. That literature has demonstrated how internalizing, the process of adopting messages from the larger "culture" surrounding the ideal body shape and size of a woman, predicts body image and eating behaviors and outcomes. This phenomenon of internalizing a set of beliefs based on a larger culture also occurs for related constructs. For instance, internalization of weight bias, which relates to self-attributions that are often negative and are made based on weight status, stem from a larger culture related to expectations about weight (Durso & Latner, 2012). To this end, we propose that a sleep culture exists in which people can also adopt messages related to shared norms and values about sleep that are transmitted via sociocultural channels, which could then potentially predict attitudes and behaviors related to sleep.

Moreover, there is some evidence that the culture surrounding sleep has shifted over time. We sleep approximately one and a half hours less than our grandparents and great-grandparents did, and the implications of doing so are serious, posing risks for both individual health and public safety (Dement & Vaughan, 2000). It is clear that as time has passed, factors such as one's lifestyle, productivity demands, and increases in technology and light sources at night, may be interfering with sleep, and it is possible that sleep has even generally become less valued in our industrialized society that presents greater demands on the individual.

> People want to have the choice of when to sleep and whether to sleep at all. The feat is within the capability of a culture that learned how to improve fertility in humans, how to prolong their length of life, and how to transplant organs from one body into another, and that now creates new organisms by genetic transfer. A society that can accomplish those things… will undo sleep if it wishes. (Melbin, 1987, pp. 133-134)

Melbin (1987) also described society as simultaneously sleep denying and sleep promoting, with nighttime being colonized by demands (e.g., shift work) as well as pleasures (e.g., night clubs, 24/7 television, the internet). These things, Melbin (1987) noted, do not respect sleep schedules or time zones and instead add a "wide awake" dimension to life even at night. This is in contrast with our biological need for sleep at night when our bodies secrete melatonin in correspondence with light and dark cycles to send a signal that it is time for sleep when the sun sets (Reiter, 1991). Extending our days has many payoffs, both literally and metaphorically speaking. For many, especially within the economics literature, sleep is viewed as "a major expenditure of time" and theoretically fits in with the idea of consumer choice given the time allocation devoted to sleep and subsequent effects on the labor market and productivity (Biddle & Hamermesh, 1990, p. 924). Society sends the message that in order to be more productive, one must forego sleep (Ruggiero, 2020); however, research indicates that the opposite is actually true. Doctors who are sleepy make more mistakes (Ulmer et al., 2009), students who are sleepy perform worse in school, especially during morning classes (Boschloo et al., 2013), and insufficient sleep is linked to worse productivity, performance, and safety outcomes (Rosekind et al., 2010). To compound these views, sleep is often seen as, "a luxury or leisure pursuit that one can indulge in when other demands and commitments allow" (Williams & Boden, 2004, p. 6). For instance, when people were asked what they intended to do with their weekends, vacations, and retirement, many listed sleeping as an, "acceptable and desirable pastime" that they were not able to afford sooner or on a regular basis (Taylor, 1993; Williams & Boden, 2004, p. 6).

Additionally, though prior research in the sleep literature has noted that social and cultural values have traditionally played an important role in determining an individual's health, including predicting sleep, the majority of the research has focused on demographic determinants

of sleep, such as age, gender, race, and socioeconomic status (Knutson, 2013; Ruggiero et al., 2019). For instance, Knutson (2013) proposed that since sleep involves behavior, it should be shaped by culture, but noted how there is a lack of research examining the cultural determinants of sleep. The research that does exist has primarily focused on children's bedtimes (Tynjala et al., 1993) and adult sleep duration (Soldatos et al., 2005) across different countries, though much of these data were collected from outside of the United States. The sleep behavior that has been focused on the most, however, is napping, which is known to vary according to cultural norms and practices. For instance, the practice of the 'siesta', or an afternoon nap, is anecdotally considered to be part of many Mediterranean and Latin American countries. One study found that 90% of 471 adolescents surveyed in Greece reported engaging in siestas, and another study conducted in Brazil found that 72% of adults sampled napped during the day at least once a week (Paraskakis et al., 2008; Reimao et al., 2000). Thus, there is evidence that cultural values regarding sleep should exist within the larger society, but further consideration needs to take place regarding how these larger cultural beliefs about sleep can be transmitted from a macro to a micro level through being adopted by the individual, such as through the process of internalization.

Internalization of Sleep Culture

Internalization can be defined as a dynamic, semiotic, culturally enabled psychological process by which culture becomes mind, and it represents, "the adoption of an influence or value as one's own belief" (Kelman, 1958; Ryan & Connell, 1989, p. 750; Zittoun & Gillespie, 2015). It is, "a continuum in which a social value or regulation is adopted as one's own or identified with" (Ryan & Connell, 1989, p. 750). Therefore, internalization can be conceptualized as the process by which meanings stemming from societal and social structures, social interactions, and

others, are brought over into the individual's thinking, so, "what originally had collective cultural meaning in the interpersonal domain, under the guidance of socially shared interpretations of reality, becomes intrapersonal" (Valsiner & Lawrence, 1997, p. 95). This process has the potential to lead to the creation of new ideas and behaviors, and internalization has been demonstrated for a number of social phenomena, such as the thin ideal, weight bias, stigma (e.g., mental health stigma), sexism, and racism (Bearman et al., 2009; Durso & Latner, 2012; Risher et al., 2003; Speight, 2007, Thompson & Stice, 2001).

Internalized sleep culture (ISC), therefore, describes a process by which individuals internalize and adopt messages from the larger sleep culture (e.g., shared norms, messages, and values about sleep), which are transmitted via sociocultural channels. It represents the transmission of the larger social value system surrounding the practice of sleep to the individual and is based on the perception of others' judgments about value priorities (Rohan, 2000). This process could, in theory, serve as a foundation for engaging in certain sleep behaviors by shaping beliefs and attitudes toward sleep. Conceptually, sleep culture is proposed to be multi-dimensional and consist of three sub-domains: 1) sleep as a commodity versus a biological/psychological need, 2) sleep as a mechanism for bonding people together, and 3) sleep choices determining one's moral value. The first sub-domain describes the contrast between believing in the importance of sleep as a biological/psychological need, versus treating sleep as a luxury or an option or commodity that can be sacrificed for other activities considered to be more important. This domain includes the importance of engaging in healthy sleep hygiene practices, such as avoiding screen time before bed and going to bed at a reasonable hour. Moreover, in order to be seen as more productive and successful in various domains in life, such as work, school, and social life, sleep may be chosen last to get ahead in these other areas.

The second sub-domain relates to how social bonding can occur between people when sharing how much they slept recently (Ruggiero, 2020). This type of bonding can occur via social media, in person, and can include sharing how much or how little one has slept, and how refreshed or tired they feel. This sharing of sleep behaviors serves as a mechanism for bonding people together.

Importantly, it is evident that these various sub-domains of internalized sleep culture reflect an often competing "socially shared interpretations of reality" (Valsiner & Lawrence, 1997, p. 95). On the one hand, American society values health and wellness, to which sleep contributes, but on the other hand, American society also values productivity, independence, and outworking the competition, which often places sleep as a lower priority on a day-to-day basis. Many people pride themselves on being able to 'successfully' function on minimal amounts of sleep, despite the extensive research showing that insufficient sleep actually harms productivity (e.g., Rosekind et al., 2010).

There also appears to be a moral judgment sub-domain of internalized sleep culture. Humans inherently categorize and understand behaviors by labeling and differentiating between "good" and "bad" (Barrett, 2006). As evidenced by the pilot data (Ruggiero, 2020), within this sub-domain individuals assign moral value to themselves and/or others based on internalized beliefs about sleep. For instance, the pilot data indicated that those who reported messages related to valuing sleep as a biological/psychological need experienced increased guilt if their own sleeping behaviors violated this message. Additionally, the pilot data indicated that moral judgements were placed on others who cannot get by successfully with minimal sleep, or chose sleep instead of other activities (e.g., work, socializing).

Therefore, individuals with a higher degree of internalized sleep culture would demonstrate greater evidence of identifying with the various cultural beliefs and messages regarding sleep. This level of internalization could then be broken down according to the three sub-domains that comprise internalized sleep culture, with individuals displaying varying levels of internalization of each sub-domain. How individuals score on each sub-domain of internalized sleep culture would in theory be correlated to other sleep-related constructs such as sleep attitudes, sleep hygiene, and even sleep outcomes (e.g., sleep duration, sleep quality, sleep latency).

Current study

Rationale

Within the sleep literature, sleep can be assessed either objectively or subjectively. Objective sleep measurement includes the assessment of sleep using technology (i.e., polysomnography and actigraphy) that is systematically scored by a trained technician or using an established algorithm to measure sleep duration and quality, as well as one's sleep architecture (polysomnography), which refers to the amount of different stages of sleep and time spent within each stage (O'Donnell et al., 2009). In contrast, subjective sleep measurement is a self-assessment of one's sleep (e.g., sleep questionnaires, sleep diaries), where one's perceptions of sleep can influence the reporting of data. Currently, there is value in subjectively measuring sleep parameters for several reasons. The first reason is for diagnostic purposes (e.g., insomnia severity, such as with the Insomnia Severity Index (Morin et al., 2011), or to identify sleep behaviors that support healthy sleep (such as measures of sleep hygiene)). The second reason is to establish an estimated baseline of one's sleep (e.g., average sleep duration and quality over the last month as assessed by, for example, the Pittsburgh Sleep Quality Index (Buysse et al., 1989)).

A third reason is to track one's sleep as close to "real time" as possible (i.e., using a sleep diary, such as the Consensus Sleep Diary (Carney et al., 2012)), which is beneficial when examining the often bidirectional relationship between sleep and various health/behavioral outcomes. These types of outcomes can also be measured in a more medical setting through the use of objective measures of sleep, such as polysomnography and actigraphy, assessing facets of sleep such as duration, quality, awakenings, latency, and time spent in the various stages of sleep. Because of the nature and required setting for these objective measures, stakeholders within the field of sleep have traditionally included physicians, researchers, and clinicians. However, much of the sleep literature reports subjective data, which may tap into different but important aspects of sleep, including how perceptions of one's sleep may vary from objective measures of sleep parameters (McCrae et al., 2005).

While there is certainly much value in measuring actual sleep behaviors as just noted, there has been substantially less research on the *beliefs and attitudes* toward the act of sleep itself. The first is the Dysfunctional Beliefs and Attitudes Scale (Morin et al., 2007), originally developed for use with older adults, which assesses dysfunctional beliefs about the perceived impact on insufficient sleep. This measure also seems to tap into anxieties related to sleep beliefs that can perpetuate the development of insomnia. The second measure is the Charlotte Attitudes Toward Sleep Scale (Peach & Gaultney, 2017), in which a sleep attitude is defined as, "the propensity to evaluate sleep with some degree of favor or disfavor that is formed, informed, and expressed by cognitive, affective, and behavioral processes" (Peach & Gaultney, 2017, p. 23). This definition also factors in how sleep is both a biological need and a choice. While these measures make an important step forward by recognizing that individuals should be assessed on dysfunctional beliefs towards sleep, as well as on how favorable individuals rate the act of

sleeping, neither of these measures explicitly tap the extent to which one has internalized the societal messages received about sleep.

Though internalized sleep culture is expected to correlate with sleep attitudes (as conceptualized and measured by Peach and Gaultney, (2017), the construct of sleep attitudes broadly captures degrees of favorability and unfavorability toward certain aspects of sleep, and it does not theorize or capture the formation process of attitudes themselves. In contrast, internalized sleep culture can be thought of as the precursor to attitudes about sleep, that formation process derived by the process of internalizing societal level messages about norms and values related sleep that are transmitted through various sociocultural channels, essentially at the "meme" level of communication. This theory is supported by the value-attitude-behavior model or hierarchy proposed by Homer and Kahle (1988). This model proposed that, "values are similar to attitudes in that both are adaptation abstractions that emerge continuously from the assimilation, accommodation, organization, and integration of environmental information" (p. 638). Values, or in this case, values and norms related to sleep that can become internalized within the individual, serve as an abstract social cognition that serve as prototypes from which attitudes, and subsequently behaviors, are produced (Homer & Kahle, 1988).

