Sleep and Parenting Young Children: A Qualitative Study

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Abstract

In recent years, there has been an increase in studies exploring the relationship between sleep and parenting. However, few have looked specifically at the relationship between sleep and parenting young children beyond infancy. As such, the present study was conducted to understand the relationship between paternal and maternal sleep and parenting young children beyond infancy. For the three weeks of the study, eight heterosexual participants (four couples) from six countries wore sleep trackers, rated their sleep daily, and took daily notes on their self-perceived parenting. During this time, four weekly interviews took place starting on day 1 of the study and alternating between 1-on-1 interviews with each parent and with the couple together. Results showed that sleep primarily influences parents' patience, followed by their mood, and ability to be present and active with their children. These effects were most noticeable for parents on weekday mornings when parents reported being under most intense time pressure. Parents also reported that sleep quality rather than quantity has more significant effects on their parenting. Moreover, this study found that the effects of sleep last beyond just the next day. As nights of sleep add up, the effects of poor sleep compound, decreasing parents' ability to remain patient, in a positive mood, or active and present. According to parents, child behaviour, naps and other breaks from parenting, spousal support, work stress, and health buffered against the effects of poor sleep. Finally, participants reported that their children unequivocally have the largest effect on parental sleep quality and quantity. The younger children are, the more extensive the effect appeared to be. To a far lesser extent parent's sleep was also influenced by their partner and other physical, work, or family related stressors.

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Table of Contents

List of Tables

List of Figures

Introduction

Sleep is crucial for proper human functioning, it is how we deal with the challenges of everyday life, while retaining the ability to learn, grow, and contribute positively to the world around us (Hamilton et al., 2008; Pilcher & Huffcut, 1996). Yet, sleep deprivation is not unusual for most people, and is especially common in parents of young children (Fernandes-Junior et al., 2016; Ferrara & De Gennaro, 2001). The extensive research on the effects of sleep deprivation conducted to date shows that it negatively affects people's health, mood, attention, and cognitive abilities, to name a few (Banks & Dinges, 2007; Pilcher & Huffcut, 1996). Still research regarding the influence of sleep on parenting is surprisingly limited, especially research involving fathers (Bai et al., 2020; Kelly et al., 2021). The available literature becomes even more limited for sleep and parenting of young children beyond infancy. In fact, to this author's knowledge, there has not been a single study looking specifically at the relationship between sleep and parenting, which involved mothers and fathers of non-infant young children. The present study will attempt to fill this gap by exploring the influence sleep has on both mothers and fathers of young children past the age of infancy.

To understand the relationship between sleep and parenting young children, we must first explore what we already know about sleep, parenting young children, and the relationship between these two. For well over a century researchers have been trying to understand just how sleep affects us (Bentivoglio & Grassi-Zucconi, 1997). Scientists have found sleep to have significant effects on physical health, cognition, mood, emotional recovery, stress, and much more (Hamilton et al., 2008; Mezick et al., 2014; Pilcher & Huffcut, 1996; Troxel et al., 2007; Williamson & Feyer, 2000). Studies have even found evidence that while we sleep the brain in essence cleans itself by getting rid of harmful substances (Beil, 2018).

Evidently, there are a number of ways in which sleep supports people's ability to manage everyday challenges. At the same time, parenting young children will inevitably be

accompanied by a number of new challenges (Pilcher & Huffcut, 1996). It would therefore stand to reason that increasing one's ability to think, manage stress, and manage one's emotional reaction and recovery, which as mentioned above can all be influenced by sleep, would also support parents to manage their everyday demands.

To further explore the connections between sleep, parenting, and young children, the following sections will take a closer look at each individually. First, the focus will be on sleep research and the effects of insufficient sleep with regard to sleep quality or quantity. Next, this paper will take a closer look at parenting as a whole and parenting young children. Finally, we will explore development in young children and consider the intersections between sleep and parenting.

Sleep

History of Sleep Research

Some of the effects of sleep, or lack thereof, on the human body had already been realized long before the first sleep studies were ever conducted (Bentivoglio & Grassi-Zucconi, 1997). Centuries ago, the Chinese would use sleep deprivation as a form of torture. In some cases they would even condemn people to death by forbidding them to sleep (Bentivoglio & Grassi-Zucconi, 1997). Knowing that partial insomnia in the very least leads to mental disturbances, researchers in the late 19th century began to look more extensively into the effects of sleep.

One of the first scientists to do this was Russian physician Marie de Manacéïne. In the late 1800s Marie de Manacéïne ran an experiment involving ten one to four-month-old puppies (Bentivoglio & Grassi-Zucconi, 1997). She would deprive them of sleep by keeping them in constant activity and came to an unexpected conclusion. Only four to five days without sleep had detrimental and irreversible effects on the puppies. This was especially interesting when she contrasted the findings with other experiments that showed similar dogs could still be saved after being starved for nearly five times as long. Upon further inspection, de Manacéïne found

that the most irreparable and severe damage resulting from sleep deprivation was sustained in the brain, an organ which remained surprisingly healthy in puppies that died of starvation. Additionally, she found that from the second day of sleep deprivation the animal's locomotor activity became weaker and slower, they had less red blood cells, and their body temperature dropped by almost 1°C. This decrease in temperature then continued down to 6°C below normal levels before the dogs died. Finally, she found that younger puppies were less resilient than older ones, highlighting the possibility of decreased sleep need with advancing age.

A few years later, partly due to the lack of detail in Marie de Manacéïne's reports, three Italian researchers, Lamberto Daddi, Giulio Tarozzi and Cesare Agostini, began conducting their own experiments (Bentivoglio & Grassi-Zucconi, 1997). They found that sleep deprived dogs would be unable to survive more than 17 days and that sleep deprivation indeed caused neurodegenerative changes. They argued that these neurodegenerative changes were similar to lead or arsenic poisoning. Moreover, Agostini also found that sleep deprivation led to increasingly crippling effects on psychic activity. While neither de Manacéïne's nor Daddi, Tarozzi, and Agostini's studies would live up to today's research quality standards, let alone today's ethical standards, they demonstrate that sleep is necessary for survival. In fact, de Manacéïne's findings would suggest that sleep may be even more important than food.

In more recent years researchers have moved on from studying animals and began looking into the effects of sleep deprivation on people. In children, inadequate sleep was found to have an effect on the central nervous system, behavioural functioning, mood, cognitive capacity, and physical health (Fadzil, 2021; Schlieber & Han, 2021). In adults, studies have consistently shown that partial sleep deprivation negatively impacts mood, cognitive and motor performance, the immune system, pain tolerance, recovery from illness, and even mortality (Ferrara & De Gennaro, 2001; Hagen et al., 2013; Stickland et al., 2016). The following section will discuss these impacts of sleep deprivation in more depth.

Physical Health and Stress

Multiple studies have argued that sleep affects a person's physical health and stress, claiming that sleep influences cortisol levels, pain, obesity, and other metabolic changes in the body.

Using data from 79 young men between the ages of 18 and 30 Mezick and colleagues (2014) sought to explore the effects of sleep on stress. For seven nights, they measured participants' sleep with a combination of smart watches and daily diaries to monitor people's sleep quantity and quality. After seven nights, a psychological stress protocol was created for each participant by exposing them to a number of stress tasks while monitoring their high-frequency heart rate variability with an electrocardiogram (ECG).

Mezick and colleagues (2014), found that during stressful tasks more sleep time was related to a lower heart rate, while less sleep time was related to a decrease in high-frequency heart rate variability. Both results showed that stressful tasks had a greater impact on people who slept less. Importantly, for men who slept less, a stressful task did not only impact immediate heart rate, instead their heart rate remained higher for longer even after the stressful task was concluded. This finding underlined the impact of sleep on a person's reaction and ability to recover after being exposed to a stressor. Another relevant finding produced by this study was in regard to the significant impact of naps. Mezick and colleagues found that naps moderated the effects on heart rate to such an extent that, when adjusting for naps, the relationship between sleep and heart rate was no longer significant.

Other researchers came to similar conclusions about the relationship between sleep and stress when looking at the activation of the Hypothalamic-Pituitary-Adrenal (HPA) axis, which is an indicator of a person's increased stress levels (Troxel et al., 2007). In fact, prior to Mezick et al.'s study, sleep had already been found to inhibit proper functioning of the HPA axis. To better understand this relationship Kumari et al. conducted a study in 2009 using cortisol

secretions as a measure of HPA axis activation. In their study, they used data from 2,751 participants from Phase 7 of the Whitehall II study cohort, which took place between 2002 and 2004. In this cohort study, participants' sleep quantity and quality was measured for seven days, while cortisol was measured using salivary cortisol secretions on six occasions throughout a normal weekday.

Results showed that sleep duration influences next day cortisol secretion (Kumari et al., 2009). This effect was even stronger when sleep duration was combined with sleep disturbance. Interestingly, sleep disturbance alone was not related to cortisol secretion at the beginning of the day and did not appear to have an effect until eight hours after participants woke up. On the other hand, sleep duration impacted the slope of cortisol secretion throughout the whole day. The longer people slept, the lower their cortisol levels ended up being at the end of the day, which strongly pointed towards dysregulation of the HPA axis. This effect was especially observable in participants who had less than five hours of sleep. These effects remained significant even when controlling for mental health, health behaviours, and social position.

Similar connections between sleep and stress were also found by Bassett and her colleagues (2015). In contrast to Kumari and colleagues' (2009) findings, Bassett et al. (2015) found that sleep quality had a significant effect on cortisol secretions, while self-reported sleep duration did not. According to Bassett et al., poor sleep quality and not quantity impacts a person's ability to regulate their response to a stressful situation. It should be noted that Bassett and colleagues' study only had 73 participants and a different measure of sleep quality was used in both aforementioned studies. This perhaps accounts for some of the contradicting findings. Given these differential findings the present study will consider how participants experience the effects of sleep quality in contrast to sleep quantity. Bassett et al.'s research added that they found differences in cortisol stress responses between genders, with poor quality sleep impacting men more strongly than women. They hypothesized that sex hormones

may serve as a moderator of the relationship. The present study will also consider whether sleep influences men and women differently.

In addition to stress, researchers have found a connection between sleep quality and obesity. Maugeri and colleagues (2018), explored the relationships between obesity, sleep, and sleepiness, independent of diet, using data from the '2030 Brno Kardiovize' cohort. The cohort consisted of a random sample of 1,482 25-to-64-year-old male and female residents of Brno, the second largest city in the Czech Republic. The results of the study showed that independently of diet and physical activity, sleep duration as well as daytime sleepiness were related to obesity (measured by BMI). Even when controlling for a number of variables, such as physical activity and diet, people with short sleep duration were significantly more likely to be obese or overweight than people with medium or long sleep duration. Furthermore, the researchers also found that excess daytime sleepiness was related to central obesity (i.e. obesity around the abdomen), which carries the highest mortality risk of any form of obesity.

The findings of Maugeri et al.'s study should be considered with caution as the study did rely on self-reporting which opens up the likelihood for self-report bias (Bai et al., 2020). Equally, sleep deprivation alone cannot be considered as the single cause of obesity. However, this research does highlight a largely negative physiological impact of sleep deprivation on the body. In fact, other research has also pointed to a link between sleep deprivation and obesity in children (Chaput, 2016) and adults (Cooper, et al., 2018). These studies also point to some of the mechanisms with which sleep influences significant contributors to obesity, namely decreased activity and increases in food intake. Researchers suggest that sleep deprivation causes changes in appetite hormones which lead to increased hunger and thereby an increase in food intake. Additionally, people who voluntarily restrict their sleep are more likely to eat more frequently, snack more, and consume more calorie-dense meals. Finally, sleep deprivation increases fatigue which cause a decrease in physical activity.

Some of the most ground-breaking research in recent years on sleep and health was conducted by David Holtzman (Beil, 2018). About a decade ago, while exploring causes for Alzheimer's disease, Holtzman discovered that brains have the ability to clean themselves by removing metabolic debris like A-beta which are thought to lead to the death of neurons. He made this discovery by forcing mice to either fall asleep or stay awake while monitoring their A-beta levels. When comparing the mice that were forced to be awake to the mice that were not, Holtzman noticed that their A-beta levels varied up to 25 percent, which he argued would likely cause aggregate damage to the brain over time. This finding could explain why restricted sleep not only leads to adverse health issues, but also why it led to eventual death in the aforementioned Chinese prisoners or the dogs in Marie de Manacéïne's late 19th century study.

Another health aspect related to sleep is pain (Wei et al., 2018). In their paper 'Insomnia really hurts: Effects of a bad night's sleep' scientists used data from 3,508 volunteers, recruited through a Dutch online psychometric data collection platform. Wei and colleagues found that perceived pain got worse after a night of poor sleep, while the opposite happened when participants had a good night's sleep. Interestingly, the relationship between sleep and pain appeared to be bi-directional, in that pain would also increase the likelihood of a bad night's sleep occurring.

Abeler and her colleagues` (2021) research supported the idea that pain and sleep may have a bi-directional relationship. In contrast to the Wei et al.'s 2018 study, when Abeler and colleagues (2021) adjusted for mental distress as a predictor of next day pain, results became non-significant. They concluded that mental distress may mediate the relationship between sleep and next day pain. It is noteworthy that Abler and her colleagues used a small and select sample for their study. Only 56 people participated and they were all residing in a sub-arctic municipality in Norway and recruited from the University Hospital of North Norway. While this study's methods appeared to be more thorough (using multiple data points or measuring

sleep using actigraphy measures), their sample is hardly as representative as the study conducted by Wei and colleagues. In either case the research points to sleep influencing some form of distress, whether it is physical or mental.

Poor sleep has also been found to influence people's health in more consequential ways. Some studies found that restricted sleep impacts inflammatory and metabolic responses, increases the risk of suffering from cardiovascular disease or type 2 diabetes, and may even lead to death (Banks & Dinges, 2007; Kumari et al., 2009). Moreover, and perhaps not surprisingly given that sleep appears to influence stress and overall health, sleep has also been found to impact performance (Klier et al., 2021). Researchers have found that in CrossFit athletes sleep quality had an impact on their athletic performance outcomes. This effect was especially significant during more mentally straining or cognitively demanding CrossFit events.