Ultimately, it was important to develop a construct and a scale to measure internalized sleep culture. This internalization process related to values about sleep, as well as other constructs (e.g., productivity, belongingness) that may compete or interfere with sleep, which are embedded within societal messages about sleep, has the potential to act as a precursor to subsequent attitudes and behaviors related to sleep. For example, thin ideal internalization is an important causal risk factor for body dissatisfaction and bulimic symptoms (Thompson & Stice, 2001), demonstrating how values related to the thin ideal are internalized, attitudes are formed,

and behaviors are influenced. Thus, internalized sleep culture is theorized to predict subsequent sleep attitudes, behaviors, and outcomes. Determining the degree of internalized sleep culture could not only elucidate its effects on an individual level, but also help us to understand the role of societal messages about sleep at a more macro level. Understanding the larger role of internalized messages about sleep might serve as an important risk factor in predicting certain sleep parameters, especially negative ones, which are associated with numerous health and safety outcomes. Sleep loss has been deemed a public health concern, which makes understanding the incorporation of societal messages about sleep into the self crucial in potentially preventing adverse outcomes associated with sleep loss.

Study Aims

Therefore, the present study aimed to address these gaps identified within the sleep literature by developing and piloting a scale with which to measure the newly conceptualized construct of internalized sleep culture. The present study described an initial validation of the construct and scale for internalized sleep culture using the standard processes of scale development (Clark & Watson, 1995; Crocker & Algina, 1986; DeVellis, 2003). This construct was theorized to strongly correlate with measures of sleep attitudes, hygiene, latency, quality, and duration. A higher degree of internalized sleep culture (i.e., indicative of more "unfavorable" values related to sleep), either broadly or broken down by subdomain, was expected to strongly correlate with more unfavorable sleep attitudes, poorer sleep hygiene, shorter sleep duration, poorer sleep quality, and longer sleep latency, demonstrating evidence of convergent validity (see Figure 1 for conceptual model). Whereas, to demonstrate discriminant validity, internalized sleep culture was hypothesized to have a weak association with social desirability, a construct that should in theory have a weak relation with internalized sleep culture broadly.

Therefore, the study aims were:

Aim 1: Develop, pilot, and refine the psychometric properties of a new scale assessing internalized sleep culture.

Aim 2: Evaluate the construct validity of the new Internalized Sleep Culture scale (ISCS) via factor analyses.

Aim 3: Test convergent validity via examination of the correlation between internalized sleep culture and the proposed nomological network, including sleep attitudes, sleep hygiene, sleep duration, sleep quality, and sleep latency, and test discriminant validity via examination of the association between internalized sleep culture and social desirability.

CHAPTER 3: MEASUREMENT DEVELOPMENT PROCESS

Methodology: Study 1

Participants

Participants were recruited from Amazon's Mechanical Turk (MTurk), an online participant recruitment site/crowdsourcing platform available to registered participants across the world. MTurk recruitment has been demonstrated as more nationally representative and diverse in comparison to data collected via college samples and are viewed as reliable as traditional methods of data collection (Buhrmester et al., 2011). Data were collected from a national sample of 300 adults, who were at least 18 years of age, proficient in English, currently resided in the United States and have done so for the majority of their life (i.e., less than 10 years lived outside of the U.S.).

Materials

Demographic questions included age, gender, race, ethnicity, whether participants were born in the United States, how long participants have resided in the United States, and the impact of COVID-19 on sleep outcomes (e.g., duration, quality, bed/wake times). Additionally, the initial version of the Internalized Sleep Culture Scale (ISCS) was utilized during this first study.

Procedure

Item Generation and Scale Development. The scale for the construct internalized sleep culture was developed using the standard process of scale development and according to measurement theory (Clark & Watson, 1995; Crocker & Algina, 1986; DeVellis, 2003). Items were created based on the proposed components of the construct conceptualization of internalized sleep culture and were also informed by the exploratory qualitative data collected in a sample of adults and emerging adults (Ruggiero, 2020). Additionally, to establish test

specifications, existing internalization scales were referenced to identify common assessments of internalization. All of these scales utilized a closed-item typical performance test style and a Likert-type response format.

Thus, the ISCS was also formatted as a typical performance measure, consistent with measures designed to assess attitudinal constructs, including previously validated internalization scales. A closed response format was chosen for the ISCS through the use of a 5-point Likert-type scale, ranging from 1 = *strongly disagree* to 5 = *strongly agree* with scores averaged to create a total score, with higher scores indicative of a higher degree of internalized sleep culture. Given the theorized multidimensional nature of the ISC construct, responses also generated three subscales with higher scores indicating a higher degree of internalization related to sleep as a commodity, sleep as a mechanism for bonding, and as a basis for moral judgments related to sleep. Averaging items to calculate a total score provides two advantages: 1) an average total score is less sensitive to missing data compared to a summed total score, and, 2) an average total score helps to preserve the original response scale (1 = *strongly disagree* to 5 = *strongly agree*) and allows for easy interpretation of the total score compared to the item anchors.

Content Validation. Next, an initial item pool was generated (see Appendix C for initial item pool). Items were developed using a formative, bottom-up method, with the manifest indicators informing the construct conceptualization due to the inherent novelty of the construct at hand. Behaviors and beliefs stemming from direct observation of the larger sleep cultures that exist in society were created into items, as well. Wording of items was also informed by previously validated scales measuring internalization of other cultural phenomena. A total of 42 items were generated during this phase.

Content validity, or the degree to which the items on a test are representative of the entire construct domain the test seeks to assess, was then evaluated (Salkind, 2010). Subject matter experts (SMEs) examined scale items to provide content validation of items relating to the hypothesized construct of internalized sleep culture. Items were reviewed and rated in terms of relevancy to the construct, classification of the item based on sub-domain, redundancy of items, and overall clarity of instructions and items. SMEs consisted of four individuals, with two content experts, which consisted of one internalization expert and one sleep expert, and two "measurement experts," which consisted of individuals well-versed in psychometrics. A content validation form was created (Appendix D) that provided construct definitions for *sleep culture, internalization, and internalized sleep culture,* including a description of the three sub-domains of the internalized sleep culture (ISC) construct. Based on the construct definitions provided, the SMEs were then asked to identify which sub-domain they believed each item was measuring. Next, the SMEs rated the relevancy of each item as either "irrelevant," "partially relevant," or "relevant," with the option to include a comment for why they rated an item as "partially relevant" or "irrelevant." Lastly, the SMEs were asked to mark any items that were unclear or otherwise difficult to read and to provide comments of any issues related to item construction, redundancy, clarity, or possible contamination (e.g., measuring behaviors outside of the intended construct), all of which would negatively impact content validity.

There was reasonable agreement among SME ratings of which domains were measured by each item. There were several criteria used to remove items from the initial 42 item pool. Items were retained only if all SMEs rated the item as "relevant" and agreed on the domain the item belonged to. The only exception to this standard was if the item could be revised in a way to address the SME's concern(s) to make the item more relevant, consistent with domain criteria,

and/or generally clearer. Seven items were rated as "partially relevant," and two items were rated as "irrelevant." A total of nine items were removed based on this procedure, and one item was removed for redundancy, resulting in a 32-item pool. Following initial examination of items, SMEs re-examined remaining items as a group to confirm or provide feedback as to whether the pool of items were missing anything reflective of the ISC construct definition provided; however, no areas of deficiency were noted. Thus, the next phase of pilot testing utilized the 32-item scale as determined by the SMEs (the scale used for Study 1 is presented in Appendix E).

Pilot Testing. Next, items were piloted to a sample of adults, who were at least 18 years of age, able to read and write in English, and resided in the United States. Participants were recruited via Amazon's Mechanical Turk (MTurk), and CloudResearch, a paid crowdsourcing platform that allows researchers to only recruit MTurk workers who pass a number of quality and effort checks, was also used. A recruitment advertisement was posted on MTurk where interested MTurk workers could complete a questionnaire via Qualtrics. Participants were compensated for completing the survey. This sample of adults collected via MTurk completed demographic questions and the measure on internalization of sleep culture. Pilot testing included the examination of item endorsement rates, item variability, exploratory factor analysis, and internal consistency.

In addition to demographic questions and the ISCS, participants also completed the 13-item Marlow-Crowne Social Desirability Scale – short form (M-C SDS; Reynolds, 1982) to ensure that responses were not motivated by social desirability. This short form is modeled on the original scale developed by Strahan and Gerbasi (1972). It is psychometrically similar to the original scale (r = .93) with one third the number of items. Participants were provided 13 true/false statements that reflect common but undesirable behaviors (e.g., "I like to gossip at

times") or uncommon but desirable behaviors (e.g., "I'm always willing to admit it when I make a mistake") and asked to indicate their level of agreement/disagreement. Responses that signal a socially desirable response earn 1 point, with 13 total points possible (one for each item). Items were then summed, with higher scores indicate a greater social desirability, which could then indicate that responses on other measures were answered in a socially desirable manner and may be invalid.

Plan of Analysis

Following administration of the ISCS items to a broad sample of adults, an Exploratory Factor Analysis (EFA) with maximum likelihood extraction with an oblique rotation was be performed to determine to examine the factor structure of the scale, with the expectation of a multidimensional model. The factor structure was determined based on eigenvalues (>1.0) and scree plots provided in the EFA output and the best fit model were selected that displayed parsimony, yet completeness, in the factor structure of the scale. The results from the EFA were used to inform any revisions necessary to the ISCS for the re-administration of the scale in a revised version for Study 2.

Results: Study 1

Prior to conducting any item analyses, these data were cleaned to confirm that all responses were within the valid range (e.g., between 1-5 for scales that required such a response range), and to ensure all participants passed the checks embedded within the survey. These checks assessed for English proficiency, participant attention (e.g., "Please select the last answer for this question."), and to catch any potential bots that passed CloudResearch's engagement and participation checks. One participant was removed during this phase for failing to pass these checks. Missing data were also assessed, with any participants missing more than 3% removed

prior to data analyses, though no participants met these criteria (Van den Broeck et al., 2005). Based on these criteria, 299 participants remained, and their data were used for analyses. Approximately half of participants identified as male (50.8%), the mean age of the sample was 40.26 years old (*SD* = 12.22), and majority of participants identified as White (88%) and not Hispanic or Latino (93.3%).

Next, item endorsement rates (means), item variability (standard deviations), item discrimination (corrected item-total correlations), and item-level internal consistency (item-corrected alphas) were examined. Negatively worded items (Items 2, 20, 24, and 31) were reverse coded prior to item evaluation, such that higher scores for these items indicated a higher degree of internalized sleep culture.

Item endorsement rates were examined by calculating the mean response value for each item (Clark & Watson, 1995; Crocker & Algina, 2008). The ISCS has a five-point Likert-type scale, such that a moderately endorsed item should have an average response of about 3, which falls close to the middle of the scale. Means near extreme anchors of the response scale suggest that the item is failing to detect certain values of the construct, or that the item was not worded strongly enough (DeVellis, 2003), and endorsements falling at either extreme can indicate floor or ceiling effects. Cut offs for the present study were means between 2.0 and 4.0, with any items with average values falling below 2.0 or above 4.0 removed (Whitley & Kite, 2013). Item variability rates were also examined simultaneously with item endorsement rates. Variability was assessed by computing standard deviations for each item. Sufficient variability in item responses was needed in order to capture differences between individuals with varying levels of internalization. Any items with a standard deviation less than 0.9 were removed due to low variability (Whitley & Kite, 2013).

Next, item discrimination and item-level internal consistency were computed. Item discrimination examines how well scale items can differentiate between individuals who are high or low on the given construct the scale is measuring (Crocker & Algina, 1986). This was performed by computing corrected item total correlations, which correlate item scores with the total score of all other items (DeVellis, 2003). Item-total correlations should be greater than or equal to 0.2 and positive, which were used as the metrics for removing items in the present study should they not meet these criteria (Clark & Watson, 1995). Lastly, item-level internal consistency was calculated to identify the degree of homogeneity among the items on the scale tallied according to the average item-to-item correlation. This is done by comparing the Cronbach's alpha (α) of the entire set of items to a "corrected" alpha that would be the new alpha should a particular item be removed from the scale. If the corrected alpha is substantially higher than the original alpha calculated, the item in question is thought to be measuring a different source of systematic variance compared to the rest of the item pool, and should subsequently be removed to ensure the scale is accurately able to capture the construct of interest.

Item-level analyses resulted in removal of several items from further analyses (see Table 2 in Appendix G for item-level descriptive statistics). A total of 11 items were removed during this phase (Items 1, 5, 6, 10, 18, 20, 21, 25, 28, 29, and 32), resulting in a 21-item scale, as compared with the original 32 item scale used during pilot testing. Items 1, 5, 6, 10, 18, 20, 28, and 29 did not meet the necessary cut off scores for item endorsement rates and item variability. Items 1, 5, 10, and 20 failed both of these analyses ($M < 2.0$, $SD < .9$); items 6, 18, 28, and 29 passed item variability cut offs, but failed item endorsement rate cut offs ($M < 2.0$). Items 21, 25, and 32 had corrected item-total correlations that fell below the r_{it} greater than or equal to 0.2 cut off. All items that failed these analyses were excluded from further analyses.

Next, item-level internal consistency was assessed during this phase. Cronbach's alpha for the resulting 21-item ISCS was 0.918. There were no items that significantly impacted Cronbach's alpha were they to be removed; therefore, the 21-item scale was retained for the next phase of analyses.

Following item-level analyses, the factor structure of the remaining 21 items was examined. Exploratory Factor Analysis (EFA) using maximum likelihood extraction with oblique rotation was conducted on the revised 21-item scale. SPSS version 27.0 (SPSS, Inc., Chicago, IL) was used to conduct the EFAs. Given the construct conceptualization for ISC and the likely correlation between the theorized subdimensions, an oblique rotation was chosen, which allows factors to correlate, unlike other rotation options (i.e., orthogonal) (Fabrigar et al., 1999). EFA examines the factor structure underlying the set of items and assesses the degree to which the items load onto a common factor (Crocker & Algina, 1986). While three dimensions were theorized to encompass the overarching construct of Internalized Sleep Culture, exploratory factor analysis determines if factor structures are unidimensional or multidimensional and help identify common themes among item groupings to help generate more precise factor labels (DeVellis, 2003).

First, eigenvalues were examined, which reflect the total amount of variance and information that is accounted for by a specific factor (DeVellis, 2003), and eigenvalues must be ≥ 1.0. Four eigenvalues above 1.0 were found, accounting for 60% of the total item variance, indicating there was a maximum of four factors possible for this scale. Eigenvalues of 8.50, 3.44, 1.66, and 1.01 were found initially for one to four factor models, respectively. Examining eigenvalues also helps determine the minimum number of possible factors required to explain at least 50% of the total item variance, which in this case was two factors (accounting for 50% of

the variance). Additionally, though four factors had eigenvalues > 1, factor four was only 0.65 below factor three, indicating that little variance is gained by the presence of a fourth factor. Next, the scree plot was examined. This plot is useful for having a visual representation of the amount of information captured by each factor in sequential order. The scree plot demonstrated that while four factors were the maximum number determined by eigenvalues, there appeared to be little benefit from a fourth factor, only adding an additional 3.5% in variance and demonstrating a "leveling off" effect on the plot, showing that its eigenvalue (1.01) was similar to factors five (0.94) and beyond. Additionally, this was confirmed once the "elbow" of the plot was determined to be at factor three, meaning that only factors to the left of the elbow are considered to be best fit in regard to how much information they provide. Thus, based on this phase of exploratory analyses, a three-factor structure or less appeared to be the most appropriate for the scale. However, all analyses with more than one factor specified yielded fairly substantial cross-loadings across factors (i.e., loadings of approximately .3 or more on two or more factors), which defies the goal of having a simple structure. These cross-loadings could also indicate that the scale could be better suited as being conceptually unidimensional, instead of the theorized multidimensional structure consisting of three factors. Alternatively, cross-loadings may indicate there is a "higher order" factor present, allowing the "subfactors" to correlate to an extent. As a result, three, two, and one factor EFA models were examined to determine the best factor structure moving forward (see Tables 2-4 in Appendix G for factor loadings for these models). A three factor model accounted for half as much variance as a two factor model, while a one factor model accounted for more than double the variance of a two factor model. Additionally, a three factor model demonstrated significant cross-loadings across the three factors, with the items thought to load onto third proposed factor (moral judgement) in fact loaded quite poorly onto this

factor, with most items loading < .30. Thus, it appeared that a three-factor model, though initially plausible, actually appeared to fit these data quite poorly. A two factor model was examined more thoroughly next. Again, this yielded substantial cross-loadings across the two remaining factors of commodity and bonding, though items frequently loaded better onto their hypothesized factor than the other. However, given the fairly substantial cross-loadings that still remained across two factors, a one factor model was also examined, which demonstrated loadings >.30, with most >.50, for one factor representing internalized sleep culture broadly.

When further examining the cross-loadings, most of the items loaded most strongly onto a one factor model (internalized sleep culture broadly), and also in some cases a two factor model (consisting of subdomains of sleep as a commodity vs. biological/psychological need, and sleep as a mechanism for bonding). The presence of a third factor (moral judgments related to sleep), while originally conceptually part of internalized sleep culture, did not demonstrate an empirical benefit. Therefore, two possibilities likely exist. First, it is possible that a one factor model, a single global internalized sleep culture factor, may be most parsimonious while also demonstrating completeness by accounting for a fairly substantial amount of variance itself. Selecting this model would capture ISC broadly and eliminate the cross-loadings that occurred when testing beyond a one factor model. However, it could also be that the scale has one strong higher-order factor (i.e., internalized sleep culture broadly) that helps explain the correlations among the items, but also has two smaller, lower-order factors (i.e., sleep as a commodity vs. biological/psychological need and sleep as a mechanism for bonding) since those two factors, while still having cross-loadings, demonstrated the strongest factor loadings according to the items hypothesized to fall onto each factor. Thus, the Confirmatory Factor Analysis in Study 2

was a competing models approach, comparing a single global factor model to a two-factor higher order model.

CHAPTER 4: VALIDATION PROCESS

Methodology: Study 2

Participants

Participants in Study 2 consisted of 369 adults recruited via MTurk. Of an initial 380 participants, nine failed the embedded bot, English proficiency, and/or attention checks, while two participants did not fully complete the survey and had > 3% of data missing. Thus, eleven responses were removed during initial data cleaning, resulting in 369 total participants for analyses. All participants were at least 18 years of age and resided in the United States. Participants were recruited in the same manner as participants from Study 1 via MTurk.

Materials

All demographic questions and social desirability questions from Study 1 were also included for Study 2 to assess discriminant validity. Additionally, the 21-item revised version of the ISCS was administered to participants. Sleep measures were included for Study 2 to examine the convergent validity of the ISCS with its theorized nomological network.

Measures

Sleep Attitudes. Sleep attitudes were measured using the Charlotte Attitudes Towards Sleep Scale (CATS; Peach & Gaultney, 2017). This 10-item measure includes two dimensions of sleep attitudes (sleep benefits/enjoyment and sleep as a time commitment) and responses range from 1 (strongly disagree) to 7 (strongly agree). Any items that explicitly mentioned “school” in the wording were edited to also include work given the sample was not targeted toward college students (i.e., item 4). Items that are negatively worded (i.e., indicating more unfavorable attitudes towards sleep) were reverse coded. Then, items were averaged, so that higher scores indicate more favorable attitudes towards sleep. Prior research has demonstrated reasonable

internal consistency (α =.79-.86) for the total scale (Peach et al., 2018; Ruggiero et al., 2019). Cronbach's alpha for the present study was α = 0.72, with a mean score of 5.08 (*SD* = 0.85).

Sleep Hygiene. Sleep hygiene behaviors were measured using the Sleep Hygiene Practice Scale (SHPS; Lin et al., 2007). The SHPS consists of 30 items assessing four sleep hygiene domains: arousal-related behaviors, sleep scheduling and timing, eating/drinking behaviors, and sleep environment. Participants were instructed to rate how frequently they engage in each practice. Responses range from 1 (never) to 6 (always). Items were then summed, consisting of four subscales and a total score, with scores able to range from 30-180. Higher scores indicate poorer sleep hygiene. Prior research has demonstrated reasonable internal consistency (α = 0.86) (Peach et al., 2018). For the purposes of the present study, only the total score was examined to assess for global sleep hygiene practices. Cronbach's alpha for the present study was α = 0.94, with a mean score of 81.28 (*SD* = 26.90).

Sleep Outcomes. Subjective sleep quality was measured using the Patient Reported Outcomes Measurement Information System – Sleep Disturbance – short form scale (PROMIS v 1.0, 8a; Cella et al., 2010). The PROMIS short form scale consists of eight items to assess sleep quality over the past seven days in adults 18 years of age and older. Sleep quality can be defined as difficulty initiating sleep, maintaining sleep, and perceived restfulness of sleep (Buysse et al., 1989; Cella et al., 2010). Sleep quality is generally how "well" one sleeps, it includes the depth and restoration of sleep, and better sleep quality consists of fewer sleep disturbances (Cella et al., 2010). The PROMIS Sleep Disturbance short form has a 0.96 correlation with the original PROMIS Sleep Disturbance scale, which consists of 27 items (Cella et al., 2010). Items are rated on a scale from 1 "not at all" to 5 "very much" (e.g., My sleep was restless") and any negatively worded items (items 2, 3, 7, and 8) were reverse coded. Then, items were summed and converted

from a raw score to a T-score, with higher scores indicative of poorer sleep quality and more severe sleep disturbances. To capture the discrepancies often found between weeknight and weekend sleep, with a greater discrepancy predictive of negative outcomes such as poorer work performance, poorer grades in school, and a reduced regulatory response and reward sensitivity (Gaultney, 2014; Hasler et al., 2012; Wolfson & Carkskadon, 1998), the scale was revised for the present study to include eight questions specifically pertaining to *weeknight* sleep and another eight questions specifically pertaining to *weekend* sleep. Average scores for weeknight sleep were 25.51 (*SD* = 7.77, range 8-39), with a highest possible score of 40. Overall, the average raw score converted to a T-score that was indicative of "mild" sleep disturbances (possible options included none to slight, mild, moderate, and severe sleep disturbances based on T-scores calculated). Additionally, average scores for weekend sleep were 23.22 (*SD* = 7.80), with the range 8-39. The average raw score, once converted to a T-score, was reflective of "none to slight" sleep disturbances on weekends. Cronbach's alpha for the present study was $\alpha = 0.85$ (weeknights), and $\alpha = 0.82$ (weekends), consistent with prior studies using this measure (Yu et al., 2011).

Open-ended questions pertaining to sleep duration and sleep latency were also added to the PROMIS scale for the present study since the scale did not directly assess for these constructs but are important sleep outcomes to measure. Sleep duration is defined as the total amount of sleep obtained at night, which may be different than the total number of hours spent in bed (Buysse et al., 1989). Sleep latency is defined as the amount of time it takes one to initially fall asleep once in bed. Thus, one question was added in which participants self-report the number of hours of sleep they received per night, on average, over the past seven days, as well as the average length of time it took them to fall asleep each night over the past seven days. These

questions were broken into a response to assess for weeknights and weekends over the past seven days. On average, participants received 6.82 hours of sleep on weeknights (*SD* = 1.26, range 4-11) and 7.53 hours of sleep on weekends (*SD* = 1.36, range 4-12). Regarding time it took to fall asleep, it took participants on average 27.43 minutes on weeknights to fall asleep (*SD* = 25.16, range 0-180) and 26.37 minutes on weekends to fall asleep (*SD* = 25.01, range 0-180).