The above research highlights the breath of influence sleep has on people's health, stress, and next day performance. Yet, the effect of sleep does not seem to stop there. Studies have consistently found sleep to also significantly impact cognition (Williamson & Feyer, 2020).

Cognition

In a collaboration between the University of New South Wales in Australia and the University of Otago in New Zealand, Williamson and Feyer (2000) set out to understand to what extent cognition is impacted by sleep. They found that 17-19 hours of no sleep has either the same or an even worse effect on an individual's cognition than the maximum permitted blood alcohol level for driving in Aotearoa, 0.05% ("Drink-driving limits in New Zealand", 2020). More specifically, Williamson and Feyer found people to perform up to 50% slower on accuracy tests after 17-19 hours of waking time. This was a concerning finding as many people frequently remain awake for that amount of time, meaning that many people are exposed to

risks that they may well be unaware of. People who have been awake that long still drive, work, operate heavy machinery, and are expected to function in society, though their cognition is inhibited to such an extent that it will impact their ability to do so safely. Other studies added to this research by finding that sleep deprivation exacerbates the effects of alcohol consumption by influencing next day fatigue and hangover symptoms (Rodrigues et al., 2021).

However the finding that sleep, or a lack thereof, influences cognition was not a new one at the time. A few years before Williamson and Feyer's 2020 study Pilcher and Huffcut (1996) performed a meta-analysis to explore the effects of sleep on cognition, mood, and performance. They were able to find 19 original research studies, utilizing a total sample size of nearly 2,000 participants. Based on this research, they concluded that human functioning is clearly and significantly impacted by sleep deprivation. More specifically, they found that sleep impacts not only cognitive performance, but also mood and motor performance. Moreover, sleep deprivation was found to have the strongest effect on mood, followed by cognitive performance and finally motor performance.

Even more interesting was their finding on the influence of partial sleep deprivation (less than five hours of sleep in 24 hours). Partial sleep deprivation had a more significant effect on individual's cognition and mood than short-term (45 hours or less) and long-term (46 hours or more) sleep deprivation (Pilcher & Huffcut, 1996). Fully sleep deprived participants performed one standard deviation worse than non-sleep deprived participants, while partially sleep deprived participants performed two standard deviations worse than non-sleep deprived participants. The authors hypothesized that this may be due to the effects less than five hours of sleep may have on circadian rhythms, in contrast to total sleep deprivation which was found to have no effect on circadian rhythms. Such a finding in a meta-analysis with a large sample size is highly relevant, especially for individuals who are frequently exposed to partial sleep deprivation, such as parents with young children (Hagen et al., 2013).

More recently researchers have expanded further on the idea that sleep has an effect on cognition. In a review, Banks and Dinges (2007) describe that restricted sleep (i.e. less hours of sleep) leads to a decrease in psychomotor vigilance, slowing of working memory, lapses in attention, reductions in cognitive throughput, and perseveration of thought. The significance of this effect becomes more prevalent the more sleep is restricted (i.e. limiting sleep to four hours a night has a more powerful effect on people than restricting sleep to six hours). It would also appear that the neurobehavioral effects of sleep restriction accumulate over time, meaning that the longer sleep is restricted, the more it will affect a person. Worryingly, it is common for people to chronically restrict their sleep to under seven hours a night. Depending on how much sleep is missing, strong effects may not be noticeable immediately, however they will accumulate over time and cause significant cognitive impairments and impairments to one's ability to function properly.

Unfortunately, a night's sleep is made up for more than sleep duration. Another factor that influences a night of sleep is sleep disruption (i.e. waking up after falling asleep) which is especially common in parents with young children (Macdonald et al., 2021). The effects of sleep disruption on people have been well established for some time. To test these effects Bonnet conducted a study in 1985 wherein he asked ten young adults between the ages of 18 and 32, who rarely took naps, to spend five nights in a sleep laboratory. After a baseline night where participants slept normally, two sleep disrupted nights took place, followed by two nights for recovery. On the two nights where sleep disruptions took place, participants were awakened after every minute of sleep in one of two ways: by answering a question or pressing a button that was out of reach. To make sure participants do not lose too much total sleep time, 30 extra minutes of bedtime were added on the two test nights. This way, total sleep time was not reduced by much, while only small amounts of REM or slow-wave sleep took place. Only about an hour of total sleep was lost on disruption nights.

Bonnet (1985) found that the impact those two test nights of sleep had on participants were equivalent to what would be expected if participants did not sleep at all. Disruptions impacted people's sensitivity to external stimulations, their performance, and their mood, which was in line with what Pilcher and Huffcut (1996) found a few years later when looking at total sleep loss. Even recovery sleep on the two nights following the disruption nights was equivalent to what would be expected, if no sleep took place on disruption nights (Bonnet, 1985). This has serious implications for parents of young children and infants that cause sleep interruptions and reductions in overall sleep time (Macdonald et al., 2021).

Mood

As sleep affects the central nervous system, it is not surprising that it would also impact a person's mood and emotions (Fadzil, 2021; Troxel et al., 2007). In their aforementioned meta-analysis Pichler and Huffcut (1996) already showed that mood is significantly influenced by sleep deprivation. More recent research added to this finding by taking a closer look at sleep quality. Studies were able to show that in addition to sleep quantity, sleep quality appears to also have an effect on individuals (Meltzer & Mindell, 2007). Specifically mothers who had children with significant sleep disruptions were more prone to depressive symptoms than mothers with children who did not have sleep disruptions.

Even more recently, researchers have discovered correlations between sleep quality and depression in both mothers and fathers (Hall et al., 2017). One study even found sleep to be a key predictor for a person's next day affect (Hamilton et al., 2008). In addition, sleep can serve as a buffer, enabling people to recover from days that contained more negative events. So not only can sleep predict a person's affect the next day, but it also intervenes with their ability to leave the negative events of the previous day behind. Even more substantial was Hamilton and her colleagues' finding that the aftermath of a poor night's sleep would add up over time, making it increasingly difficult for people to recover.

Sleep is by no means the only predictor of mood, yet these studies clearly highlight the influence of sleep on people's mood, emotional functioning, and emotional recovery. While sleep alone does not guarantee negative mood, the evidence highlights the increased likelihood of negative reactions to negative events. More importantly, the reaction is likely to last longer than it would following a better night's sleep, as sleep influences people's ability to emotionally recover.

Other studies have added to this by pointing out that one's capacity to regulate emotions and one's emotional reactivity, would also affect sleep quality (Gruber & Cassoff, 2014). This means that the relationship between sleep and affect may be bilinear. A few nights of poor sleep, with regard to either time or quality, could thereby severely impair a person's ability to moderate their own emotions, which in turn would interfere with their ability to get a good night's sleep. This is highly concerning as a bad night's sleep could start people on a run of negative affect, making a good night sleep simultaneously more important and more difficult to obtain. One could easily picture the consequences this could have on mental health, especially for people who do not understand the importance of sleep.

One way out of the vicious circle of sleep and affect could be mindfulness-based practices which have been shown to positively impact both affect and sleep (Campbell et al., 2018). As mindfulness involves experiencing the present moment with purposeful attention to the surrounding environment, it can be consciously manipulated more easily than one's affect. In fact, Campbell and colleagues argued that mindfulness serves as a mediator between sleep deprivation and needs satisfaction. Therefore, if mindfulness could be utilised through practice or conscious application, this may have an effect on needs satisfaction, thereby affecting sleep and setting one up for a positive feedback loop. In fact, recent studies support this presumption by describing that mindfulness-based interventions can positively influence sleep outcomes (Shallcross et al., 2019). Ironically, it is also worth noting that additionally to affect and

emotional resilience, mindfulness is also impacted by poor sleep practices (Campbell et al., 2018). In fact, mindfulness was found to have decreased significantly after only one night of sleep deprivation, faster even than the effects of sleep on other psychological functions.

Quantity or Quality

While the evidence clearly shows that sleep influences individuals, there is some debate on whether sleep quality or sleep quantity has a greater impact on people. To date, studies have found some evidence for both. A good example of this debate are the aforementioned findings of Kumari and colleagues (2009) and Sarah Basset and colleagues (2015). Both Kumari et al. and Bassett et al. agree that sleep is significantly related to next day stress, measured through cortisol secretions. They also agree that this strongly indicates dysregulation of the HPA axis. However, their results disagree on whether sleep duration or quality has a stronger impact on next day stress. While Kumari and colleagues (2009) found next day stress to be more strongly related to sleep duration, Bassett and her colleagues (2015) not only did not find this relationship, but also found that sleep quality affects next day stress. On the other hand, it is entirely possible that both results are correct due to the differences in their methods, as Kumari et al. measured participant cortisol throughout a regular day while Bassett at al. measured participant cortisol secretions in relation to a psychosocial stress test protocol. Therefore, it could be that sleep duration impacts the slope of cortisol secretion during an average day, in support of Kumari et al. findings, while sleep quality serves as a buffer to stressful stimuli, supporting what Bassett et al.'s found. In either case both studies show that poor sleep inhibits proper functioning of the HPA axis, which is a finding that is also supported by other research (Troxel et al., 2007).

To settle this debate, Finan et al. (2015), set out to specifically contrast the effects of sleep duration with the effects of sleep quality on human functioning. While Kumari and Bassett and their respective colleagues worked with vastly different sample sizes and varying

procedures, Finan, and colleagues' study was able to test the effects of both sleep quality and quantity using the same sample. They did so by conducting a human experiment wherein the same participants underwent sleep restriction on three nights and sleep interruption on three other nights. They also ensured that reductions in total sleep time were comparable for both parts of the experiment. They then looked at the effects of restricted sleep, by quality or quantity, on the participants' mood. Results clearly indicated that sleep continuity disruption has a larger effect than delayed bedtime. Moreover, in line with the aforementioned research by Banks and Dinges (2007), Finan et al. (2015) found the effects of poor sleep would accumulate over time. Interestingly, they also found that forced awakenings not only increased negative mood, but they also caused a deficit in participant's ability to feel positive emotions.

How Much Sleep do we Need?

While the sleep quality or quantity debate may be still ongoing, most scientists agree that sleep is vital for human functioning. Nevertheless, researchers have struggled to define exactly how much sleep a person needs (Banks & Dinges, 2007; Ferrara & De Gennaro, 2001; Chaput et al., 2018). Ferrara and De Gennaro set out to determine this in their 2001 review titled 'How much sleep do we need?'. They reported that according to most studies the amount of overall sleep has decreased over the past 50 or 100 years. This decline in overall sleep time has also been observed by other researchers (Kumari et al., 2009). Nevertheless, the question of how much sleep is needed cannot be answered by simply observing how much people actually sleep. In fact, there appear to be a number of factors that influence how much sleep an individual requires. This is perhaps best highlighted by the finding that sleep need does not even remain steady within individuals throughout their lifespan (Rathus, 2010). Instead, sleep appears to decrease over time. More specifically, sleep time is highest right after birth as toddlers are sleeping up to 16 hours a day, including naps (Rathus, 2010; Schlieber & Han, 2021). In preschool children sleep is found to be between 13 and 10 hours a day and according

to Mindell and colleagues (2013), during this time sleep duration decreases by 42 minutes. The time children spend sleeping then continues to drop more sharply until late adolescence, after which the decline in sleep time continues at a slower pace (Fernandes-Junior et al., 2016; Rathus, 2010). Interestingly, there appears to be even more going on underneath the surface.

While total sleep time steadily decreases over a person's lifespan, non-REM does not always behave the same way (Rathus, 2010). In fact, when a child is born, at first their non-REM sleep increases. More specifically, as new-borns adjusts to their novel environment in the first 15 days of their life, REM sleep takes up more than half of a child's total sleep time. After the first 15 days, REM sleep begins to dramatically decrease. This decrease in REM sleep is responsible for the decrease in the child's overall total sleep time. It is around age two that the amount of non-REM sleep begins dropping off. During these first two years, non-REM sleep rises from approximately 8 to 10 hours a day. Shortly thereafter REM sleep begins to stabilise and remains largely stable over one's lifetime, while non-REM sleep continues to decline. Therefore, as one's age increases beyond age two, it is non-REM sleep and not REM sleep that is primarily responsible for the drop in total sleep time. This reduction in total sleep time is not always as voluntary as it would appear at first glance. For example, as adults get older it becomes harder for them to fall and stay asleep, which leads to further reductions in total sleep time (Chaput et al., 2018).

Governments have also attempted to offer recommendations on sleep duration. Acknowledging the declining need for sleep as people age, the New Zealand National Sleep Foundation suggests that adults under 65 should sleep between seven and nine hours, while adults over 65 should sleep seven to eight hours ("Sleep tips for adults", 2018). When numbers are mentioned in research, these are usually in line with the New Zealand National Sleep Foundation's recommendation. In fact, a few studies have stated that the number of "Adequate" sleep hours lies somewhere between seven and eight or seven and nine hours (Banks & Dinges,

2007; Hagen et al., 2013; Mezick et al., 2014). These numbers were supported by the findings of the aforementioned Czech cohort study on sleep and obesity (Maugeri et al., 2018). This study that included 1,482 participants, found that 70% of the adults slept between seven to nine hours, while approximately 30% slept less than seven hours, and only less than 1% slept more than nine hours.

While there is ample evidence that less than seven hours of sleep can lead to adverse effects in most adults, there are also a few studies that looked at what happens if a person increases their sleep duration beyond eight or even nine hours (Ferrara & De Gennaro, 2001; Kumari et al., 2009). In their review Ferrara and De Gennaro (2001), found that in regard to performance and sleepiness only small benefits are achieved when sleep is increased to more than nine hours. In fact, Hamilton and colleagues (2008) even found that increasing sleep past a certain point increases fatigue. These findings would imply that the consequences of not enough sleep outweigh the nearly non-existent benefits of too much sleep.

Most studies would agree that not even the average sleep need for a group is indicative of the actual sleep requirements of an individual (Chaput et al., 2018). This belief is also shared by researchers who attempted to define the aforementioned sleep need range for most people (Banks & Dinges, 2007; Ferrara & De Gennaro, 2001). Researchers agree that even if a study was to uncover the average number of sleep required by a specific group, as soon as more participants or variables like cultures or family values get introduced, the so-called “Average” sleep need begins to shift. In fact, researchers have argued that sleep needs can vary based on a variety of factors including one’s age, genetics, culture and background, overall behaviour, daily schedule, family, personal routines, social or environmental factors, or one’s position in the morningness-eveningness continuum (Banks & Dinges, 2007; Chaput et al., 2018; Ferrara & De Gennaro, 2001).

Ferrara and De Gennaro (2001) concluded that the uniqueness of our sleep need is best compared to the individuality of our dietary requirements, specific to every person and unique on every day. This is why most researchers and studies agree that the search for a magic number of required sleep is most likely in vain (Chaput et al., 2018). Instead, the most reliable answer to the question of how much sleep we require is one presented by Chaput and colleagues "…individuals obtain the right amount of sleep if they wake up feeling well rested and perform well during the day." (p. 421).

Gender, and Culture

Two additional factors that need to be considered when conducting research on sleep are gender and culture. Not all sleep research clearly indicates that there are gender differences. However, a number of studies have found that gender significantly impacts how sleep is experienced by individuals (Angelhoff et al., 2017; Hall et al., 2017). When comparing women and men, women were found to be more susceptible to sleep disturbances, while men's cortisol responses (used to measure stress) seem to be more significantly influenced by their past night's sleep (Bassett et al., 2015; Troxel et al., 2007). Meaning, that while women suffer more sleep disruptions, they are also more resilient to the effects of poor sleep. Researchers argued that this may be in part due to sex hormones, as they can impact women's stress responses and thereby serve as a buffer for them.

In contrast to sleep and gender, studies on cross-cultural differences and sleep paint a clearer picture, with most researchers agreeing that there are definite distinctions. In one such study Mindell et al. (2013) used a sample of 2,590 children to review cultural differences between what they defined as mostly Asian and mostly Caucasian countries. Mostly Asian countries included Singapore, Thailand, Japan, Korea, China, India, Hong Kong, Malaysia, and the Philippines, while mostly Caucasian countries consisted of New Zealand, the United States, Canada, the United Kingdom, and Australia. Mindell and colleagues found that children in

mostly Asian countries go to sleep much later and sleep for less hours at night than those from mostly Caucasian countries. An extreme example of this was the contrast of India and Australia/New Zealand as bedtime in India is almost three hours after regular bedtime in Australia/New Zealand, 10:26pm and 7:43pm respectively. Interestingly, children in mostly Asian countries made up for the difference in total sleep time with daytime naps, suggesting that overall sleep need might still be the same.

These findings not only highlight the importance of understanding individual sleep practices when dealing with a diverse sample in a sleep study, they also underline the relevance of daytime naps. This is not to say that differences can only be found between countries with predominantly different racial heritage. In fact, a study looking at American and Italian adolescents showed that Italians have significantly better sleep hygiene (going to sleep at regular times) than American teens (LeBourgeois et al., 2004). The present study will remain mindful of these findings when conducting sleep research with a multicultural sample.

In summary, research would suggest that sleep measurably influences people's mood, cognition, reaction to stress, and overall health. While there is some debate on precisely how much sleep a person needs and whether quality or quantity has the most significant effect on individuals, it is clear that sleep has an effect on people's next day functioning. The following literature review will explore how sleep intersects with parenting young children.

Sleep and Parenting Literature Review

Research clearly indicates that while there is diversity in sleep need, every person is in some way affected by sleep. Now, first studies are beginning to look into how sleep influences parenting (McQuillan et al., 2019; Tu et al., 2018). However, research on parenting young children still remains scarce (Bai et al., 2020). The present paper hopes to fill this gap. Before focusing on the currently available research on parenting and sleep, this chapter will first explore the relevance of parenting and development in young children.

Parents and Young Children

As primary caregivers and often primary sources of human interaction, parents significantly impact their young children (Ku et al., 2021; Mak et al., 2020; Rempel et al., 2012). Young children depend on their parents for their basic physical and developmental needs. Parents also carry primary responsibility for their children's health, security and safety, nutrition, emotional development, and learning (Pierce, 2020). Providing sufficient support and resources for their children requires parents to be attentive, available, and in control of their emotions. Elements that are all significantly influenced by sleep. As discussing all theories on human development is beyond the scope of this paper, the following sections will focus specifically on developmental theories that are closely related to sleep, such as parental emotional control and availability, or children's development of secure attachments and emotion regulation.

Parental Emotional Control and Availability

While looking at the connection between parenting stress and childhood behaviour problems, Mak et al. (2020) found that there is a strong relationship between the two. In fact, they concluded that both childhood behaviour problems and parenting stress increase in tandem, which means they may affect one another. The way researchers suspected this relationship works is: parenting stress increases a parent's negative emotions which limits their

ability to have appropriate reactions towards their children; these reactions in turn negatively influence the child's behaviour which can have an effect on parenting stress. As sleep clearly influences people's reaction to stress, poor sleep could exacerbate this relationship and thereby indirectly contribute to children's behaviour problems.

However, it is not only parent's emotional control that appears to influence young children. Philbrook et al. (2014), explored the effects of mother's emotional availability on young infants at bedtime. In their study researchers visited families three times when the children were aged one month and three times when the children were aged three months. Ninety six mothers took part with children aged one month and 88 took part when their children were three months old. Researchers used the Emotional Availability Scales (EAS) to measure maternal emotional availability during infant bedtime. The EAS includes four scales, non-hostility, sensitivity, non-intrusiveness, and structuring. Using video and audio recordings, infant temperament questionnaires, and by receiving cortisol measurements from children before bedtime researchers explored the effects of maternal emotional availability. Results showed that mothers' emotional availability was related to children's cortisol secretion at bedtime. In fact, the more emotionally available mothers were, the lower the children's cortisol secretions were. This effect was significant at both one and three months of the children's age. Finally, children also reacted with less cortisol secretions when their mothers presented routine caregiving and non-hostility.

Another study measuring the relationship of cortisol and emotional availability found similar results in slightly older children (Senehi et al., 2021). Senehi and colleagues looked at mother-child relationships, with children at a median age of around 1.5 years. They found that children's hair cortisol concentration was moderated by the mother's emotional availability. The higher a mother's emotional availability was, the lower amounts of hair cortisol were found in children.

Gökçe & Yılmaz (2018), conducted yet another study which highlighted the importance of parental emotional availability. In this study parental emotional availability was described as the ability to control emotions, emotional expressions, compromise, sensitivity, non-hostility, and emotional participation. The research uncovered that a lack of maternal and paternal emotional availability negatively impacts a child's ability to regulate their emotions later in life.

The above research clearly indicates that parental emotional availability has an impact on children. This is further supported by Cummings and Patrick's (1995) findings that emotional availability plays a key role in a child's emotionally secure development. However, the links back to parental sleep require further research. First studies have begun to look at this connection. One of these was conducted by Bai and colleagues, (2020) who found parents' emotional availability to be inversely related to their sleep quantity and quality. Given this finding, it stands to reason that improving a parent's sleep quantity and quality could benefit the parent's ability to be emotionally available for their children, which in turn would help the children develop more secure attachments.

Furthermore, as sleep disturbances have been found to influence people more as the day progresses, the effects of improving parents' sleep are likely more evident in later parts of the day (Troxel et al., 2007). This is when children are especially dependent on their parents' emotional control for a healthy night-time routine. Such routines have been found to increase children's sleep quality and quantity, and, if established early, can serve to support children's long-term development and well-being (Mindell et al., 2013; Rathus, 2010; Schlieber & Han, 2021).

Secure Attachment

Another crucial role that primary caregivers are responsible for is creating a safe and secure environment for their children (Sroufe, 2005). Constructive child development requires

an emotionally, psychologically, and physically secure environment where the child can engage with the world around them at the pace and in the way they personally require (Cummings & Patrick, 1995; Sroufe, 2005; Waters et al., 2021). In fact, studies have found that the higher the quality of childcare was in childhood, the more likely adolescents would be secure in their attachments in later life (Waters et al., 2021).

The consequences of insecure attachment were explored by Sroufe in 2005. Sroufe found a number of differences in social competence between children who were securely attached and those who were not. Infants and children who had a secure attachment history grew up to be more confident, resilient and ego resilient, having more self-esteem, and were more independent later in life. Moreover, infants with secure histories were better at coping with social problems like aggression, frustration, or just giving up. These individuals were also found to be more persistent, flexible, and co-operative in their interactions. On the other hand, infants, and young children, whose parents were psychologically unavailable, developed anxious-resistant or anxious-avoidant attachments. These attachments predicted less self-reliance, more dependence, more disorganisation, and more avoidance and resistance in later life. Furthermore, anxiously attached infants would go on to deal with frustration by whining or demonstrating fretful non-compliance. In addition, insecurely attached children are more likely to develop anxiety, social withdrawal, aggression, impulsivity, depression, and hostility later in life (Cummings and Patrick, 1995). Sroufe concludes that attachment experiences made in early life are "vital in the formation of the person" (Sroufe, 2005, p. 365).

There are many ways in which parents can influence how their children perceive the safety and security of their environment and enable them to create secure attachments. According to Cummings and Patrick (1995), in its simplest form children's feelings of security are impacted by the perceived ability and availability of their parents. This ability or availability can be impacted by parent-child conflict, parental depression, or even parental couple conflict.

If, for example, children perceive their parents' conflict as non-constructive, it can lead them to view their parents' marriage as insecurely attached, which in turn would negatively influence the child's assessment of their own attachment to them (Fosco & Grych, 2012). Moreover, the way the couple behaves towards each other will also influence their behaviour towards their children thereby further influencing the child's feelings of security.

In line with these findings, Negrini (2020) argues that children will use the parents' alignment as a reference point for a safe and secure environment. This enables especially young children to actively explore the world around them and thereby serves as a crucial element for early childhood development. Apart from impacting a child's wellbeing at the time, consistency and predictability on the side of the caregivers also predicts the child's mental health. Moreover, significant within family conflict not only has an impact on the child's emotional security, but also their psychological, social, physical, and emotional wellbeing and development (Amir, 2017). This effect appears to be strongest when the children are young and the conflict is within the parental unit (Negrini, 2020). Perhaps this is because of the dependence of young children on their parent's emotional availability (Senehi et al., 2021).

These findings clearly show that stability in the family unit helps create a safe and secure environment for children. Such an environment in turn supports the development of secure attachments in young children. As sleep has been found to influence spousal marriage satisfaction it may serve as a moderator in the relationship of sleep and parenting (Maranges & McNulty, 2017). Further research looking at the effects of parental sleep on depression, also suggests that sleep could play an important role for parents and thereby children's development of secure attachments (Hall et al., 2017).

Emotion Regulation

To better understand the impact of the family unit on children, Fosco and Grych (2012) conducted a study looking at what influences children's emotional regulation. Their results

showed that children's emotional regulation was affected by family negativity, family positivity, as well as maternal and paternal warmth and emotional support. Interestingly, all four elements were also influenced by inter-parental conflict. In fact, the increases in tension and hostility along with the decrease in family members` positivity resulting from parental conflict appeared to disrupt the family's general emotional climate. It would therefore appear, that while inter-parental conflict may not directly undermine children's emotion regulation, it affects the mechanisms that influence children's ability to manage their own emotions. Simply put, when parents fight, they are less able to create a positive environment for their children which impacts parents' ability to give their children the required sense of security, warmth, and emotional support they require. This in turn affects the children's ability to regulate their own emotions, in addition to the aforementioned development of secure attachments.

Morris and colleagues (2007) reviewed the present literature to explain how the family context influences the development of children's emotion regulation. They argued that this happens in three ways: observation, parenting practices, and the family emotional climate. First, children learn about appropriate behaviour and acceptable ways to manage their own emotions by observing the family environment. This is also where they learn to manage how they experience their emotions. If parents are less likely to regulate their emotions, so too children will be less likely to feel a need to regulate their own emotions. Second, with appropriate parenting practices parents can serve as emotional coaches and help children manage their reactions to their own emotions. Third, when expanding on the mechanisms at play in the family's emotional climate, the authors argued that marital relations could also influence children's emotional regulation. In line with aforementioned research by Fosco & Grych (2012) Morris et al. (2007) suggest that this is because children exposed to family or marital conflict feel less emotionally secure, even if the conflict is not directed at them.

Morris and colleagues (2007) also briefly mention a number of other mechanisms that are at play as children develop the ability to regulate their own emotions. The researchers state that all three influences (observation, parenting practices and behaviour, and family emotional climate) are influenced by parental characteristics, such as mental health, ability to regulate one's own emotions, and the parent's family history. Furthermore, they claim that a parent's characteristics (mental health, emotional regulation, family history) will also have an effect on the child's characteristics, which may make them more or less able to regulate their emotions.

Sleep directly or indirectly influences most of these relationships and in that the family environment a child is exposed to. Specifically, sleep influences parents` emotions, emotional expression, parenting practices, and their marital relationships (Bassett et al., 2015; Gruber & Cassoff, 2014; Maranges & McNulty, 2017; Martorell and Bugental, 2006). As such, sleep has an effect on the amount and constructiveness of inter-parental conflict as well as parenting practices. Thereby, sleep impacts the family's overall functioning and emotional climate which in turn has an effect on children's feelings of secure attachment and healthy emotion regulation.

Parenting Practices vs Parenting Style

Before concluding this section, a distinction between parenting style and parenting practices must be made. Parenting style sets the context of parenting, while parenting practices refer more to day-to-day parenting behaviour (Fox et al., 1995). Parenting style is largely comprised of the parent's views on parenting, attitudes towards the child, and the emotional climate in which parents express their behaviour. Usually, parenting style is split into four categories: authoritative, defined as strict and demanding but responsive and warm; authoritarian, defined as strict and demanding and non-responsive and cold; neglectful, which is neither demanding nor warm or responsive; and permissive parenting which, while warm and responsive, is also characterised by inconsistent discipline (Morris et al., 2007; Tu et al., 2017). Parenting practices, on the other hand, do not have set categories, as they are guided

more by elements such as parental mood, behaviours, or parent's socialization objectives on a given day. (Gordon et al., 2021; Morris et al., 2007)

To date, most research has focused on parenting style (Fox et al., 1995). One example of such research is a study by Chaudhuri et al., (2009). They found that parenting style is predicted by personal experiences, ethnic background, and family income. In another study, parenting style was found to predict children's academic performance, with children of uninvolved parents spending an average of over two more years in school compared to children of authoritarian parents (Majumder, 2015). As parenting styles have shown to be a relevant factor in child development, the present study will acknowledge these if they are noticed throughout the research process (Majumder, 2015). However, parenting practices will be the focus of this study, as parenting practices refer more to daily variability in parental behaviour.