Social Desirability. The 13-item Marlowe-Crowne Social Desirability Scale – short form (M-C SDS; Reynolds, 1982) was administered to assess social desirability in participants. This short form is modeled off the original scale developed by Strahan and Gerbasi (1972). It is psychometrically similar to the original scale (*r* = .93) with one third the number of items. Participants were provided 13 true/false statements that reflect common but undesirable behaviors (e.g., "I like to gossip at times") or uncommon but desirable behaviors (e.g., "I'm always willing to admit it when I make a mistake") and asked to indicate their level of agreement/disagreement. Responses that signal a socially desirable response earn 1 point, with 13 total points possible (one for each item). Items were then summed, with higher scores indicate a greater social desirability. Cronbach's alpha for the present study was $\alpha = 0.75$, consistent with previous studies (Reynolds, 1982).

Procedure

All questionnaires were administered to a second, independent sample of adults via MTurk, all of whom were at least 18 years of age, able to read and write in English, currently resided in the United States and have done so for the majority of their life (i.e., less than 10 years lived outside of the U.S.). Participants answered demographic questions, social desirability questions, the revised ISCS, as well as self-report questions related to sleep outcomes, including

sleep attitudes, sleep hygiene, sleep duration, and sleep quality. Participants were compensated for completing the survey.

Plan of Analysis

Following the EFA that was conducted in Study 1, a Confirmatory Factor Analysis (CFA) was performed using this second, independent sample to determine how well these data fit the potential factor models selected from the EFA. The comparative fit index (CFI), Tucker-Lewis Index (TLI) and root mean square error of approximation (RMSEA) were examined to determine the best fit of these data. Items were removed during CFA as needed to determine best fit for the pre-selected factor structure and the scale was revised accordingly. Convergent and discriminant validity were also assessed via correlations between the ISCS and the sleep outcomes measured, and via the association between ISCS and social desirability, respectively.

Results: Study 2

Data were collected from 380 participants initially. Prior to beginning analyses, data were examined to ensure participants passed bot, English proficiency, and/or attentional checks, which were the same ones used during Study 1. Additionally, data were examined to ensure that all responses were within a valid range (e.g., sleep duration hours), and missing data were also assessed, with any participants missing more than 3% to be removed prior to data analyses (Van den Broeck et al., 2005). Based on these criteria, eleven participants were removed from the data set prior to analyses, resulting in 369 participants.

Nearly half of the participants identified as male (55%), were an average age of 39.88 years (SD = 11.51), and the sample was predominantly White (83.7%) and not Hispanic or Latino (93.2%). Detailed demographic information is presented in Table 5 (Appendix I).

In line with standard practice related to scale development, item analyses were replicated using the revised version of the ISCS. All items are numbered according to their item number found in the revised ISCS for Study 2 (see Appendix F for scale). Item endorsement rates (i.e., mean), item variability (i.e., standard deviation), item discrimination (corrected item-total correlations), and item-level internal consistency (item-corrected alphas) were examined. Additionally, negatively worded items (Items 1, 17, and 21) were reverse coded prior to item evaluation, such that higher scores for these items indicated a higher degree of internalized sleep culture.

All 21 items displayed moderate endorsement rates (i.e., means between 2.0 and 4.0), demonstrating the lack of floor or ceiling effects for any items. Similarly, all items had sufficient variability in responses, with standard deviations greater than or equal to 0.9. Next, item discrimination was assessed, with all corrected item-total correlations falling above the greater than or equal to 0.2 cutoff, with all corrected item-total correlations falling between 0.34 and 0.71. Lastly, item-level internal consistency was computed, and the Cronbach's alpha for the 21-item scale was 0.92. There were no items that markedly impacted Cronbach's alpha, such that removing them from the scale would improve the overall internal consistency. Thus, all 21-items of the revised ISCS were retained for the next phase of analyses.

Factor Analyses

Next, a confirmatory factor analysis (CFA) was conducted (SPSS AMOS v.27.0; SPSS, Inc., Chicago, IL) to confirm the underlying factor structure of the ISCS that was identified in Study 1 based on the exploratory factor analysis (EFA) findings. At that time, it was decided that the CFA would focus on a competing models approach based on the two potential models identified based on the EFAs: a two-factor higher order model (one higher order factor

representing ISC globally, and two lower order factors for commodity and bonding) versus a single global factor model (ISC broadly). The purpose of this competing models approach was to examine whether the added complexity of the presence of two lower order factors added anything to the fit of the model. Ultimately, goodness of fit and the principle of parsimony within scale development theory were tested simultaneously.

All participants from Study 2 ($N = 369$) were included in the CFAs since all participants had complete data on the ISCS. The first model examined was the single global factor model. Upon crafting this one-factor model in AMOS, the minimum discrepancy per degrees of freedom, the Comparative Fit Index (CFI), the Tucker Lewis Index (TLI), and the Root Mean Square Error of Approximation (RMSEA) were all examined to evaluate the fit of the model. The following cut offs were used to evaluate how well a predetermined factor model fit the empirical data: $\chi 2/df < 3.0$, CFI ≥ 0.9, TLI ≥ 0.9, and RMSEA ≤ 0.07 (Hooper et al., 2008; Hu & Bentler, 1999; Steiger, 2007). Additionally, individual factor loadings for each item should ideally be ≥ 0.7, demonstrating that each individual item fits well with the proposed factor structure.

Upon initially testing this one-factor model with the 21-item revised scale, individual factor loadings ranged from 0.32-0.77, with some individual items meeting or exceeding the cut off, though many items either slightly or significantly fell short. Additionally, all fit indices did not meet the necessary cut offs, $\chi 2/df = 11.45$, CFI = .589, and TLI = .543, and RMSEA = .169, indicating that this one-factor model fit the empirical data poorly. When looking at the individual factor loadings, a number of items had very poor loadings onto the ISC construct (all <0.5). These items were removed from the scale in an attempt to see if the removal of those items were bringing the factor loadings of the whole scale down, resulting in a 12-item scale (items 2, 3, 4,

6, 7, 8, 9, 11, 15, 16, 18, 19). Upon making these changes, the overall one-factor model was still not a good fit (χ_2/df = 15.61, CFI = .716, and TLI = .653, and RMSEA = .199). Though the individual factor loadings showed a slight improvement, with seven items having loadings >.7 from this change, resulting in a seven-item scale (items 3, 4, 6, 8, 11, 16, 18; all part of the originally conceptualized "bonding" factor). However, the overall fit of this single factor model actually worsened with fewer items, despite a single factor scale with more items also having a poor fit. Therefore, a single global factor model may not be the best fit for these data.

Next, the two factor higher order model was examined using CFA. Considering the hypothesized correlation between the commodity and bonding subdomains of internalized sleep culture, when constructing the CFA, the latent factors in the model were allowed to correlate with one another. Given that they were, in fact, correlated (r = .57), a higher-order model was created, such that an overall, global Internalized Sleep Culture factor was specified within the model, followed by the two lower-order factors for commodity and bonding. The commodity factor initially had 11 items, and the bonding factor initially had 9 items. Item 20 was removed from analyses since it was originally theorized to be part of the moral judgment factor that was not being tested. Initial individual factor loadings ranged from 0.32-0.83. Fit indices reflected a significantly better fit than the prior one-factor model, χ_2/df = 6.82, CFI = .572, and TLI = .544, and RMSEA = .121, though still falling slightly short from the cut offs indicated previously. Items 1, 5, 10, 12, 14, and 17 were removed based on factor loadings <.7. Upon re-running the CFA with those items removed, items 13 and 21 now had factor loadings <.7 and they were removed.

When the CFA was re-run, results indicated that a two-factor higher order model consisting of 12 items (items 2, 3, 4, 6, 7, 8, 9, 11, 15, 16, 18, 19) divided between a commodity

factor and a bonding factor within the overall construct of internalized sleep culture was a better fit for the empirical data (χ_2/df = 3.02, CFI = .948, and TLI = .935, and RMSEA = .08). Of the retained 12 items, five were included within the *sleep as a commodity vs. biological/psychological need* factor (items 2, 7, 9, 15, and 19), and seven were included within the *sleep as a mechanism for bonding* factor (items 3, 4, 6, 8, 11, 16, and 18). All items had factor loadings >.7 and fit did not improve with removal of additional items. Therefore, it appeared that a two factor higher order model outperformed a single global factor model regarding goodness of fit of these data while also remaining parsimonious. See Table 6 in Appendix I for factor loadings for the retained items and see Figure 2 for a depiction of the two factor higher order model.

Once the final 12 items identified in this selected model, corrected-item total correlations and internal consistency were re-calculated. Corrected item-total correlations indicated acceptable discrimination, with values ranging from .68 to .79 (Clark & Watson, 1995). Cronbach's alpha for the overall ISCS was .92, indicating good internal consistency, and each subdomain also had good internal consistency (α = .90 for Commodity, α = .91 for Bonding), all exceeding the minimum alpha cut off of .7 to demonstrate acceptable internal consistency (Mallery & George, 2003).

Validity Analyses

Finally, convergent and discriminant validity analyses were performed using the final selected 12-item scale. Convergent validity, or the extent to which two measures that should theoretically be related in hypothesized directions and magnitudes, are in fact related, was examined by correlating internalized sleep culture with the variables within its theorized nomological network, including sleep attitudes, sleep hygiene, sleep duration, sleep quality, and

sleep latency. Medium to large associations were hypothesized for correlations in both positive (sleep hygiene, sleep quality/disturbances, sleep latency) and negative directions (sleep attitudes and sleep duration). Discriminant validity, or constructs that theoretically should not be related, are in fact not related, was assessed by correlating internalized sleep culture and its subscales with a measure of social desirability, a construct theorized to be conceptually distinct from internalized sleep culture. Evidence of discriminant validity was found if scores on internalized sleep culture were weakly correlated with social desirability.

Consistent with the hypotheses for convergent validity analyses, global internalized sleep culture scores were significantly associated with all sleep constructs within the theorized nomological network, ranging from small, medium, and large (*r*'s 0.22 to 0.67, $p < .05$) associations in the hypothesized directions (see Table 7 in Appendix I for a detailed correlation matrix). A higher total score on the Internalized Sleep Culture Scale was associated with less favorable sleep attitudes, poorer sleep hygiene behaviors, and longer sleep latency, shorter sleep duration, and poorer sleep quality for both weeknights and weekends. Additionally, scores on both the Commodity and Bonding subscales were significantly associated with all sleep constructs within the nomological network, demonstrating small, medium, and large associations (*r*'s 0.19 to 0.61 for Commodity; *r*'s 0.16 to 0.58 for Bonding, $p < .05$) in the hypothesized directions, consistent with hypotheses and findings for the global ISC score.

Additionally, consistent with the hypothesis for discriminant validity analysis, global ISC, as well as the commodity and bonding subscales, were weakly correlated (*r's* -.10 to -.11), indicating a weak negative association between internalized sleep culture and social desirability, suggesting evidence of discriminant validity. Higher reports of internalized sleep culture were weakly associated with lower scores on a measure of social desirability.

Hypotheses regarding anticipated associations between the ISC subscales were also examined. The commodity and bonding subscales were expected to demonstrate a medium to large positive association, such that an individual who scored high on internalized sleep culture related to sleep as a commodity would also likely score high on internalized sleep culture related to sleep as a bonding mechanism given the proposed higher order factor structure to the scale. Indeed, a large positive association (r = .57) between the commodity and bonding subscales was found, consisted with initial predictions.