This section has highlighted the crucial role parents play in child development. Moreover, the section has described some areas where sleep, or sleep deprivation might play a role in the relationship between parents and their children. The following section will briefly cover developmental theories relevant to the specific age of the children focused on by the present study.

Development in Young Children

Parents significantly influence the development of their children. However, there is arguably no more impactful time in a person's development than the first years of their life (Rathus, 2010). The following section will first discuss why the present research has selected to focus on young children beyond infancy. Later, this section will offer a brief overview on popular developmental theories before describing Piaget's theory on development in more detail. Piaget's theory of development was selected to guide this paper as it is one of the most prominent and well researched developmental theories. Furthermore, Piaget's theory also acknowledges children's evolving ability to think and interact with their environment in new

ways as they get older. As such, this theory helps highlight the importance of parental involvement at specific developmental stages. Special attention will be given to what Piaget called the pre-operational stage, as this includes children between the ages of approximately 18 months and seven years (Piaget, 1964). Finally, this section will offer an overview of current research on development in early childhood.

Early childhood is a time of rapid development children are forming basic cognitive, behavioural, and emotion regulation skills as well as building early maps of the world around them (Mak et al., 2020; Morris et al., 2007; Rathus, 2010). These maps and skills build a foundation that will influence ongoing development and success in later life making this a crucial age for children. As such, young children need their parents for guidance (Rathus, 2010). Moreover, children at this age are still what Piaget would describe as 'ego-centric', meaning that they view everything that occurs around them as being about them. As children begin to enter school around age five or six, brand new challenges arise for both parents and their children.

Children at a young age need their parents to be vigilant and capable of supporting them through their new explorations, while the child's newly gained mobility forces parents into new challenges. Moreover, it appears crucial at this time that parents meet the child's new and increasingly diverse demands with positivity, attention, and emotional availability (Bornstein et al., 2008; Chronis et al., 2007; Cummings & Patrick, 1995), all of which are influenced by sleep (Banks & Dinges; 2007; Fadzil, 2021; McQuillan et al., 2019; Troxel et al., 2007).

On the other hand, the younger children are, the more significantly they influence their parent's sleep (Hagen et al., 2013). In a meta-analysis, Hagen and colleagues found that the younger children are, the more average sleep minutes their parents loose. As such, children before infancy are likely to cause frequent disturbances in their parent's sleep. These frequent disturbances would likely be far too common for the purposes of the present study. Finally,

another reason to consider non-infant young children for the present study is the considerable lack of research in the area of sleep involving such children (Bai et al., 2020; Kelly et al., 2021).

It is for these reasons, that children at the age of toddlerhood and early childhood are at an ideal age for involvement in the present research and will therefore be the focus of the present study.

Theories on Development

Aside from early mentions of child development by researchers like Charles Darwin in his paper 'A Biographical Sketch of an Infant', the first theory on child development was described by Sigmund Freud (Darwin, 1877; Rathus, 2010). Freud believed that there are five stages of psychosexual development (Rathus, 2010). All of Freud's five stages were largely focused on psychosexuality and the negative consequences of improper actions taken at key developmental stages. Building on Freud's theory, Erik Erikson developed his theory on psychosocial development (Rathus, 2010). In contrast to Freud who believed there was a more singular focus in each developmental stage, Erikson believed that each stage consists of a dichotomy. One example of this are children between the ages of one and three, where according to Erikson children are grappling with the dichotomy of shame and doubt versus autonomy. He also believed that there were developmental challenges in each dichotomy.

Another notable theory was developed by Albert Bandura, who believed that children learn by observing and copying what they see. John B. Watson, Ivan Pavlov, and B.F. Skinner, believed that children learn behaviours through conditioning (Rathus, 2010). Another theory, developed by Urie Bronfenbrenner, suggests that children develop as a result of a number of systems which they are embedded in and which are then embedded in larger systems, and so on. To name one example of this, a child is largely influenced by their family, which is influenced by their economic situation, and so on (Rathus, 2010). Another theory which focuses on the social environment of the child was developed by Lev Vygotsky. His

sociocultural theory claims that children, especially young children, learn from their environment and develop as a result of their social interactions and the social support that they receive (Rathus, 2010).

However, one of the most prevalent theories of child development, and the one that this paper will describe in more detail, was developed by Jean Piaget. During one of his studies at the Binet IQ test lab in Paris, Piaget discovered that children at different ages would give different answers, but that these answers were not simply a reflection of their intelligence, but rather of their development (Asokan et al., 2014). More specifically, he noticed that children, who answered questions incorrectly, did so in a consistent, yet illogical manner (Rathus, 2010). It was then that Piaget discovered that children undergo an orderly sequence in their cognitive and moral development. He argued that there are four main chronological stages of cognitive development, characterised by distinct logic and operational ability (Piaget, 1964).

The first stage of development is called the sensory-motor stage (Piaget, 1964). This stage spans over the first 1.5 years of a child's life. During this stage children develop foundational knowledge such as basic motor skills and basic differentiation of objects. For children, in the first few months of their life, objects have no permanence: as soon as the child cannot see the object, it is as if it no longer existed. At this age children also begin to develop intentional behaviour as well as first emotions, like disgust or distress (Amir, 2017; Rathus, 2011).

The second stage of development is called the pre-operational stage and starts at around 1.5 years. It lasts until approximately age seven and begins with "a reconstruction of all that was developed on the sensory-motor level" (Piaget, 1964, p. 177). In this stage, thought, symbolic function, and language commence. Here the child does understand that an object exists even if it can no longer be seen and that things in the world are connected. Pre-operational children begin to mentally represent the world, while they do not yet have the ability to focus

on two elements of a situation at the same time (Rathus, 2010). A child at this age is not able to understand the reversibility of operations (Piaget, 1964). If, for example, ice is kept in a glass until it melts, the child does not recognise that the same amount of water is present before and after the ice has melted.

According to Piaget (1964), the third stage starts at the age of seven and ends at age 11 and is called the concrete operational stage. At this stage the child evolves beyond ego-centrism and begins to understand that things can be related to each other rather than just to the child themselves. It is shortly after the commencement of this stage that children enter the autonomous morality stage. Moral judgements are now more autonomous and the child understands that actions should be judged beyond the impact they have on the child. At this age children also develop an understanding of ordering, classification, and other fundamental operations of basic logic. This includes basics in mathematics, geometry, and even physics.

Finally, the last stage is known as the formal operational stage, which begins at age 12 (Piaget, 1964). This stage, like all stages before, will require a reconstruction of thought. Usually around age 12, a child becomes able to engage in more complex thinking. This includes an understanding of causation, deductive logic, abstract thought, and hypothesis testing (Heo et al., 2011; Piaget, 1964).

The following section will further expand on the development of pre-operational aged children as they will be a focus of the present study.

Pre-Operational Stage of Development

Piaget claimed that operations were a key mechanism in the development of young children (1964). He describes operations as “actions which lead from one state to another” (p. 186). In mental processes operations are also described as reversible and flexible (Rathus, 2010). Such understanding and logic undergoes significant development in young children. In fact, Piaget believed that similarities in logic between young children in the pre-operational

stage and adults, who are already in the concrete operational stage, are likely purely coincidental. Children in the pre-operational stage have not yet developed the ability to think in a reversible or flexible way. As a result, they are only able to see the world as one dimensional (Rathus, 2010). This way of thinking limits their ability to comprehend transformations and thereby operations (Piaget, 1964). Children at this age will egocentrically put all of their focus on the present state as they see it. One frequently used example to test this is the beaker experiment, which is described in more detail in the upcoming study by Asokan and colleagues (2014).

Additionally to the child's inability to comprehend transformation, the pre-operational stage is characterised by egocentrism (Asokan et al., 2014; Rathus, 2010). Egocentrism means that the child puts themselves at the centre of everything, assuming that everyone shares their point of view, as well as their feelings and desires. The child is therefore unable to understand anything from someone else's point of view. At this age, this is not a sign of selfishness but simply a sign of limited cognitive ability (Rathus, 2010).

At this developmental stage children also begin to show their first signs of moral development and moral realism (Rathus, 2010). Approximately at age five, children begin to understand the connection between actions and consequences, although they still do not have any considerations for intent. Children at this age "judge the wrongness of an act only in terms of the amount of damage done, not in terms of the intentions of the wrongdoer" (p. 375).

According to Piaget (1964), a child's thinking at this age is guided by pre-operational logic and egocentrism. Therefore, parenting practices can be perceived in an unintended way by a young child. Pre-operational children have no understanding for extenuating circumstances and they will judge interactions with parents at face value. If, for example after a fight with a spouse or due to insufficient sleep, a parent is more dismissive or negative towards the child, the child may not have the capacity to understand that they are not the cause.

The child will instead assume that the negativity is a result of their actions or the parent's regular state. Tired parents could therefore lead to children building false maps of the world. For example, if a child draws a picture for her mother and hands it to her, and the mother has just lost her job, her stress may lead to a dismissal of the child or even an untimely expression of frustration. With the child's egocentric view they will have just learned that giving mommy paintings makes her angry or dismissive, which will likely discourage such actions in the future. This speculation is in line with Cummings and Patrick's (1995) presumption that a child's emotional security is not impacted by parental emotions, but rather by the child's observation and understanding of them.

Asokan and colleagues (2014), conducted a study to test Piaget's claims about pre-operational development in young children. They conducted three experiments with 200 children who were aged four to seven years old. The experiments tested children's egocentrism, centration tendency (ability to only focus on a single aspect of a situation at a time), and conservation/reversibility. As expected, Asokan and colleagues found that most children were only able to build their understanding on what they see in front of them and most of their answers were in line with Piaget's theories about pre-operational children. Furthermore, as Piaget would have predicted, as the children's age increased, they were more likely to advance past their pre-operational abilities. In this experiment when asked to describe an image from a doll's perspective 90% of four-year-old children described their own perspective, while only 42% of seven-year-old children did. Similarly, in another part of the experiment where children were asked to judge two rows of coins with the same amount of coins but spread out differently, four-year-olds were more likely than seven-year-olds to judge the spread out row of coins as involving more coins, 92% and 72% respectively. Finally, seven-year-olds were better able, than four-year-olds, 77% and 96% respectively, to recognise the reversibility of liquid in a

beaker experiment wherein researchers would pour the same liquid from a thinner to a wider beaker.

Development in Toddlers and Young Children

More recent studies further highlight the importance of early childhood for the development of cognitive, motor, and behavioural skills (Bornstein et al., 2008; Ku et al., 2021). Parents play a key role in a number of these developments. Karstad and colleagues (2015) for instance, claim that during early preschool years parents influence their children's emotional understanding which predicted future behaviour problems, mental disorders, language skills, and social competence.

Other studies have found similar results when looking at emotion regulation and emotional expression (England-Mason & Gonzalez, 2020). One of the most prominent examples of how children learn emotional expression was conducted by Albert Bandura and his colleagues in the 1960's (Rathus, 2010). They found that if children are exposed to a video of adults hitting a cloud doll, the children are more likely to do so themselves. Bandura and his colleagues argued that observing such behaviour not only teaches children new aggressive behaviours, but also establishes such behaviour as appropriate responses to feelings of aggression. As children use parents as key reference guides at a young age, parents play a critical role at shaping their children's emotional understanding and regulation.

Moreover, early childhood is also a time when children develop key cognitive functions. Mulcahy and colleagues (2021), for example found that receiving behaviour management training at age three to four has a positive effect on executive functioning. This positive effect was found to often last for more than a decade. More importantly, executive functioning is expected to have a positive impact on academic success and mathematical achievements in particular, which in turn could lead to further improvements in executive functioning. In line with these findings, other studies also found evidence for the development

of memory, language, and even perception of time in young children (Andrews, Murphy, & Dunbar, 2020; Qu et al., 2021; Şimşek & Erdoğan, 2020). Parents could provide key contributions in nearly all of these areas, by guiding and supporting their children.

Finally, as children reach toddlerhood, they increase their mobility and independence, sleep fewer hours, and increase their exploratory ambitions (McQuillan et al., 2019; Rathus, 2010). With this, young children beyond infancy pose new behavioural and temporal challenges for their parents (Hagen et al., 2013; McQuillan et al., 2019). These novel challenges simply add to the need for parents to be vigilant, attentive, and in control of their emotions around their young children, all of which is influenced by sleep (Troxel et al., 2007; Williamson & Feyer, 2000). The following section will further expand on these relationships.

Sleep and Parenting

Recent research indicates that there is likely a connection between sleep and parenting. For decades scientists believed that what mattered in regard to parenting were factors like demographic characteristics, the mother's age and development, or the mother's affect (Hubbs-Tait et al., 2006). Interestingly, when including the child's perspective in the equation they discovered that the parent's responsiveness to their child's needs were vastly more important. In short, anything that enhances parent's ability to be responsive has a positive effect on parenting, while anything that inhibits parent's ability to do this has a negative effect on parenting. As Hubbs-Tait and colleagues worded it: "What matters to the parent is having the physical and emotional energy first, to be patient with the child's demands and, second, to respond appropriately to them" (p. 491). Based on the aforementioned studies on sleep one could argue that sleep could certainly qualify as 'disruptive' to a person's ability to be patient or respond appropriately to a child's needs.

In line with this argument, a number of studies have found a relationship between sleep, fatigue, parenting, and emotional state. In one study Hall and her colleagues (2007), found that

mothers who have higher depression scores were more likely to have worse sleep quality, fatigue, and doubts about managing their child's sleep. In another study, researchers found that more stressors were experienced by mothers with depressive symptoms (Gordon et al., 2021). Yet another study, which considered parent's sleep while in hospital with their child, found a relationship between negative mood and sleep quality (Angelhoff, et al., 2017). The researchers that made this finding went on to state that mood affected by sleep can impact a parent's decision making and thereby inhibit their ability to properly fulfil their parenting responsibilities.

In a similar study parents, who were in a hospital with their children, reported that their interactions with their children suffered due to the sleep they had lost (Stickland et al., 2016). The study also found that parent's decisions were compromised by the lost sleep. In line with the parent's abilities decreasing due to the lack of sleep, children also began to misbehave and became more moody as their sleep also decreased. As expected, this led to further negative parent-child interaction. In contrast to Angelhoff and colleagues study (2017), which used participant questionnaires, Stickland et al. (2016) used 30 minute participant interviews to arrive at their results. Both studies had relatively small samples; 35 parents and 15 parents respectively.

One of the mediators in the relationship between sleep and parenting may be fatigue. Dunning and Giallo (2012) using a sample of almost 1,200 mothers of children up to age six, found that fatigue was correlated to parenting stress and parenting self-efficacy. They argued that a mother's ability to deal with parenting stress may be inhibited as they get exhausted physically or mentally. This exhaustion causes them to focus on coping with situations, rather than looking out for the best interests of the child, thereby inhibiting the mother's parenting ability. According to the researchers, parenting stress could also be impacting fatigue just as much as fatigue affects parenting stress, making this relationship reciprocal. Moreover, fatigue

was also found to be related to the amount of joy mothers experience from parenting, which could further handicap a mother's ability to respond appropriately to her child's needs. Dunning and Giallo's findings are relevant as one of the key mechanisms that could impact parental fatigue is in fact sleep quality. This connection could further widen the aforementioned negative feedback loop of sleep and affect (Gruber & Cassoff, 2014; Hamilton et al., 2008). Specifically, sleep could be impacting fatigue, which would influence parenting ability. Decreased parenting ability would decrease parenting satisfaction. Decreased parenting satisfaction would negatively influence affect and a mother's emotional state. This in turn would have a negative impact on sleep, and so on.

Adding to the relevance of the sleep parenting relationship was a study conducted by Lillis and colleagues (2018). The researchers looked at the relationship between sleep, mood, and parent's social interactions throughout the day. They found that sleep quality predicted the mother's emotional health and served as a buffer for negative interactions. Interestingly, the strongest interactions that mothers reported, both positive and negative, included interactions with children.

Perhaps cortisol secretion explains the effect that Lillis and her colleagues found (2018). As mentioned above, cortisol secretion is influenced by sleep (Bassett et al., 2015; Kumari et al., 2009). Martorell and Bugental (2006) argued that maternal cortisol level was strongly correlated with the use of harsh parenting practices. Although their methods did not enable them to conclude a causal relationship, they did find that a mother's perceived powerlessness and the child's temperament were strongly correlated with mother's increased cortisol. The authors' hypothesis for the direction of this relationship was that a child's difficult temperament and a mother's perceived powerlessness increases a mother's cortisol level. That in turn increases the likelihood of the mother exhibiting harsh parenting practices. On the other hand, as their findings are solely correlational, causality cannot be drawn. It may well be that

a mother's increased cortisol influenced both her parenting practices as well as her perceived powerlessness and the expression of the child's difficult temperament. In either case, as sleep impacts cortisol secretion and cortisol secretion increases the likelihood of harsh parenting, these findings should be concerning.

In addition to parents' sleep possibly having an effect on parenting, being a parent per se may have an impact on sleep. To explore this, an Australian study used data from four company-based population studies that sampled men (Macdonald et al., 2021). A total of over 1,200 fathers were included in the sample. Using a single item sleep assessment as well as a more comprehensive test of parental anxiety and stress, the study found a moderate relationship between parental stress and sleep. Interestingly, fathers with higher incomes experienced a one standard deviation higher correlation between the two variables. This suggests that for fathers who are not sleeping well, better financial resources may only add to the stress of parenting.

As can be expected, not only fathers are impacted by their children. Meltzer and Mindell (2007), found that maternal sleep quality was also significantly affected by their children. Specifically, the children's sleep quality predicted maternal sleep quality. This finding is further supported by a study which focused on the parents of children with severe psychomotor impairment (SPMI; Tietze et al., 2014). SPMI was found to be strongly related to significant sleep disturbances. The study found that each night parents would spend an average of one hour caring for their children, which led to severe sleep disturbances in the parent's sleep. As could be expected, the study found that caring for children with SPMI severely influenced the parent's quality of life. Moreover, parental sleep disturbances were related to impairments in parental physical, mental, and even social functioning, as well as working ability.

In yet another study looking at parents who work nights, researchers found that people with children slept less than people without children (Fernandes-Junior et al., 2016). Fatigue

was also more common in people with children, who had less total sleep on weekdays. This research clearly shows that children influence their parent's sleep and therefore that the sleep relationship between parents and children is bi-directional.

However, parenting and sleep cannot be considered in isolation, as most people who have children also live and sleep with a partner (Troxel et al., 2007). The couple is part of the family system and the couple's interactions with each other has an effect on parenting (Cummings and Patrick, 1995). Therefore, the couple's relationship too must be considered in the context of sleep and parenting.

Recent studies have come to similar conclusions which has led to them further exploring the couple-child-sleep relationship. One such study found children's night-time awakenings to be inversely correlated with parents' marital satisfaction, while another study discovered that relationship satisfaction may be related to the couple's sleep quality (Troxel et al., 2007). Furthermore, research has found good sleep to be correlated with marital satisfaction, while poor sleep is related to more marital unhappiness. In line with this research, Maranges and McNulty (2017) found that relationship satisfaction was positively correlated with a good night's sleep for both genders and sleep to influence men's evaluation of and experiences in marital interactions.

These studies highlight a possible relationship between a child's nigh-time awakenings and marital unhappiness, with parental sleep as a moderator. As all of these findings are correlational, it is also possible that marital satisfaction influences child sleep quality with parental sleep as the moderator. However, it is clear that a relationship is indeed present.

Considering the clear presence of a relationship between sleep, children, and the parental unit, it is surprising how little research has looked at the influence of sleep on parenting. The following section will describe the only four studies known to this author that

considered this relationship. The section will also describe why research in this area is still lacking and why further research is required.

The Relationship Between Sleep and Parenting in Typically Developing Children

The area of parenting and sleep is surprisingly understudied, given the growing literature on sleep in the context of the family (Kelly et al., 2021). To this author's knowledge, there are only four studies that have considered the effect that sleep has on parenting in typically developing children (Bai, et al., 2020; Kelly et al., 2021; McQuillan et al., 2019; Tu et al., 2018). All four studies were published in recent years, and most have also stated their surprise about the lack of research in this area.

The oldest of the four studies was conducted by McQuillan and colleagues in 2009. Their study looked at 314 mother-child pairs, with the mother's ages ranging between 21- 50 years old and the children's ages between 2.45-2.89 years old. The sample consisted of mostly Caucasian middle-class families. It took a little over one week and included multiple levels of measurement. On the first day, during a house visit, mothers were asked to complete parenting, stress, and demographic questionnaires. On this day, they were also asked to wear an actigraph watch for one week to measure their sleep. In order to ensure multiple methods of sleep measurement were used, participant sleep duration was controlled for with a daily diary, where participants would enter the number of minutes they slept on the previous night. Four sleep components were considered: timing, variability, activity, and duration.

A few days after the first home visit a second visit took place one hour before the child went to sleep, whereby research assistants would observe the interactions between children and their mothers. Observers also completed the Home Observation for Measurement of the Environment inventory (HOME) and the Post-Observation Questionnaire (POQ). Finally, at the end of the study, mothers were asked to complete a number of questionnaires at the research lab. These included a stress test, social support test, as well as tests measuring parenting hassles,

household disorder, role overload, child aggression, child attention problems, child's misbehaviour, and child oppositional behaviour.

McQuillan and her colleagues (2009) found that parents' ability to deal with the challenges of parenting may be inhibited by insufficient sleep. They stated that the more sleep difficulties mothers had, in regard to variable, late, and short sleep and latent sleep onset, the more likely they would be stressed, rate their homes to be more chaotic, or rate their child as misbehaving. Worse sleep was also associated with less positive parenting observed by research assistants on their second home visits. Other studies have highlighted the importance of positive parenting practices, as these have been associated with a decrease in children externalising and internalising problems (Parent et al., 2016).

Furthermore, according to McQuillan and colleagues (2009) demographic characteristics like the mother's age, employment, and number of children also played a role. The more children a mother had, the less likely she was to show positive parenting practices before the toddler's bedtime. Younger mothers were also more likely to be stressed and go to sleep later. Moreover, researchers stated that sleep problems were also associated with more dysfunctional parenting and that the longer it took mothers to fall asleep, the more likely they were to report lax and overreactive parenting. Finally, the researchers added that highlighting the importance of sleep as well as consistent bedtime routines to parents may lead to significant improvements in positive parent-child interactions.

In another study, Bai and colleagues (2020), wanted to understand the relationship between maternal sleep patterns and parenting infants in the first six months post-partum. To do this they looked at mothers' emotional availability. The data used for this study was drawn from the first three points of analysis in the Project SIESTA II longitudinal study: the first at one month, then the second at three months and finally the third at six months of the child's age. The study included 142 mother-child dyads. At the beginning of the study the mean age

of mothers was just under 30 and the mean age of children was 1.21 months. About 85% of women were living with a partner. At all three analysis points, parent-child interactions were recorded for one night before the child's bedtime. While the average length of the recordings was 77.6 minutes, this was heavily dependent on how long it took for children to fall asleep and when mothers would shut off the recordings. To assess sleep mothers filled in a daily diary for a week at each analysis point. Finally, to increase reliability, researchers who scored child-parent interactions from the available recordings were blind to maternal sleep.

Results showed that when mothers were contrasted with one another, mothers who fell asleep later and had more variability in when they slept, were less emotionally available for their children and showed poorer parenting quality (Bai et al., 2020). Moreover, the mother's emotional availability at bedtime remained relatively stable across the six months. There was one observed difference though. Mothers who slept less hours, fell asleep later, and had more variable sleep times at six months, showed less emotional availability than mothers with the same conditions at one or three months of the child's age. Therefore, it is possible that as children age, they place additional demands on mothers, perhaps through reduced sleep duration or other novel challenges that disrupt everyday life (Rathus, 2010). The effect of sleep on a mother's emotional availability is concerning, as studies have shown how important a mother's emotional availability is for a child's development (Gökçe & Yılmaz, 2018). Particularly at bedtime in the first months of life, decreased maternal emotional availability appears to be clearly related to an increase in infant cortisol secretion, which indicates an increase in the child's stress levels (Philbrook et al., 2014).

In another study Tu and colleagues (2018), looked at the effect of sleep on permissive parenting. To understand this relationship, they used a sample of 234 mothers with 237 adolescents. In their sample nearly 1/3 participants were African-American. Teenagers had an

average age of 15.8, while the average age of mothers was over 40. Sleep was measured using actigraphy and self-reports.

Results showed that sleep duration along with sleep of falling asleep were both inversely correlated to permissive parenting (Tu et al. 2018). Moreover, poor sleep quality and quantity had a negative impact on parent-child interactions. The researchers believed that the mother's lack of sleep could be responsible for influencing their daily functioning. That in turn could affect a mother's attention, and energy and lead to more permissive parenting. The findings of this study were concerning, as the authors highlight that permissive parenting is correlated with problematic behaviours in teenagers. Finally, this study highlighted the importance of using multiple methods of assessing sleep as mothers self-reported more sleep problems than were shown by actigraphy based data.

One of the most recent studies on parenting and sleep and the only one to involve mothers and fathers, was conducted by Kelly and colleagues in 2021. Researchers used data from two waves of a larger study conducted between 2010 and 2012 in south-east American public schools. A total of 130 fathers,(mean age 39.78) and 223 mothers (mean age 36.15) were included in the research. The mean age of students was 10.41 years with a standard deviation of 7.85 months. Around 60% of participants were Caucasian/European American. Total sleep time and quality was measured using motion-logger actigraphs. Not all actigraph monitored nights of sleep produced usable data, however the nights that did produce usable data were still used in the study. Harshness of parenting was self-reported by parents using subscales from the Conflict Tactics Scale Parent-Child Behaviours, a scale that was shown to reliably measure harsh parenting behaviours. The study controlled for single motherhood status, number of children, child gender, race/ethnicity, parent's symptoms of impulsivity, delinquency over the past year, and children's externalising behaviour.

Kelly and colleagues (2021), found that fathers, who slept less, were more likely to resort to harsh parenting practices, like physical or psychological aggression. Sleep quality and quantity both had this effect on fathers, but no effect was found on mothers. The authors argued that this adds to the 'father vulnerability hypothesis', which proposes that mothers are more resilient to the potential consequences of sleep problems because they have a superior ability to regulate their negative emotions. Interestingly, the research also found the positive relationship between parenting practices and sleep to be moderated by the child's gender, as the effect was stronger if the child was male.

Out of the above four studies, two focus on children well beyond early childhood, while a third focuses on young post-partum children (Bai et al., 2020; Kelly et al., 2021; Tu et al., 2018). To this author's knowledge, McQuillan and colleagues (2019), conducted the only study that considered parenting and sleep in young children beyond infancy, although their sample included only mothers. In fact, only one of the four studies included mothers and fathers (Kelly et al., 2021). None of the studies included both mothers and fathers as well as the age group considered by the present study, which highlights the gap in present research. The present study will aim to fill this gap.

The Present Study

Research to date indicates a possible relationship between sleep and parental behaviour. To further understand this relationship the present study will explore the influence of sleep on mothers' and fathers' perceived ability to parent their young children. To this author's knowledge the present study is the first study to explore the unique relationship between sleep and parenting in mothers and fathers of typically developing young children after infancy in Aotearoa, New Zealand. A number of recent studies have mentioned the scarcity of research in this area, especially research involving fathers, who are poorly represented in parenting research (Gökçe & Yılmaz, 2018; McQuillan et al., 2019).