CHAPTER 5: DISCUSSION

The present dissertation study aimed to conceptualize a novel construct titled "Internalized Sleep Culture," (ISC) including developing its theoretical base and associated nomological network, which consisted of previously established constructs of sleep attitudes, sleep hygiene, sleep latency, sleep quality, and sleep duration. Additionally, the aim was to then develop, pilot, and refine the psychometric properties of a new scale assessing this new construct. The theory behind internalized sleep culture, as well as the initial construction of the scale, were informed by pilot data collected from young adults assessing broader messages about sleep within American society, as well as examining gaps within the current sleep literature as it pertains to the definition of culture used within this study and observable norms and anecdotes seen within social channels pertaining to sleep. These processes yielded a general internalized sleep culture construct consisting of three proposed subdomains: 1) sleep as a commodity vs. a biological/psychological need, 2) sleep as a mechanism for bonding, and 3) moral judgments related to sleep.

Next, a 42-item pilot scale was created and edited according to feedback by sleep and scale development subject matter experts, who evaluated the content validity of the original scale according to item relevancy, contamination, and deficiency. The subject matter experts determined 32 items from the original 42 items were a representative sample of the larger domain of behavioral indicators of the target construct, internalized sleep culture. This 32-item scale was then administered to a broad sample of adults within the United States to evaluate its item-level psychometric properties and initial factor structure was explored (EFA). Results indicated that though three factors were initially theorized to comprise ISC, after testing a one, two, and three factor model, two possibilities likely existed regarding factor structure. First, a

unidimensional structure of internalized sleep culture broadly appeared to capture the most variance while maintaining parsimony and avoiding substantial cross-loadings across factors. Alternatively, it was possible that a two-factor higher order model existed, consisting of one strong higher-order factor, internalized sleep culture broadly, and two lower-order factors of sleep as a commodity vs. biological/psychological need and sleep as a mechanism for bonding. Therefore, the subsequent Confirmatory Factor Analysis (CFA) tested these competing models to determine best fit for the scale.

Further, the scale was revised according to Study 1 findings resulting in a 21-item scale that was readministered to an independent sample of adults within the United States, and measures of sleep attitudes, sleep hygiene, sleep latency, sleep quality, and sleep duration were given as well to test ISC's convergent validity, and social desirability was assessed to test ISC's discriminant validity. The 21-item scale passed all item-level analyses initially. Results from Study 2, including the competing models CFA, yielded a final 12-item scale consisting of one higher-order factor of internalized sleep culture globally, and two lower-order factors consisting of 1) sleep as a commodity vs. a biological/psychological need, and 2) sleep as a mechanism for bonding. The 12-item ISCS broadly, as well as the two lower-order factors, all demonstrated good internal consistency ($\alpha = .90$ for ISCS globally, $\alpha = .90$ for Commodity subscale, $\alpha = .91$ for Bonding subscale) and passed item-level analyses again, which suggests that the final ISC scale items were not too extreme in nature, were relevant for most participants given the scale, displayed sufficient validity, and were able to discriminate between individuals with higher compared to lower scores on the ISCS. Additionally, when correlations were run testing the association between internalized sleep culture (global ISC and the two lower order factors) and constructs within its nomological network, theorized to converge with the ISC construct, all

correlations were significant, ranged from small to large in magnitude, and were in the hypothesized directions, providing evidence of convergent validity. Moreover, when internalized sleep culture and social desirability were correlated, a small, weak correlation existed, providing initial evidence of discriminant validity.

However, when vector correlations were run, using sleep quality, duration, and latency as the unit of analysis, the correlation of the two vectors of correlations for the subscales Commodity and Bonding were $r = .98$, for ISCS and sleep attitudes $r = .99$, for Commodity and sleep attitudes $r = .99$, and for Bonding and sleep attitudes $r = .98$. This demonstrated that any one vector of correlations with the six aforementioned outcomes yielded identical information as any other vector examined. This redundancy was also confirmed by calculating the attenuated correlations of ISCS and sleep attitudes predicting the remaining outcome variables, and these results yielded very similar correlations. Attenuated correlations, or the raw correlations of X and Y divided by the square root of the product of the reliability estimates of X and Y, calculates a correlation statistic that accounts for error contained within the measurement of these variables. For instance, when calculating the attenuated correlations for ISCS' association with sleep hygiene, and sleep attitudes' association with sleep hygiene, the attenuated correlations were $r = .69$ and $r = -.64$, respectively. This was indicative of minimal predictive discrepancy between the two constructs, signifying some lack of distinctiveness between the two constructs and redundancy. Although, when hierarchical multiple regressions were calculated, with sleep attitudes in level 1, ISCS in level 2, and the remaining sleep variables as the dependent variable, the inclusion of ISCS did significantly contribute to the variance accounted for in the model above and beyond just the inclusion of sleep attitudes (as signified by a significant ΔR^2), demonstrating an increase in predictive capacity through the inclusion of the ISCS. Therefore,

though the ISCS demonstrated incremental validity above and beyond sleep attitudes as evidenced by hierarchical multiple regressions when predicting the sleep outcomes within the nomological network, the prior analyses still suggested that internalized sleep culture, as it was currently assessed by this new measurement device, was not able to fully distinguish itself as a unique construct from the pre-existing scale assessing the construct of sleep attitudes.

Overall, this dissertation documents the initial construct conceptualization and attempted validation process for the Internalized Sleep Culture Scale. Until this point, culture as it pertained to sleep was a concept narrow in scope within the sleep literature, primarily studied related to cross-cultural napping practices (Paraskakis et al., 2008; Reimao et al., 2000), cross-cultural differences in adult sleep duration (Soldatos et al., 2005), and cross-cultural differences in children's bedtimes (Tynjala et al., 1993). There had been no theory crafted or documentation of a distinct culture within the Western practice of sleep itself. Furthermore, no research to date has applied the process of internalization, or the transmission of broader societal norms and values via sociocultural channels and subsequent adoption of these values, to sleep (Kelman, 1958; Zittoun & Gillespie, 2015). This new way of focusing on the culture related to sleep, emphasizing the social nature of sleep, is the first known attempt to conceptualize and understand sleep as a psychosocial process that is often referenced as a satirical, cultural "meme," and how these ideas have the potential to become internalized within a person, influencing their own thoughts and behaviors.

Strengths

Despite the lack of empirical evidence confirming that internalized sleep culture, as it was conceptually defined and empirically assessed via a novel measurement device, was unique enough from a pre-existing measure of sleep attitudes, this research still made a number of

important contributions to the sleep literature as it currently exists. This work highlights *how* sleep attitudes are likely formed. According to the work by Homer and Kahle (1988), a values-attitudes-behavior hierarchy exists; while values and attitudes are similar to one another because they emerge from the exposure to and synthesizing of information from the environment, values inherently act as a precursor to attitude formation, which then influence related behaviors. Conceptually, this research attempted to demonstrate this values-attitudes-behavior hierarchy by focusing on how the values related to sleep, which has not been previously studied, become internalized within an individual's way of thinking to influence attitudes and behaviors. These cultural 'memes' related to sleep, a phenomenon many individuals in the United States are aware of anecdotally, likely impact attitude formation related to sleep, and this study attempted to theorize and measure this in a systematic way for the first time. Though the field of health psychology touts the biopsychosocial model (Engel, 1977) as a means of conceptualizing most psychological constructs and phenomena, research on sleep has lacked a focus on the psychosocial/sociocultural *predictors* of sleep to essentially answer the question, "why are people sleeping the way they are?"

Limitations and Implications

There are some limitations to recognize as a product of this research, as well. Internalized sleep culture was initially conceptualized as having a moral judgement component related to sleep. However, through examination by subject matter experts, as well as item-level analyses in Study 1, majority of these items were removed, thereby suggesting that this was not actually a component to the sleep culture as it was conceptualized. This may not actually have been the case. Methodologically, this study would have benefitted from further utilization of the subject matter experts, particularly following the removal of the moral judgment domain based on Study

1 analyses, to aid in the ongoing process of construct validity. It is possible that by removing this domain, internalized sleep culture became too similar to sleep attitudes, which does not contain a moral judgement component in its conceptualization or measurement. By engaging in additional construct validity efforts at this stage, it is possible that re-writing items aimed to assess moral judgments related to sleep could have allowed it to remain in the scale. Further work should be done to go back to this stage of construct validation to assess for relevancy, contamination, and deficiency, particularly as it relates to moral judgments about sleep. These questions require finesse to craft, given that many individuals want to appear socially desirable within research, and the questions pertaining to moral judgements about sleep could potentially paint some participants in a socially undesirable light (Krumpal, 2013). For instance, in Study 1, lower scores on internalization of moral judgements related to sleep was associated with higher scores of social desirability, which again is unsurprising given the content of this subscale assessing people's tendency to judge themselves and/or others based on sleep behaviors. Additionally, in the effort to reduce poor quality data, likelihood of bots, and random responding by using CloudResearch, a paid service that oversees the MTurk study to only include participants with the highest marks indicative of quality and effort of responses, this may have increased response bias in a way to promote social desirability bias through the recruitment of professional participants who often provide answers they assume the researchers want to hear (Hauser, Paolacci, & Chandler, 2019).

These data were also collected from single samples in a cross-sectional manner, which influence the validity and reliability estimates obtained (Messick, 1995). Should internalized sleep culture be able to be defined and measured in a way that yields an empirical distinction from sleep attitudes, additional testing would be required, such as through longitudinal research,

which would allow for the examination of sleep outcomes within the proposed nomological network over time, rather than the cross-sectional snapshot obtained, which may or may not be reflective of the predictive capacity of internalized sleep culture over time. Additionally, test-retest reliability would also need to be examined to assess its temporal stability.

Moreover, though the hope was that MTurk would produce a more nationally representative sample reflective of this country's diversity according to a number of demographic variables, data were mostly reflective of the responses of white, non-Hispanic or Latino, cisgender, higher SES individuals. Prior research has demonstrated that more favorable sleep attitudes have been linked with older age and identifying as female, and while identifying as white has also been linked with having more favorable sleep attitudes, this was shown to be the case only when these individuals were also of higher SES (Ruggiero et al., 2019). Given that the internalized sleep culture construct is conceptually proposed to serve as a precursor to the development of attitudes, and how empirically it displayed overlap with sleep attitudes, it would be important to gain perspective from a more racially and economically diverse sample to allow the opportunity for more variability in responses on future items related to ISC. This would be especially important should ISC be shown to be empirically distinct from sleep attitudes given the values-attitudes-behavior hierarchy, and how the demographic makeup of the sample could impact this causal link (Homer & Kahle, 1988). Perhaps future research would benefit from additional qualitative research, such as through interviews or focus groups, with an emphasis on targeting specific demographic groups to elucidate more information on sleep culture.

Future Directions and Conclusions

This research holds implications for future empirical and clinical work. Initially, it appears that two possibilities exist. First, it is possible that internalized sleep culture could in fact

be both conceptually and empirically distinct from sleep attitudes through the re-conceptualization of the moral judgments dimension that was initially proposed as part of the construct. Perhaps by re-engaging in the construct validation process through further conceptualization and re-writing of these items, ISC may show that it is empirically distinct from sleep attitudes to support the proposed theory that internalized sleep culture acts as a precursor to the development of sleep attitudes. Second, it is also possible that what is being called internalized sleep culture may in fact not be able to be shown as being distinct from sleep attitudes, and instead aids in a re-conceptualization process of the sleep attitudes construct. The current conceptualization and scale assessing sleep attitudes as created by Peach and Gaultney (2017) currently focuses on college students. Given that internalized sleep culture provided a significant increase in unique variance above and beyond the initial variance accounted for by sleep attitudes in predicting sleep outcomes of duration, quality, latency, and hygiene, it is possible that internalized sleep culture and the way it is currently conceptualized could serve as the basis for the expansion of how we think about sleep attitudes generally, beyond college students, with a focus on the adult population as a whole. Internalized sleep culture, as assessed by this research, clearly measured something unique that was not able to be captured by how sleep attitudes are currently measured, and it may be indicative of a need to expand the sleep attitudes construct to more comprehensively include the sociocultural aspect that internalized sleep culture proposes.