The present study hopes to explore the following areas:

(a) Explore couples sleep and parenting experiences using both self-reported and quantitative sleep tracker data over a period of one month.
(b) Explore parent's perceptions of moderators and mediators on sleep and parenting.

By conducting this research, this study hopes to provide relevant information to sleep scientists, parents, and families on the relationship between sleep and parenting young children.

Methods

Methodology

Before determining the methodology, the ontology and epistemology of this research must be outlined. This study will operate under a relativist ontological view on reality and a subjective epistemological view on knowledge. The methodology used in the present research will be hermeneutic phenomenology, whereby sleep will be the studied phenomenon.

Relativist ontology holds the belief that reality is intersubjective and always framework-dependent (Baghramian & Carter, 2015). In other words, relativism claims that reality is constructed as an intersection of subjective viewpoints. If more viewpoints are added, or the context changes, reality is also subject to change. An example of this is the definition of beauty. Different cultures have different definitions of beauty. While beauty in one culture may seem constant, as soon as more cultures are introduced, the reality of beauty begins to shift. As such, research for the present study will be conducted with the belief that reality is constructed by the subjective viewpoints of the participants.

Congruently, subjectivist epistemology assumes that knowledge is always subjective, and reality is an agreement that is socially constructed (Levers, 2013; Slevitch, 2011). While subjectivism accepts that an external reality exists it assumes that "universal knowledge of an external reality is not possible beyond individual reflections and interpretations" (Lever, 2013, p. 3). Simply put, while an external reality exists, we are limited by our perceptions and our own interpretation of reality.

A relevant example of this is what constitutes a good night's sleep which appears to vary from person to person (Ferrara & Gennaro, 2001). In fact, researchers have gone as far as saying that there are so many factors impacting sleep, such as gender, age, and culture, that it may not even be possible to define an optimal amount of sleep (Cheung et al., 2021; Ferrara & Gennaro, 2001). More recent research by Chaput et al., (2018), supported these ideas and added

that sleep also varies across a person's lifecycle. As reality cannot be directly observed and one is limited to individual interpretations of reality, the present study will attempt to get a depiction of reality through the gathering and analysis of participant's subjective viewpoints.

In order to explore people's perceived effects of sleep on parenting, this study adopted a hermeneutic phenomenological methodology and a qualitative research design. A qualitative research design enabled the researcher to explore the breadth and depth of the perceived impact of sleep. Furthermore, it gave the researcher an opportunity to identify and understand the particular frames and worldviews of participants (Slevitch, 2011). Phenomenology was selected as this study aimed to explore the phenomenon of sleep and how parents experience differences in sleep quality and quantity. Phenomenology aims to understand a phenomenon, such as sleep, by analysing it through the viewpoint of multiple individuals that experience it (Creswell, 2014; Neubauer et al., 2019).

Hermeneutic phenomenology was selected as its philosophical assumptions are in line with the ones stated above. Hermeneutic phenomenology assumes that experiences are interpretive, that people are biased by their background understandings and cannot experience a phenomenon without referring back to these understandings (Neubauer et al., 2019). A hermeneutic phenomenological methodology will enable the researcher to understand the impact of sleep on individuals' parenting through the eyes of the participants. It will also enable the researcher to mitigate his own biases when analysing the results of this work.

Hermeneutic phenomenology defines the role of the researcher as a research subject who will be impacted by their own historic lens (Neubauer et al., 2019). This also impacts how data will be analysed. Phenomenology outlines multiple data analysis requirements to manage the researcher's inability to leave his lifeworld behind (Neubauer et al., 2019). These guidelines for data analysis will be described in more detail in the data analysis section of this paper.

Participants

Participants were recruited using snowball recruitment. Initially, in order to participate in the study participants had to reside in New Zealand, be in a couple, and have at least one child between the ages of 12 months and seven years. Four couples who fit these parameters were identified. It was later discovered that only one of the four couples had a child outside of the 12 month to seven year age range. As the age of the child was only two years outside of the desired age range a decision was made to keep the parents in the study. Including one couple which had one child within the desired age range and one slightly above it, gave researchers an opportunity to contrast the couple's experiences with children in different age groups.

Former studies frequently failed to introduce enough sample diversity, especially by limiting their sample to mothers (Bai et al., 2019). For this reason only couples where fathers also agreed to participate were included. To take part in the study participants had to be willing to take part in four interviews on four consecutive weekends, wear a sleep tracker for three weeks, and share their sleep tracker data. All participants voluntarily fulfilled the necessary criteria to participate in the study.

The present sample consisted of eight participants, ranging in age from 32 – 45 (m = 41.25, SD = 4.27). All participants were married to a spouse of the opposite sex, resulting in a total of four married couples. An equal number of mothers and fathers took part in the present study. The mean age of fathers was 43 (SD = 2.16, range = 40 – 45), while that of mothers was 39.5 (SD = 5.45, range = 32 – 44). Three of the four couples had two children while one couple had three children. The mean age of all children was 4.87 (SD = 2.39, range = 1.33 – 9). The mean age of all children not including the child outside of the initially intended age range was 3.87 (SD = 1.94, range = 1.33 – 7).

Participants originated from six different countries (Brazil, New Zealand, Poland, Spain, Samoa, United Kingdom) and included six different ethnicities (European,

Japanese/Latin American, Māori/NZ European, Spanish, Samoan, Asian - Sri Lankan). Four participants had a Master's degree or equivalent, three had a Bachelor degree or equivalent but no Master`s degree, and for one participant a high school diploma was their highest level of education.

Procedure

The present study lasted three weeks. A longer timespan was selected as it increased the likelihood of variation in sleep quality and quantity for each participant. This allowed the researcher to explore within-person as well as between-person linkages between parenting and sleep. Similar approaches have been taken by researchers in the past (Bai et al., 2020).

Prior to commencing the study, all participants were briefed on the goals, structure, confidentiality, and duration of the study. Participants were also informed of the potential risks and benefits to taking part in the study. Participants were assured that there was no hidden agenda and that the research was focused on their views rather than imposing the researcher's views on them and the study. These assurances were mentioned in the hopes that they would increase participants` willingness to participate and share their experiences openly. Participants were also given a study overview guide sheet (see Figure 1) to support their understanding of the process during the three weeks of the study.

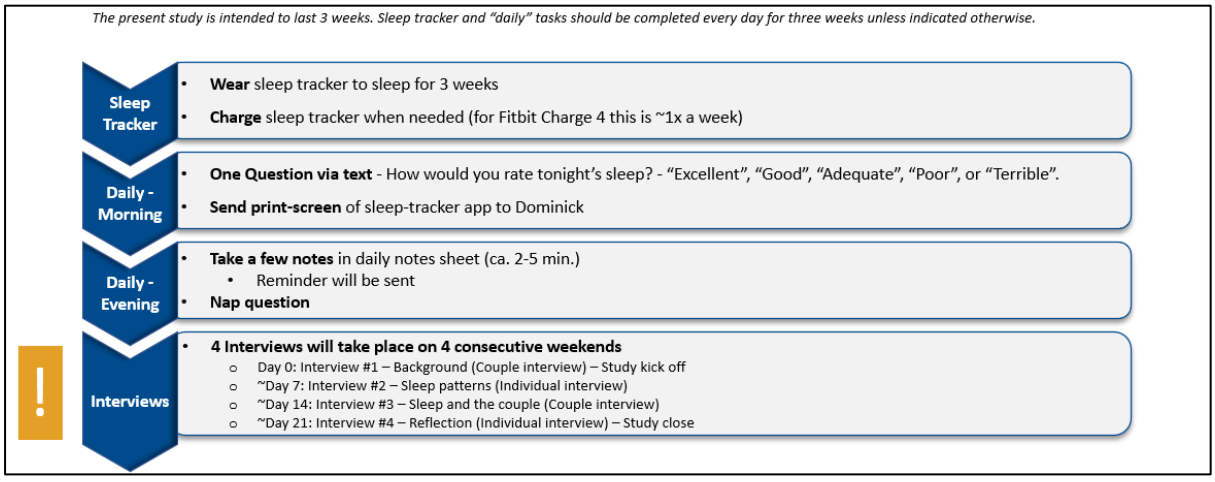

Figure 1: Study overview given to participants

Additionally, participants completed two online questionnaires: the first was a consent form along with an information sheet (see Appendix C); the second collected participants` demographic information. To increase anonymity, participants were then asked to select a pseudonym; if they did not select one, a pseudonym was selected for them. There were four components to the present study: two to assess participants' sleep and two to understand people's perception of the impact this had on them.

Sleep was assessed using sleep trackers and self-reporting. Past research has highlighted the importance of using multiple methods of sleep assessment (Bai et al., 2020; Tu et al., 2018). Using multiple methods enables researchers to cross-reference their findings and avoids perception biases, which according to Tu and colleagues may be relatively high. For the duration of the study participants were asked to wear a smart watch while sleeping. Three of the eight smart watches were Fitbit charge 4's, while the rest were late model Apple watches. Each day participants were asked to send a picture of their previous night's sleep tracking to the researcher. Participants failed to track a total of 14 days of sleep, which equates to an average of less than two nights per participant. As a result more than 91% of nights of sleep were tracked throughout the three weeks of the present study.

Additionally, participants were asked two questions to assess sleep. First, in the morning at 8:00am participants were asked via text message to rate their sleep as either "Excellent", "Good", "Adequate", "Poor", or "Terrible". As research has consistently found sleep requirements to vary between and within individuals (e.g., depending on age), the daily self-reports were seen as a key measure (Chaput et al., 2018; Ferrara & De Gennaro, 2001). Moreover, research has also found naps to positively impact individuals, by reducing the effects of a poor night's sleep (Mezick, et al., 2014). Therefore, every day at 8:00pm participants were asked if they took any naps during the day and if so for how long.

Parenting was gauged using self-assessments. Parents were asked to take notes at the end of each day for the duration of the study. Participants received daily reminders to take notes around 8:00pm along with their daily nap question. Notes were taken on a pre-prepared "Evening Note Sheet" (see Appendix A) which included three key areas of parenting that past research has identified as relevant. These areas are emotional availability, parenting stress, and parent's enjoyment of the child-parent relationship (Bai et al., 2020; Dunning & Giallo, 2012; Meltzer & Mindell, 2007).

Emotional availability included questions such as "How emotionally available were you for your child(ren) today?", and "Did your children struggle with anything today? Were you able to be there for them the way you would have liked to?". Parenting stress prompts included "Did you have any time to spend with your child(ren) today?", "Did the kid(s`) mealtimes happen when they usually do?", and "Did your child(ren) spend more or less time with the iPad/Screens/TV today?". Finally, questions regarding parental enjoyment of the child-parent relationship included prompts like "How did you feel as a parent today (e.g., stressed, happy)?", and a question about the parent's experience if they spent time with their children.

Parents were reminded that these questions were just prompts and did not all need to be answered. Instead, the researcher was primarily interested in the parents` perceptions of the day's events, and the affect sleep may have had on them and their ability to parent their child(ren). Participant notes were used primarily to support the weekly interviews, which always took place on weekends. As the study focused on people's experiences of the sleep phenomenon, the key element of the study were the weekly interviews that took place with each participant.

In total, four 20–30-minute semi-structured interviews took place over the span of three weeks. Interviews were semi-structured as this form of interview provides richer and broader

data compared to structured interviews by giving people the opportunity to describe their experiences in more detail (Ajjawi & Higgs, 2007). Moreover, using semi-structured interviews enabled the progress of the discussion to be guided by participants. An overview of the interviews can be found in Figure 2.

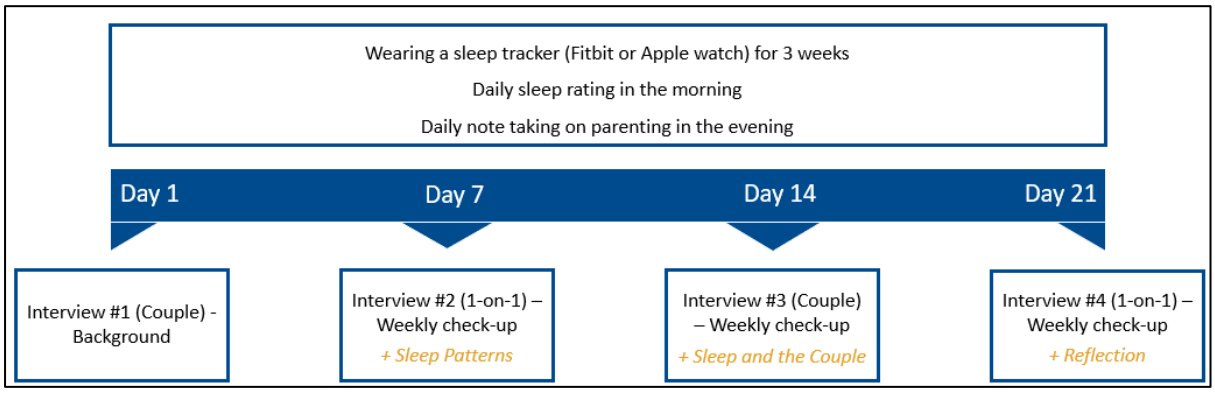

Figure 2: Interview timing

The first and third interview were conducted with the couple simultaneously, while other two interviews were one-on-one interviews. Whether both partners would be present depended on the content of the interview. By using this structure, researchers aimed to enable couples to enter into an exchange with each other at times, but also to give participants enough freedom to express themselves through one-on-one interviews. A copy of the interview guide can be found in Appendix B.

The first interview marked day one of the study. This was a couple interview and focused on gathering background information about the participants and their children. This interview included questions on parental presence (e.g., “Who is home more”), night-time parenting (e.g., “Who wakes up when the children wake up at night”), parenting responsibilities, and parenting attitudes (e.g., cultural beliefs).

One week later, participants took part in the second interview, which was conducted one-on-one. The first part of this interview explored the participants’ usual sleep habits (e.g.,

"When do you usually go to sleep/wake up?") and sleeping arrangements ("does anyone sleep next to the children?"). The second part focused on the parents' experiences in the past week (i.e., how they slept and how this impacted their parenting). This part was roughly guided by the same parameters as the daily sleep questions and parenting prompts (quality of sleep, emotional availability, child-parent relationship enjoyment, and parenting stress).

One week after the second interview, approximately on day 14 of the study, the third interview took place. This interview was conducted with the couple together. Similarly to the second interview, it included two parts. The first part focused on sleep and the couple. It included questions about the couple's sleep setup (e.g., "What is your sleeping arrangement?"), their parenting setup (e.g., "How would you assess your co-parenting (parenting as a team)?"), and a combination of the two (e.g., "Does sleep impact the relationship or the ability to parent as a team?"). The second part, as in the prior week, focused on the participants' weekly experiences with sleep and parenting.

Finally, the fourth interview concluded the study on approximately day 21. This interview was conducted one-on-one, so each individual would have the ability and space to express their views freely. In this case the first part of the interview focused on a more in-depth view of the past three weeks: the participant's sleep, parenting enjoyment, self-assessed emotional availability, and parenting stress. The second part of the interview was used to take a closer look at possible mediators/moderators, and the participant's usual experience with sleep deprivation outside of the three week study.

As interviews only happened once a week and participants could not be expected to remember all of the week's events as well as their sleep patterns, parents were asked to review their weekly notes prior to each interview. Participants were also verbally reminded of their sleep patterns that week throughout the weekly interview. All interviews were conducted in person at the participants' respective residences. On which day each weekend the interviews took place depended on participant availability.

Ethics

The present study was approved by the Massey University Human Ethics Committee: Northern, Application NOR 22/14. As human participants were involved in the study, a number of ethical considerations had to be made. These include ensuring participants received sufficient information before participating in the study, such as information about potential risks and benefits to participating.

Participants were asked to sign an informed consent form prior to the commencement of the study. Informed consent covered the gathering, storage, and use of the data. Participants were informed that they may withdraw their consent at any time. Prior to signing the consent form, participants were given information describing the study they are about to participate in, including a list of risks and benefits to participation. A copy of the information sheet and consent form can be found in Appendix C. Consent forms were completed electronically using Qualtrics.

One identified risk was that participants may feel their parenting is being judged during the study. To mitigate this risk, participants were frequently reminded that the study focuses on lived experience and uses self-reporting for parenting. Self-reporting focuses solely on the participant's own impressions and experiences and thereby leaves no room for judgement by others. Another potential risk involved participants` heightened focus on sleep. This could have led to participants experiencing altered difficulty in falling asleep. As this did not occur no action was required.

One expected benefit from participating in the study was the participants` opportunity to reflect on their sleep and how this impacts their ability to function not just in a parenting role. A number of parents reported the positive impact of their self-reflection on both their sleep and their parenting. Moreover, participants were able to generate knowledge that helped

them be more aware of how sleep impacts their emotions and actions. The participant's experience of these benefits is described in more detail in the results section of this paper.

To ensure confidentiality, all participants chose or were assigned a pseudonym. Interviews that were recorded on a password protected phone were, immediately transferred to a password protected computer, and deleted from the phone. Interviews were de-identified on transcription. All data was transferred via secure means. Any identifiable information (e.g., consent forms) was stored separately from de-identified data and kept on password protected devices.

Finally, the present research was conducted in accordance with the principles of the Treaty of Waitangi. Principles of participation, partnership, and protection guided the entire research process, especially when working with Māori participants. While this research did not directly focus on Māori, their participation was welcomed throughout the study. The research was designed and conducted ensuring it remained respectful of the heritage of Māori. One of the focal points of the research design was to ensure that throughout the study the researcher partnered with participants when exploring sleep and parenting. The four tikanga principles outlined in the Mana (justice and equity); Whakapapa (relationships); Te Ara Tika; Tika (research design); and Manaakitanga (cultural and social responsibility); were also closely observed.

Reflexivity

Qualitative research acknowledges that all research is contextual and the researcher conducting the study and analysing the data is a human being prone to biases and pre-conceived notions (Creswell, 2014; Dodgson, 2019). Reflexivity requires the researcher to identify their biases and reflect on how their views evolve throughout the research process. This critical self-evaluation of one's positionality can ensure quality and rigour. Reflexivity is also an opportunity for the researcher to share their views with the reader. This transparency allows

the reader to better know the researcher and enables the reader to understand the context under which the research took place (Dodgson, 2019). In light of the importance of reflexivity a diary was kept throughout the duration of this study. The first entry was made before the commencement of the study, while the last entry took place after all interviews were completed. The evolving views of the researcher are outlined below.

I would consider myself an insider on sleep and somewhat of an outsider on parenting. Like every human being, I have experience with sleep. I am also familiar with how cognitively and emotionally debilitating poor sleep can be. In regard to parenting, while I do not have children of my own, I played a large role in helping raise my two siblings who are nine and 17 years younger than me. Especially in the case of my sister, who is 17 years younger than me, I had a chance to experience what it is like to look after, interact with and, at times be responsible for a young child. While this did introduce me to some of the responsibilities of parenting, in my view it does not amount to actually being a parent to one's own children. Therefore, I still view myself as an outsider on parenting. With this in mind, throughout the study I asked more clarifying questions when discussing parenting than I did when discussing sleep.

Two further factors that may have influenced me throughout the research process are my gender and my international background (I have lived in seven different countries on three continents). Given the international sample of the present study, I believe that my international background supported my ability to interview participants and analyse the results of this research. Furthermore, being male gave me an opportunity to empathise with fathers in the present study and understand their unique viewpoints. I expected that I would have an easier time understanding the male perspective, but I was very conscious not to assume knowledge because of my gender. The study design allowed me to also get viewpoints of both parents, separately and together, in semi-structured interviews. This, as well as collecting sleep tracker data, and returning to interview participants multiple times enabled me to obtain rich data.

Looking closer at my views on sleep and parenting prior to the commencement of the study, these were in line with current research. I believed that poor sleep can significantly impair a person's functioning, emotional reactions, and self-control (Pilcher & Huffcutt, 1996). In addition, I expected parents to be more self-critical following poor sleep. Therefore, I expected sleep to greatly influence participant's self-perception of their own parenting. I also expected couples to work as a team to master their daily challenges, with women carrying the majority of the responsibility for the household. Finally, I expected participants to feel the impact of sleep quality more than that of sleep quantity.

My views remained unchanged through the first week of my research, as the first interviews focused only on the participants' background. Interestingly, following the first set of eight one-on-one interviews in week two, I felt even more resolve in most of my views. A lot of the data on the relationship between sleep and parenting appeared to point to the directions I expected. A few participants later reported that this was likely in part because they shared some of my views. Knowing this, in order to avoid confirmation bias I began asking more follow-up questions in subsequent interviews. It is worth noting that at this point not all information shared was in line with my expectations. Women, for example, did not bear as much of a primary responsibility for their children as I would have expected, especially considering the nuclear families I was interviewing. I was positively surprised by this finding and adjusted my prior assumptions on this topic accordingly.

As my participant's views evolved during the third and fourth interviews, so did mine. I noticed that after the second week of self-observation, parents were reporting more consistently on their ability to use reserve energy for their children following a day of poor sleep. These reserves enabled them to remain more in control than expected. On the other hand, when days of poor sleep added up, the effect on parenting ability appeared to be larger than anticipated. As a result, I am now more aware of human energy reserves and our ability to

overcome a poor night of sleep. Simultaneously, I am more aware of the detrimental effects of multiple nights of poor sleep.

In regard to parenting my views have also evolved. Parents reported the difficulties of raising children under the age of two and the severe sleep disruptions they had to endure with every child until this age. I did not expect the difference to be this vast and every parent to report on sleep deprivation during the first two years of their child's life so consistently, especially as none of my initial questions were directed at parenting children under the age of two. I was deeply appreciative of receiving this information now that I am likely on the cusp of expanding my own family.

Furthermore, following the last interview it struck me that I did not find as much of a male-female role separation as I expected. Instead, I observed much more unspoken mutual support, and collaboration that almost seems necessary to manage the challenges of parenting. As a result, I now believe that the needs of the child can outweigh traditional gender roles. Finally, I did not observe the gender differences in sleep need that I expected. I now regard sleep need as individual and gender to not play as significant of a role as I originally anticipated.

Data Analysis

In line with the aforementioned research methodology, this study used hermeneutic phenomenology for data analysis. Hermeneutic phenomenology utilizes the strategies from both phenomenology and hermeneutics (Ajjawi & Higgs, 2007). By using phenomenology, the aim becomes to understand the experience of a given phenomenon from the participants' perspective and explore the participants' lifeworld (Creswell, 2014; Neubauer et al., 2019).

To gain a deeper understanding of the phenomenon and the gathered text from interviews, the hermeneutic circle was utilized (George, 2021; Neubauer et al., 2019). The hermeneutic circle assumes that new understanding is created through renewed interpretations of text. According to the hermeneutic circle (see Figure 3), the reader commences their

exploration of a text with an already established initial understanding. As the reader interacts with a text as a whole, they gain a new understanding. As the reader begins to break the whole text into separate parts, they gain an even deeper understanding. If the reader then engages back with the whole text, they are now able to interpret it with their deeper understanding (Ajjawi & Higgs, 2007). The hermeneutic circle thereby requires the reader to deliberately re-engage with the original text to revise their understanding (Neubauer et al., 2019).

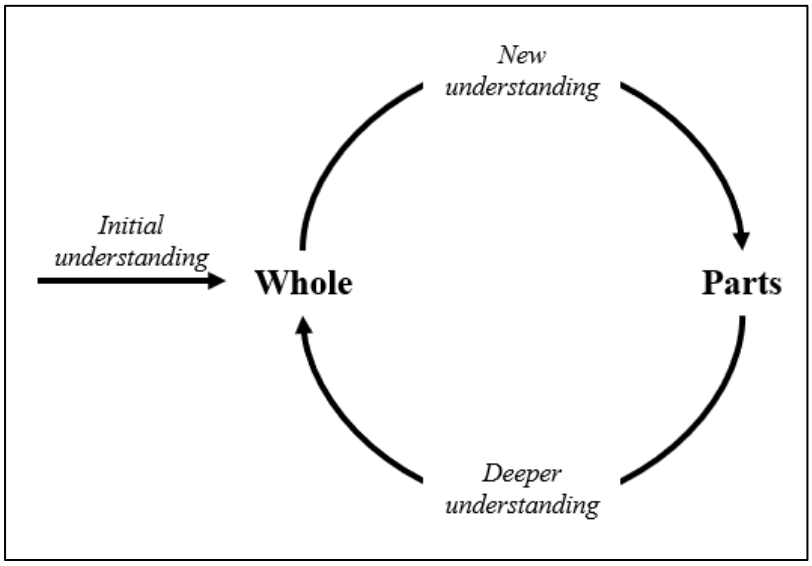

Figure 3: Hermeneutic circle

The stages used in the analysis of the data were largely in keeping with those suggested by Ajjawi and Higgs (2007) for hermeneutic phenomenology. All forms of phenomenological data analysis begins with preparing the data for analysis (Creswell, 2014). To do this in the present study all interviews were transcribed. Initially, there were six transcripts for each of the four couples equalling a total of 24 transcripts. Each couple's six interviews were merged into one document, creating four documents each containing all interviews for one of the four couples.

Once prepared, in the second stage, the researcher immersed himself in the text by reading and re-reading all interview transcripts (Ajjawi & Higgs, 2007). At this stage first notes were taken. To commence the third stage one group of interview transcripts was randomly

selected and read a third time to allow the researcher to get a sense of the data before commencing line by line coding. A few draft codes were developed during this process.

Next, line-by-line coding was commenced using the first couple's interview transcripts. During this process new codes were created. A new code was created whenever a part of the transcript did not fit into any of the already existing codes or whenever a new code was found to be more suitable. Text that was found to be superfluous like off topic conversations or an unnecessary repetition that added no new information was coded as such and disregarded going forward.

After coding was completed for the first interview transcript, quotes were transferred and organized into an Excel sheet, as this allowed for a better overview of the data. Transferred quotes were separated horizontally by code and vertically by Interview number. At this point 38 codes were included. Each of the 38 codes was considered individually and contrasted with the other 37 codes. During this process half the codes were found to be superfluous, leaving 19 actively used codes.

The 19 codes were then used to code the remaining three couple's interview transcripts. After each couple's transcripts were coded, the codes were added to the Excel sheet and the process of reflecting on the viability of individual codes was repeated. The list of codes grew or shrunk by approximately three codes after each couple's transcripts. Finally, after all four couple's interviews had been coded 20 codes were present.

In the fourth stage of the process the 20 codes were reviewed and turned into 14 sub-themes. During this process the data was once again reviewed and further comments were added. In line with the fifth stage described by Ajjawi & Higgs (2007) these sub-themes were then clustered into themes based on conceptual similarities.

In the next sixth stage the researcher reviewed the themes and the original transcripts to gain a new understanding of the overall text and thereby gain a new understanding of its

parts (Ajjawi & Higgs, 2007). This new understanding of the text's whole and its parts was also used to add insights and interpretations to the already existing themes. The seventh and final step in the process included a critique by a senior researcher, Dr Kathryn McGuigan. Following this review final adjustments were made and the primary researcher was able to conclusively report on the results. The results were then once again reviewed in tandem with the original transcripts to ensure the results truly reflected participants' subjective views. This repeated interaction with the transcripts enabled the researcher's understanding of the phenomenon to evolve gradually which is key in the hermeneutic approach (Ajjawi & Higgs, 2007).

Results

The present section will start by giving an overview of the couples and a figure for each couple summarising their sleep tracker data. Following this an overview of the themes will be presented. Finally, the themes will be outlined and explored.

The Couples

Tara and Oscar

Tara and Oscar are a Spanish couple with three children aged six, four, and one and a half. Tara is a stay-at-home parent and Oscar is a high-level manager. Oscar interviewed for and changed jobs within the same organization during the three-week period of this study. He mentioned that the stress of this has somewhat influenced his sleep. Oscar has been struggling with sleep for a long time. Throughout the study he experienced multiple sleep interruptions each night and rated his sleep more poorly than any other participant. Oscar claims that he is unable to reach deep sleep after his first sleep interruption, which is what leads to his consistently poor sleep ratings. His sleep tracker results largely support this claim. During the first interview Tara and Oscar debated sleep need. Tara's position was that people need sleep and their functioning is severely diminished if they cannot reach a necessary threshold. Oscar's view, in line with what could be expected of someone struggling with what may appear as chronic sleep deprivation, believes that functioning is possible regardless of sleep.