Additionally, it is also possible that the societal and social messages that are theorized to encompass sleep culture may vary over time and according to generations, especially as social channels become more integrated into everyday life. Some generations alive today did not grow up with these information and social highways that often transmit cultural memes, and so

perhaps these individuals internalize messages differently than their younger counterparts. It could be beneficial for future research to expand on internalized sleep culture/sleep attitudes by isolating age groups to inquire about messages pertaining to sleep, and test either a measure of internalized sleep culture or an expanded measure of sleep attitudes, perhaps mapped according to generation structures (e.g., Post War, Boomers, Gen X, Millennial, Gen Z). This could elucidate whether sleep culture is a moving target, or whether some messages related to sleep persist across generations, which may ultimately affect sleep behaviors and outcomes.

It would also be interesting for future research to help gain an understanding of if, and why, some individuals internalize certain messages about sleep more than others. For instance, social media may play a role in exposure to, and internalization of, cultural memes pertaining to sleep. While many people engage with social media in today's world, it is possible that amount of time spent on social media, as well as amount of time actively engaging with content during time on social media, may increase the likelihood of internalizing messages about sleep, rather than those who are only exposed intermittently. While the link between social media use and sleep has been extensively studied among adolescents and young adults, particularly related to use prior to bedtime, and especially recently as it relates to the phenomenon of "fear of missing out" or 'FoMO' (e.g., Scott & Woods, 2018; Tandon et al., 2020), less attention seems to be paid to adults broadly. This would be important information to know if internalized sleep culture, or an expansion of sleep attitudes, should be further assessed in adults, to better understand what social media habits may be predictive of an increased susceptibility to exposure to, and internalization of, messages tapping into sleep culture. Additionally, perhaps certain personality traits may either contribute to a vulnerability to internalization of certain ideas, or a hardiness against such. For instance, the well-known Big Five model of personality as delineated by

McCrae and Costa (1987), which includes personality traits of agreeableness, openness, extraversion, neuroticism, and conscientiousness, could play a role in predisposition to internalize certain messages about sleep. It would be plausible that those in Western society high in openness, extraversion, and agreeableness, may be open to the exposure to new ideas on social platforms, which may influence internalization of such ideas into their own belief system, Whereas, it is also plausible that those low in openness and high in neuroticism may be exposed to messages within social channels that serve to confirm their own belief systems, and thus internalize those messages that allow them to engage in confirmation bias related to sleep. Several pathways could exist simultaneously for the internalization of messages tapping into sleep culture.

Regardless of whether internalized sleep culture is able to be shown to be distinct from sleep attitudes, or whether this work serves as the basis for expanding the conceptualization of sleep attitudes, this research also has important clinical implications. Given the high prevalence of sleep disturbances in the United States, including over 35% of adults reporting receiving less than 7 hours of sleep per night, and 50-70 million adults having a sleep disorder, having a scale that can potentially assess individuals who may have preventable and modifiable disturbances would significantly reduce healthcare costs, as well as systemic and individual-level burdens of these sleep disturbances (American Sleep Association, 2021; Institute of Medicine, 2006). For instance, both internalized sleep culture and sleep attitudes are theorized to encompass cognitive and behavioral processes (Peach & Gaultney, 2017); therefore, screening individuals who endorse a high degree of internalized sleep culture and/or unfavorable sleep attitudes and streamlining them into clinical interventions using Cognitive Behavioral for Insomnia (CBT-I)

principles may serve to modify some of the unhelpful cognitions that are impacting their sleeping behaviors.

Overall, this dissertation documented the initial conceptualization and scale development of internalized sleep culture. Though the construct was not able to fully distinguish itself from that of sleep attitudes, this work highlighted and began addressing the gap within both the sleep literature and the health psychology literature related to the sociocultural predictors of sleep. These studies began to examine how values and norms pertaining to sleep may be transmitted across social avenues and become embedded within an individual's own belief system, possibly affecting subsequent sleep-related behaviors. This work should serve as a springboard for future research to attempt to validate a revised conceptualization and standardized system of measurement for internalized sleep culture, or serve to rediscover the existing construct of sleep attitudes as a more culturally enabled, socially influenced process.

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Appendix A: Qualitative Themes of Sleep Culture Pilot Data

Table 1
Qualitative Themes of Sleep Culture

Qualitative themes identified	Example messages
Sleep as a biological/psychological need vs. a commodity	"You need a good night sleep before a test the next day" "I have been told by many people that getting at least 8 hours of sleep per night helps with memory, weight loss, mood, and overall energy throughout the day" "You should go to bed at a reasonable time and not stay up late if you need to wake up early" "Having enough sleep is a gift" "Sleep is a luxury rather than a necessity" "Sleep is one of the first things sacrificed if you want to be successful"
Sleep choices determine one's moral value	"Sleeping in is lazy, you should be getting up early to have a sense of accomplishment" "Staying up all night and not getting much sleep is normal and a cool thing to do"
Sleep as a mechanism for bonding with others	"College students tend to not sleep so it bonds us because we're all struggling and running on little sleep" "People usually talk about how little sleep they had, not if they had a good amount, and it is kind of like bonding when people lose sleep over the same things"

Appendix B: Conceptual Model

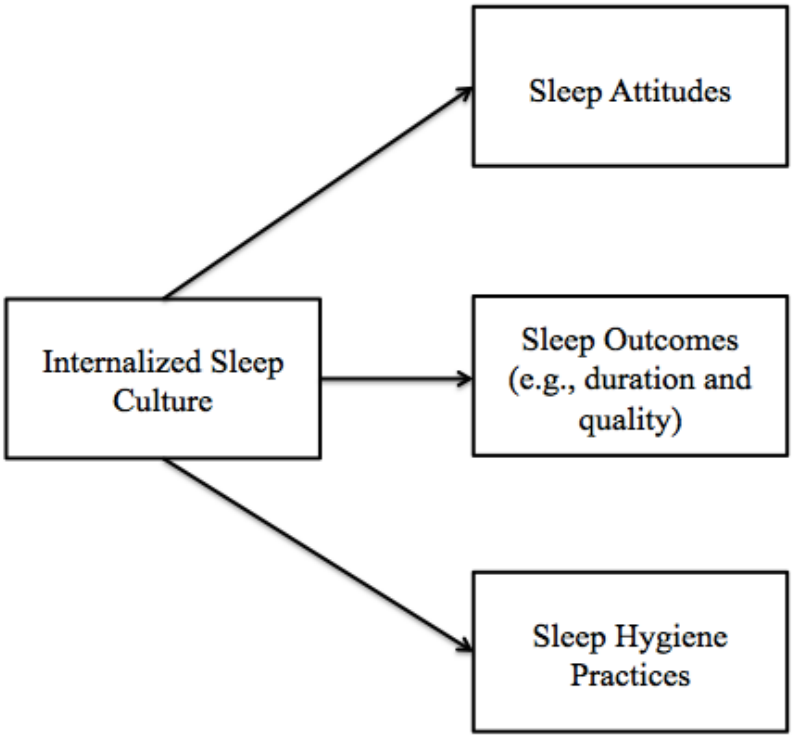

Figure 1. A conceptual model depicting internalized sleep culture and its nomological network.

Appendix C: Initial scale

Internalization of sleep culture is defined as a psychological process where a person adopts or identifies with certain beliefs about sleep stemming from messages transmitted from society, social interactions with peers, and even social media. Please rate on a scale from 1 (strongly disagree) to 5 (strongly agree) how much you disagree/agree with the following statements about sleep. The more you agree with a statement, the more you should identify with that belief; the less you agree with a statement, the less you should identify with that belief:

1. I believe in the phrase "sleep is for the weak."
2. I make sleep a priority in my life.
3. I believe that society encourages me to choose other activities (work, schoolwork, socialization) over sleep.
4. My friends and I bond over times when we do not get enough sleep.
5. I look down on other people who choose sleep over other activities.
6. It is acceptable to go to bed late at night, even if it means I will be tired the next day.
7. You should prioritize responsibilities over sleep.
8. It is bad to be the first one of my friends to go to sleep at night.
9. I often talk to my friends about how I do not get enough sleep.
10. Other people will see me as cool if I can run off of less sleep than the average person.
11. It is socially acceptable to be sleepy during the day.
12. My friends and I commiserate over who gets the worst sleep.
13. Getting enough sleep at night means I am lazy.
14. If you go to bed early you are not as fun as everyone else.
15. I need to sacrifice sleep in order to be successful.
16. I feel closer to my friends when we talk about our sleep patterns.
17. If I want to socialize and get good grades/perform well at work, that means my sleep will have to suffer.
18. I could be doing more useful things than sleeping.
19. It is important to me to go to sleep at a reasonable hour.
20. Not needing a lot of sleep is a bragging right.
21. I enjoy talking to my friends about the sleep we get.
22. I would benefit from getting more sleep.
23. Getting at least 8 hours of sleep per night is important to me.
24. I would rather scroll through social media with my friends than go to bed.
25. I wear sleep loss like a badge of honor.
26. I will miss out on other things in life if I choose to sleep.
27. I feel guilty for having a long night of sleep.
28. My friends and I brag to each other when we sleep well.
29. Having healthy sleep hygiene is important to me.
30. Getting enough sleep is a treat.

31. Others shame me for choosing sleep over work/school/socialization.
32. I need to reduce how much I sleep in order to get ahead.
33. I've bonded with other people about how tired we are.
34. I prioritize getting enough sleep.
35. I feel guilty when I do not get the recommended amount of sleep.
36. It is important to vent to my friends about my sleep.
37. I sleep less so I have more time to get other things accomplished.
38. I feel shamed by others for wanting to go to bed early.
39. I often pick doing other activities over going to bed early.
40. Sleeping a lot means you are lazy.
41. I prioritize my physical and mental health by getting enough sleep.
42. Society sends the message that sleep can be sacrificed.

Appendix D: Subject Matter Expert Rating Form

Instructions: As part of the process of developing items for potential use in a measurement device, we are asking you to evaluate the degree to which each item shown on the next two pages appears to be relevant to the construct of interest (in this case, *internalization of sleep culture*). Below is the definition of the construct. Please read and familiarize yourself with the definition before starting the task.

Internalization: Internalization can be defined as a dynamic, semiotic, culturally enabled psychological process by which culture becomes mind, and it represents the adoption of an influence or value as one's own belief (Kelman, 1958; Zittoun & Gillespie, 2015). It can be conceptualized as the process by which meanings stemming from societal and social structures, social interactions, and others, are brought over into the individual's thinking, so, "what originally had collective cultural meaning in the interpersonal domain, under the guidance of socially shared interpretations of reality, becomes intrapersonal" (Valsiner & Lawrence, 1997, p. 95). This process has the potential to lead to the creation of new ideas and behaviors, and internalization has been demonstrated for a number of social phenomena, such as the thin ideal, weight bias, stigma (e.g., mental health stigma), sexism, and racism (Bearman, Korobov, & Thorne, 2009; Durso & Latner, 2012; Risher, Otilingam, & Grajales, 2003; Speight, 2007, Thompson & Stice, 2001).

Sleep Culture: According to anthropologists, culture can be defined as, "the shared values, norms, and codes that collectively shape a group's beliefs, attitudes, and behavior through their interaction in and with their environments" (Airhihenbuwa, Iwelunmor, Ezepue, Williams, & Jean-Louis, 2015, p. 67). Therefore, based on this definition of culture, *sleep culture* describes the shared values and norms related to sleep that collectively shape a group's beliefs, attitudes, and behaviors related to sleep through their interaction in and with their environments.

Therefore, *Internalized Sleep Culture* describes a process by which individuals identify with or adopt wider societal-level values about sleep as one's own values, and thus identifying or adopting the wider-held "sleep culture" in the United States. These values are transmitted as messages via sociocultural channels (e.g., social media, peers, social structures, etc). Conceptually, sleep culture is proposed to be multi-dimensional and consists of three sub-domains of beliefs or norms: 1) sleep as a biological/psychological need versus a commodity, 2) sleep as a mechanism for bonding people together, and 3) sleep choices determining one's moral value.

The first sub-domain describes the contrast between believing in the importance of sleep as a biological/psychological need, versus treating sleep as a luxury, an option, or commodity that can be sacrificed for other activities considered to be more important. This sub-domain includes the importance of engaging in healthy sleep hygiene practices, such as avoiding screen time before bed and going to bed at a reasonable hour. Moreover, in order to be seen as more productive and successful in various domains in life, such as work, school, and social life, sleep may be chosen last to get ahead in these other areas of life. These are different examples of what could be found within this component.

The second sub-domain relates to how social bonding can occur between people when sharing how much they slept recently. This type of bonding can occur via social media, in person,

texting, etc, and can include sharing how much or how little one has slept, and how refreshed or tired they feel. This sharing of sleep behaviors serves as a mechanism for bonding people together. Lastly, the third sub-domain consists of the moral value placed on one's sleeping behaviors, with judgments made either toward the self or toward others based on the valuation of what is morally "good" or "bad."

After you have a clear understanding of the concept of *Internalized Sleep Culture* (as we have defined it), please continue with the task. For each item below we are asking you to provide two separate ratings.

First, *for each item*, please indicate which sub-domain component you feel the item is primarily measuring. These sub-domains are labeled as 1, 2, and 3, based on the number provided in the construct conceptualization above.

Second, please use the scale provided (irrelevant, partially relevant, or relevant) to rate the item's level of relevancy to the construct defined above.

Third, please place a question mark ("?") in the last column for any item that was unclear or otherwise difficult to read. If appropriate, please mark suggested corrections, such as if aspects of an item measure other constructs, or indicate confusing aspects in the item text.

*****Please be mindful that it is likely that these questions could be interpreted differently based on one's socioeconomic status. Please make any notes for items that are confusing, should be worded differently, to ensure items can be interpreted as easily as possible despite differing SES backgrounds.*****

Scale instructions: Please rate on a scale from 1 (strongly disagree) to 5 (strongly agree) how much you disagree/agree with the following statements about sleep. The more you agree with a statement, the more you should identify with that belief; the less you agree with a statement, the less you should identify with that belief.

1 (strongly disagree) 2 (disagree) 3 (neutral) 4 (agree) 5 (strongly agree)

		Relevancy			
	Subdomain	*Irrelevant*	*Partially*	*Relevant*	*Clarity*
1. I believe in the phrase “sleep is for the weak.”					
2. I make sleep a priority in my life.					
3. I believe that society encourages me to choose other activities (work, school work, socialization) over sleep.					
4. My friends and I bond over time when we do not get enough sleep.					
5. I look down on other people who choose sleep over other activities.					
6. It is acceptable to go to bed late at night, even if it means I will be tired the next day.					
7. You should prioritize responsibilities over sleep.					
8. It is bad to be the first one of my friends to go to sleep at night.					
9. I often talk to my friends about how I do not get enough sleep.					
10. Other people will see me as cool if I can run off of less sleep than the average person.					
11. It is socially acceptable to be sleepy during the day.					
12. My friends and I commiserate over who gets the worst sleep.					
13. Getting enough sleep at night means I am lazy.					
14. If you go to bed early you are not as fun as everyone else.					
15. I need to sacrifice sleep in order to be successful.					
16. I feel closer to my friends when we talk about our sleep.					
17. If I want to socialize and get good grades/perform well at work, that means my sleep will have to suffer.					
18. I could be doing more useful things than sleeping.					
19. It is important to me to go to sleep at a reasonable hour.					
20. Not needing a lot of sleep is a bragging right.					
21. I enjoy talking to my friends about the sleep we get.					
22. I would benefit from getting more sleep.					

23. Getting at least 8 hours of sleep per night is important to me.					
24. I would rather scroll through social media with my friends than go to bed.					
25. I wear sleep loss like a badge of honor.					
26. I will miss out on other things in life if I choose to sleep.					
27. I feel guilty for having a long night of sleep.					
28. My friends and I brag to each other when we sleep well.					
29. Having healthy sleep hygiene is important to me.					
30. Getting enough sleep is a treat.					
31. Others shame me for choosing sleep over work/school/socialization.					
32. I need to reduce how much sleep I get in order to get ahead.					
33. I've bonded with other people about how tired we are.					
34. I prioritize getting enough sleep.					
35. I feel guilty when I do not get the recommended amount of sleep.					
36. It is important to vent to my friends about my sleep.					
37. I sleep less so I have more time to get other things accomplished.					
38. I feel shamed by others for wanting to go to bed early.					
39. I often pick doing other activities over going to bed early.					
40. Sleeping a lot means you are lazy.					
41. I prioritize my physical and mental health by getting enough sleep.					
42. Society sends the message that sleep can be sacrificed.					

Appendix E: Scale used in Study 1 (edited according to SME feedback)

Please rate on a scale from 1 (strongly disagree) to 5 (strongly agree) how much you disagree/agree with the following statements about sleep.

1. I believe in the phrase "sleep is for the weak."
2. I make sleep a priority in my life.
3. I feel pressured to choose other activities (work, schoolwork, socialization) over sleep.
4. My friends and I bond over times when we do not get enough sleep.
5. I look down on people who choose sleep over other activities.
6. Individuals should prioritize other responsibilities over sleep.
7. I often talk to my friends about how I do not get enough sleep.
8. Other people will see me as accomplished if I can run off of less sleep than the average person.
9. My friends and I commiserate over who gets the worst sleep.
10. People who go to bed early are not as fun as everyone else.
11. I need to sacrifice sleep in order to be successful.
12. I feel closer to my friends when we talk about our sleep.
13. If I want to socialize and get good grades/perform well at work, that means my sleep will have to suffer.
14. I could be doing more useful things than sleeping.
15. I talk to my friends about the sleep we get.
16. I would rather scroll through social media with my friends than go to bed.
17. I will miss out on other things in life if I choose to sleep.
18. I feel guilty for having a long night of sleep.
19. My friends and I brag to each other when we sleep well.
20. Having healthy sleep hygiene is important to me.
21. Getting enough sleep is a treat.
22. I need to reduce how much I sleep in order to get ahead.
23. I've bonded with other people about how tired we are.
24. I prioritize getting enough sleep.
25. I feel guilty when I do not get the recommended amount of sleep.
26. It is important to vent to my friends about my sleep.
27. I sleep less so I have more time to get other things accomplished.
28. I often feel ashamed for wanting to go to bed early.
29. I often pick doing other activities over going to bed early.
30. Sleeping a lot means you are lazy.
31. I prioritize my physical and mental health by getting enough sleep.
32. Other people have told me that sleep can be sacrificed

Appendix F: Scale used in Study 2 (edited according to Study 1 analyses)

Please rate on a scale from 1 (strongly disagree) to 5 (strongly agree) how much you disagree/agree with the following statements about sleep.

1. I make sleep a priority in my life.
2. I feel pressured to choose other activities (work, schoolwork, socialization) over sleep.
3. My friends and I bond over times when we do not get enough sleep.
4. I often talk to my friends about how I do not get enough sleep.
5. Other people will see me as accomplished if I can run off of less sleep than the average person.
6. My friends and I commiserate over who gets the worst sleep.
7. I need to sacrifice sleep in order to be successful.
8. I feel closer to my friends when we talk about our sleep.
9. If I want to socialize and get good grades/perform well at work, that means my sleep will have to suffer.
10. I could be doing more useful things than sleeping.
11. I talk to my friends about the sleep we get.
12. I would rather scroll through social media with my friends than go to bed.
13. I will miss out on other things in life if I choose to sleep.
14. My friends and I brag to each other when we sleep well.
15. I need to reduce how much I sleep in order to get ahead.
16. I've bonded with other people about how tired we are.
17. I prioritize getting enough sleep.
18. It is important to vent to my friends about my sleep.
19. I sleep less so I have more time to get other things accomplished.
20. Sleeping a lot means you are lazy.
21. I prioritize my physical and mental health by getting enough sleep.

Appendix G: Study 1 Tables

Table 2
Exploratory Factor Analysis for Three Factors and Descriptive Statistics.

	Factors					
Item	Commodity	Bonding	Judgement	*M*	*SD*	r_{it}
2	.40	-.45		2.16	1.02	.31
3	.68			2.45	1.33	.67
4	.44	.60		2.37	1.30	.60
7	.43	.60		2.30	1.34	.59
8	.53			2.09	1.21	.55
9	.58	.51		2.01	1.23	.57
11	.69			2.02	1.26	.63
12	.53	.53		2.17	1.20	.53
13	.66		.31	2.20	1.26	.62
14	.62	-.30		2.56	1.33	.59
15	.55	.59		2.60	1.35	.53
16	.46			2.01	1.18	.46
17	.66			2.25	1.22	.66
19	.32	.47		2.10	1.24	.34
22	.70		.35	2.01	1.11	.66
23	.45	.65		2.50	1.38	.64
24	.62	-.49		2.14	1.07	.49
26	.37	.52		2.02	1.14	.52
27	.67			2.28	1.31	.63
30				2.01	1.05	.55
31	.65	-.31		2.12	1.12	.54

Note. $N = 299$; r_{it} = corrected item-total correlations computed using only items within factor. $\lambda <$ .30 not shown.

Table 3

Exploratory Factor Analysis for Two Factor Model.

	Factors	
Items	Commodity	Bonding
2	.41	.31
3	.68	
4	.37	.66
7	.37	.65
8	.54	
9	.44	.64
11	.65	.40
12	.45	.64
13	.64	.31
14	.58	.43
15	.44	.62
16		.46
17	.66	
19	.39	.42
22	.68	.34
23		.71
24	.50	.35
26	.37	.58
27	.65	.38
30	.36	.31
31	.54	.31

Note. $N = 299$. $\lambda < .30$ not shown.

Table 4

Exploratory Factor Analysis for One Factor Model.

	Factor
Items	ISC Global
2	.42
3	.69
4	.62
7	.62
8	.55
9	.59
11	.69
12	.55
13	.67
14	.60
15	.57
16	.47
17	.70
19	.35
22	.70
23	.66
24	.52
26	.55
27	.66
30	.36
31	.55

Note. $N = 299$.

Appendix H: Study 2 Measures

Internalized Sleep Culture Scale

Please rate on a scale from 1 (strongly disagree) to 5 (strongly agree) how much you disagree/agree with the following statements about sleep.

The more you agree with a statement, the more you should identify with that belief or you agree with the idea; the less you agree with a statement, the less you should identify with that belief or you disagree with the idea. There are no right or wrong answers.

1. I make sleep a priority in my life.
2. I feel pressured to choose other activities (work, schoolwork, socialization) over sleep.
3. My friends and I bond over times when we do not get enough sleep.
4. I often talk to my friends about how I do not get enough sleep.
5. Other people will see me as accomplished if I can run off of less sleep than the average person.
6. My friends and I commiserate over who gets the worst sleep.
7. I need to sacrifice sleep in order to be successful.
8. I feel closer to my friends when we talk about our sleep.
9. If I want to socialize and get good grades/perform well at work, that means my sleep will have to suffer.
10. I could be doing more useful things than sleeping.
11. I talk to my friends about the sleep we get.
12. I would rather scroll through social media with my friends than go to bed.
13. I will miss out on other things in life if I choose to sleep.
14. My friends and I brag to each other when we sleep well.
15. I need to reduce how much I sleep in order to get ahead.
16. I've bonded with other people about how tired we are.
17. I prioritize getting enough sleep.
18. It is important to vent to my friends about my sleep.
19. I sleep less so I have more time to get other things accomplished.
20. Sleeping a lot means you are lazy.
21. I prioritize my physical and mental health by getting enough sleep.

Social Desirability Scale

Listed below are a number of statements concerning personal attitudes and traits. Read each item and decide whether the statement is true or false as it pertains to you.

1. It is sometimes hard for me to go on with my work if I am not encouraged.

2. I sometimes feel resentful when I don't get my own way.
3. On a few occasions, I have given up doing something because I thought too little of my ability.
4. There have been times when I felt like rebelling against people in authority even though I knew they were right.
5. No matter who I'm talking to, I'm always a good listener.
6. There have been occasions when I took advantage of someone.
7. I'm always willing to admit it when I make a mistake.
8. I sometimes try to get even, rather than forgive and forget.
9. I am always courteous, even to people who are disagreeable.
10. I have never been irked when people expressed ideas very different from my own.
11. There have been times when I was quite jealous of the good fortune of others.
12. I am sometimes irritated by people who ask favors of me.
13. I have never deliberately said something that hurt someone's feelings.

Charlotte Attitudes Towards Sleep Scale

Below is a list of several statements reflecting people's beliefs and attitudes about sleep are listed below. Please indicate to what extent you personally agree or disagree with each statement. There is no right or wrong answer. For each statement, use the scale provided (1 – Strongly Disagree, 2 – Disagree, 3 – Somewhat Disagree, 4 – Neither Agree Nor Disagree, 5 – Somewhat Agree, 6 – Agree, 7 – Strongly Agree) to mark the number that corresponds to your own personal belief. Please respond to all items even though some may not apply directly to your own situation.

1. Sleep is a necessity.
2. I am inclined to skip sleep in order to socialize longer.
3. Getting a good night's sleep makes me happy.
4. I usually choose work/schoolwork as a more important activity than my sleep schedule.
5. I look forward to a full night of sleep.
6. In the past, I haven't made time for adequate sleep in my schedule.
7. I often pick other activities over going to bed early.
8. Getting a full night of sleep is satisfying to me.
9. I enjoy a good night's sleep.
10. I sleep less so I have more hours during the day to get work accomplished.

Sleep Hygiene Practice Scale

The following items are descriptions of common sleep habits, daily life activities, and sleep environments. Please select the number to indicate how often the situations fit your personal experiences, with 1 indicating never and 6 indicating always.

1. Bedtime is not consistent.
2. Get out of bed at inconsistent times.
3. Stay in bed after waking up in the morning.
4. Sleep in on weekends.
5. Napping or resting in bed for over an hour during the day.
6. Lack of exposure to outdoor light during the day.
7. Lack of regular exercise.
8. Unpleasant conversation prior to sleep.
9. Not enough time to relax prior to sleep.
10. Falling asleep with TV or music on.
11. Pondering unresolved matters while lying in bed.
12. Check the time in the middle of the night.
13. Doing sleep-irrelevant activities in bed (e.g., watching TV, on phone, reading).
14. Worry about not being able to fall asleep in bed.
15. Worry about night-time sleep during the day.
16. Vigorous exercise during the 2 hours prior to sleep.
17. Drinking caffeinated drinks (e.g., coffee, tea, soda) within 4 hours prior to bedtime.
18. Drinking alcohol within 2 hours prior to bedtime.
19. Consuming stimulating substances (e.g., nicotine) during the 2 hours prior to bedtime.
20. Going to bed hungry.
21. Drinking a lot during the hour prior to sleep.
22. Eating too much food during the hour prior to sleep.
23. Sleep environment is either too noisy or too quiet.
24. Sleep environment is either too bright or too dark.
25. Sleep environment is either too humid or too dry.
26. Feeling too hot or too cold during sleep.
27. Poor ventilation in bedroom.
28. Uncomfortable bedding and/or pillow.
29. Too many sleep-unrelated items in bedroom.
30. Sleep is interfered by bed partner.

Patient Reported Outcomes Measurement Information System – Sleep Disturbance – short form scale

In the past week, on a scale from 1 (not at all) to 5 (very much), to what extent have you experienced…

1. My sleep was restless.
2. I was satisfied with my sleep.

3. My sleep was refreshing.
4. I had difficulty falling asleep.
5. I had trouble staying asleep.
6. I had trouble sleeping.
7. I got enough sleep.

In the past week, my sleep quality was:
Very Poor
Poor
Fair
Good
Very Good

Sleep Duration Questions

During the past week, how many hours of sleep did you get on average?

During the past week, what time did you usually wake up?

During the past week, what time did you usually go to bed?

How long (in minutes) has it taken you to fall asleep over the past week?

Appendix I: Study 2 Tables and Figures

Table 5
Study 2: Demographic Information.

Age: *M (SD)*	39.88 (11.51)
Age: range	19-73
Gender[a]	
Male (%)	55%
Female (%)	43.3%
Nonbinary (%)	1.6%
Race (%)[b]	
White	83.7%
Black/African American	11.4%
Asian	6.2%
American Indian/Alaska Native	0.8%
Native Hawaiian/Pacific Islander	0.3%
Other	0.9%
Ethnicity (%)	
Hispanic or Latino	6.2%

Note. [a]A broad range of gender identities were available to choose from, only data from the three gender identities listed were endorsed.; [b]Percentages exceed 100% because participants were allowed to select more than one race they identify as.

Table 6
Confirmatory Factor Analysis and Descriptive Statistics for Retained Items in Final Model.

	Factors		*M*	*SD*	r_{it}
Items	Commodity	Bonding			
2	.71		2.90	1.42	.68
7	.86		2.44	1.38	.79
9	.83		2.54	1.38	.76
15	.83		2.27[c]	1.30	.76
19	.77		2.75	1.43	.74
3		.78	2.66	1.32	.74
4		.80	2.59	1.37	.76
6		.78	2.27	1.29	.73
8		.79	2.46	1.22	.76
11		.77	2.93	1.36	.74
16		.76	2.95	1.39	.73
18		.75	2.24	1.30	.70
Global ISC	.76	.74	--	--	--

Note. $N = 369$; r_{it} = corrected item-total correlations computed using only items within factor.

Table 7

Correlations Between Internalized Sleep Culture, Subscales, and Nomological Network Measures.

	1	2	3	4	5	6	7	8	9	10	11
1. ISC Total	--										
2. ISC Commodity	.85	--									
3. ISC Bonding	.88	.57	--								
4. Sleep Attitudes	-.53	-.61	-.32	--							
5. Sleep Hygiene	.65	.59	.55	-.53	--						
6. Sleep Quality - Weeknights	.54	.48	.45	-.42	.59	--					
7. Sleep Quality - Weekends	.44	.41	.34	-.43	.56	.88	--				
8. Sleep Duration - Weeknights	-.26	-.32	-.16	.25	-.16	-.44	-.37	--			
9. Sleep Duration - Weekends	-.13	-.11	-.12	.15	-.08	-.33	-.43	.59	--		
10. Sleep Latency - Weeknights	.25	.20	.24	-.19	.27	.48	.44	-.26	-.20	--	
11. Sleep Latency - Weekends	.23	.19	.20	-.21	.27	.44	.45	-.22	-.23	.86	--

Note. All correlations between ISC variables and sleep outcomes were significant at $p<.05$. All correlations between ISC total and subscales with sleep outcomes were in the hypothesized directions, demonstrating convergent validity. All significant correlations among sleep outcome variables were also in the expected directions.

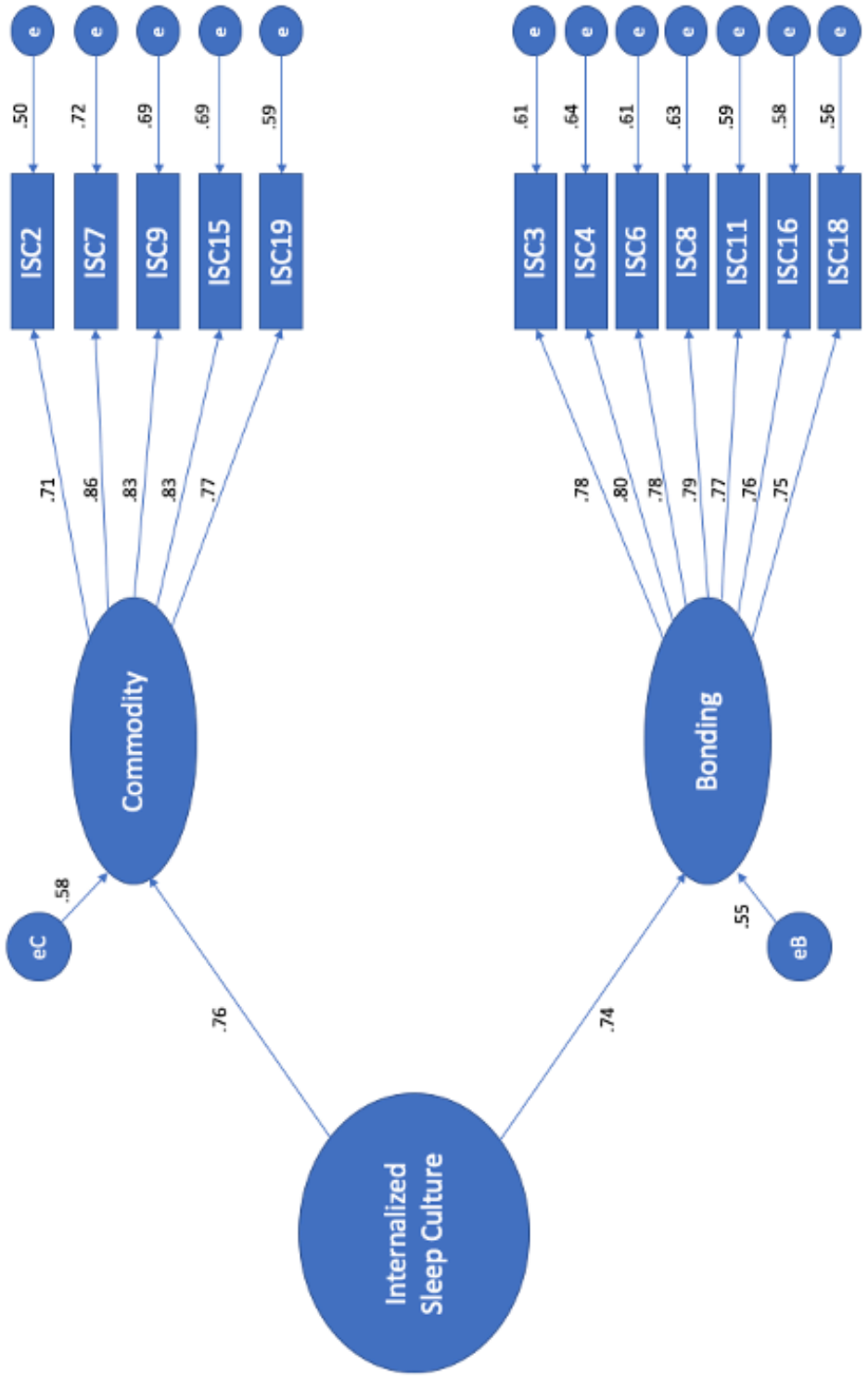

Figure 2. Confirmatory Factor Analysis Model. Demonstrating one higher order, global Internalized Sleep Culture factor, and two lower order factors, sleep as a commodity vs. biological/psychological need (commodity for short), and sleep as a mechanism for bonding (bonding for short).

Appendix J: Finalized Version of the Internalized Sleep Culture Scale

Please rate on a scale from 1 (strongly disagree) to 5 (strongly agree) how much you disagree/agree with the following statements about sleep.

1. I feel pressured to choose other activities (work, schoolwork, socialization) over sleep.
2. My friends and I bond over times when we do not get enough sleep.
3. I need to sacrifice sleep in order to be successful.
4. I often talk to my friends about how I do not get enough sleep.
5. If I want to socialize and get good grades/perform well at work, that means my sleep will have to suffer.
6. My friends and I commiserate over who gets the worst sleep.
7. I need to reduce how much I sleep in order to get ahead.
8. I feel closer to my friends when we talk about our sleep.
9. I talk to my friends about the sleep we get.
10. I've bonded with other people about how tired we are.
11. It is important to vent to my friends about my sleep.
12. I sleep less so I have more time to get other things accomplished.