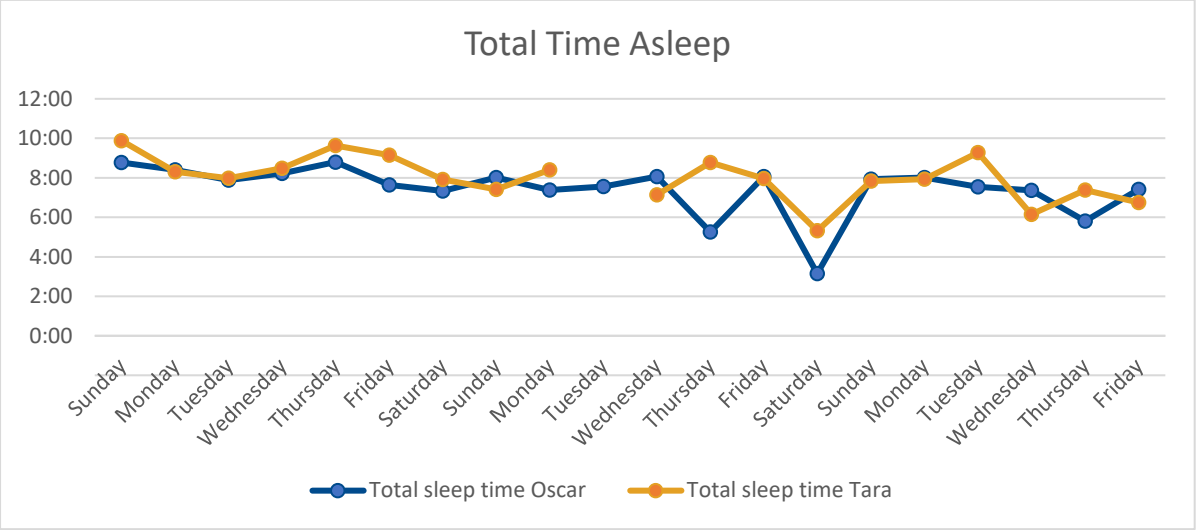

Figure 4: An overview of Oscar and Tara's sleep during the present study

Oscar and Tara were the only couple in the study that had a child under the age of two. Tara appeared to be an engaged parent and took on primary responsibility for raising the children. Oscar appeared to be a very involved parent, especially outside of working hours. The couple worked as a team to complete their chores and responsibilities in the morning and evening. Both parents seemed to be concerned with their partner's wellbeing. For example, one night when Oscar noticed that Tara did not sleep well, he pre-emptively got up earlier the next morning and completed the morning routine with their children by himself, so Tara could spend more time in bed. In turn, a few days later when Oscar was not feeling well, Tara entertained the children all day, so that Oscar could spend the day in bed and read.

Lucy and Nate

Lucy and Nate are a Samoan-Māori couple with part Dutch and German heritage. They have two children aged five and two. Both parents work full time in high level management roles. According to both parents, they have an even split of parenting responsibilities. Currently, or at least for the duration of this study, it appeared that Lucy worked more hours than Nate, which frequently influenced her sleep duration. She mentioned that once her children have gone to sleep, she often continues working. Nate's sleep was very structured,

usually going to sleep and getting up at the same time every day. Lucy's sleep appeared to be more driven by the requirements of the day. On a number of occasions during the study, longer working hours or evening work functions led to a reduction in her sleep time (time actually spent asleep according to the sleep tracker) which eventually led to more naps on weekends or recovery sleep at night. Averaging six hours and one minute over three weeks, Lucy had the lowest average total sleep time out of all parents by nearly one hour.

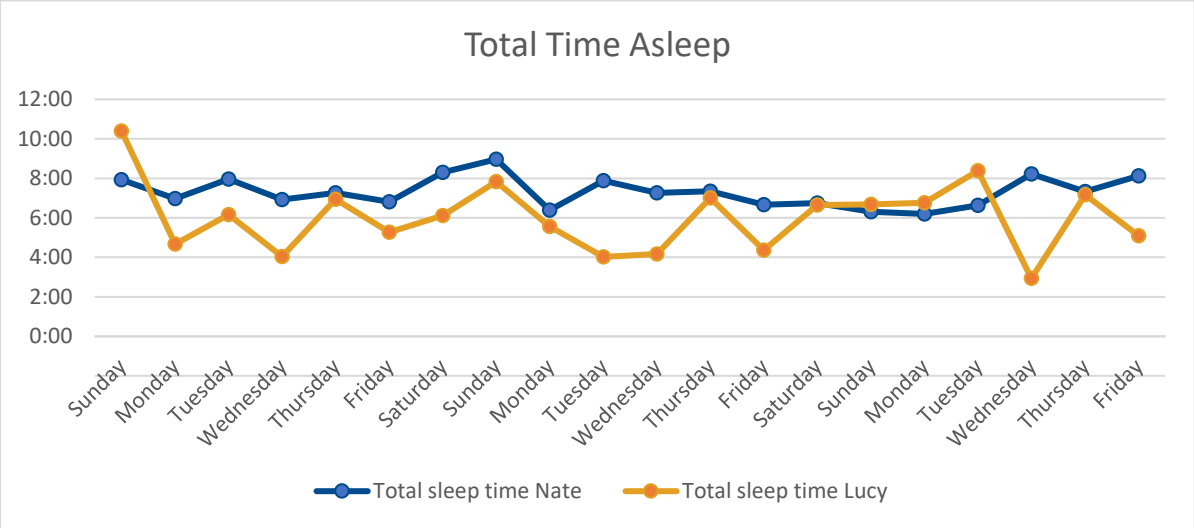

Figure 5: An overview of Nate and Lucy's sleep during the present study

Prior to the start of the study, Lucy and Nate had already developed a strategy that enabled each parent to sleep through the night at least every other night. Each night they would switch bed sides and they taught their children, if they needed anything at night, to wake up the parent closest to the bedroom door. This way each parent would be able to sleep without any major interruptions at least every other night. Interestingly, during the three-week study this became superfluous as their youngest child stopped waking up at night. Nate described his parenting approach as giving his children attention and giving them the power to make choices. Lucy described her parenting as attentive but less patient than Nate's. In addition, Lucy and

Nate received support from their parents who took their children for one day every weekend leaving Lucy and Nate time for self-care and to look after one another as a couple.

Emma and Honda

Emma and Honda have two children aged seven and four. Both parents are from different cultures, one being from Eastern Europe while the other is originally from South Asia and grew up in Western Europe. Honda works full-time as a high-level manager and Emma is currently a stay-at-home mom, although she was working until recently. Both parents share their parenting responsibilities evenly outside of working hours, while during working hours Emma is responsible for the children. The couple had recently moved to a new home and they were still in the process of unpacking as the present study was being conducted. Emma mentioned that this interfered with their daily routine. Coincidentally, Emma also began a new detox diet simultaneously with the first day of the study. This caused some variation in her sleep and, according to her, impacted her ability to function on the first days of the study.

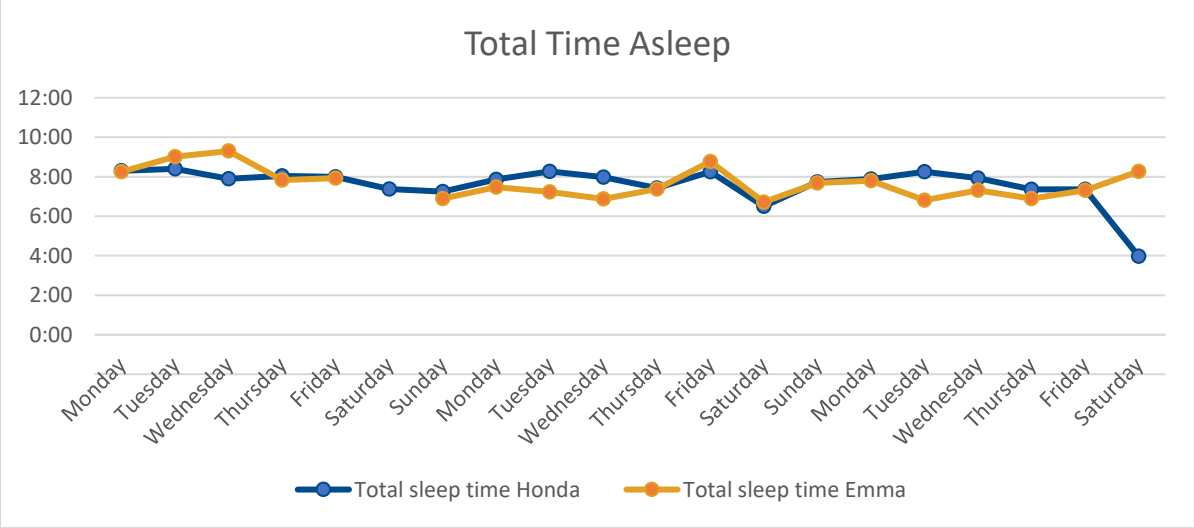

Figure 6: An overview of Honda and Emma's sleep during the present study

Emma and Honda's children have been sleep trained. Both parents frequently described this as a necessity for them, as they were otherwise unable to function in the early days of

parenting. Emma's sleep was consistently rated as "Good". Only two nights of sleep were not rated as "Good", one of them according to Emma was caused by her new diet and the other by one of the children needing extra attention at night due to illness. According to Honda, his sleep was at times influenced by his reflection on the fairly recent passing of a close family member. A number of times he also reported that work stress or intoxication negatively influenced his sleep. Emma and Honda's parenting approaches appeared to be quite different and, according to them, complimentary. Emma stated that she does not believe in rewards and punishments; instead, she wants her children to feel that they can share anything with their mother. Honda on the other hand, subscribed to more traditional models of parenting.

Nicole and Mark

Nicole and Mark are a Brazilian couple with Asian heritage. They have two children aged five and nine. Both parents work. Mark works full-time and Nicole works part-time in order have some time available for their children when they are not in school. Outside of regular working hours Mark and Nicole's parenting responsibilities are split fairly evenly, except Nicole drives the children to their various school related and extra-curricular activities.

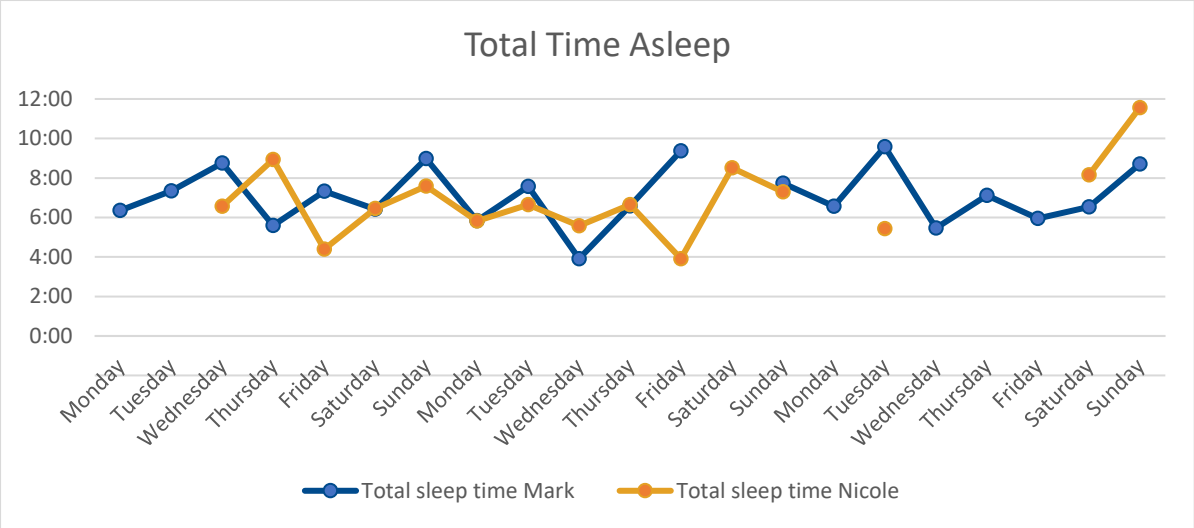

Figure 7: An overview of Mark and Nicole's sleep during the present study

In the first week of the study Nicole began working in a new role in her current company. She reported feeling quite overwhelmed with the new challenges which negatively influenced her sleep. Additionally, one of her family members was suffering from serious health concerns which also influenced the quality of her sleep in the first week. Mark had been focused on improving his health for the past year, part of which was maintaining good sleep hygiene. Both parents reported frequently falling asleep for a short while watching movies in the evening before finally relocating to bed. At times this was reflected in the sleep tracker data, while at other times the sleep tracker failed to capture this disruption. Moreover, the youngest child would often climb into his parents' bed at night, which interrupted Nicole's but not Mark's sleep. Both parents appeared to be very involved in parenting their children, worked hard to be emotionally available for them, and aimed to teach them responsibility. Mark and Nicole described their parenting as more demanding and in line with their Asian heritage. They reported having high expectations of their children and working hard to equip them with what they view as basic skills. Throughout the study Mark and Nicole reported that their children behave better when they have less access to television.

Overview

Three key themes emerged in the present study. This section will offer a brief overview (see Figure 8) and description of each theme. The rest of the chapter will expand on each theme by describing the findings and contrasting them with past research.

The first theme describes how sleep influences parenting. According to participants sleep influences parent's patience, mood, presence, and activity. Moreover, the present study found that nights of sleep can add up and that weekday mornings are the most stressful time for parents. Sleep quality was also found to have a stronger effect on parents than quantity, though as hours of sleep decrease sleep quantity becomes more important.

The second theme expands on buffers against poor sleep. Participants reported a number of buffers including children, work, health, naps, breaks, and mutual support. These buffers helped decrease the influence poor sleep had on their next day functioning.

Finally, this chapter will conclude with a description of the third theme which reports on what influences parent's sleep. The primary influence on parent's sleep were children, especially if the children were under the age of two. Couples also reported influencing each other's sleep. Other influences were mostly related to health and stress.

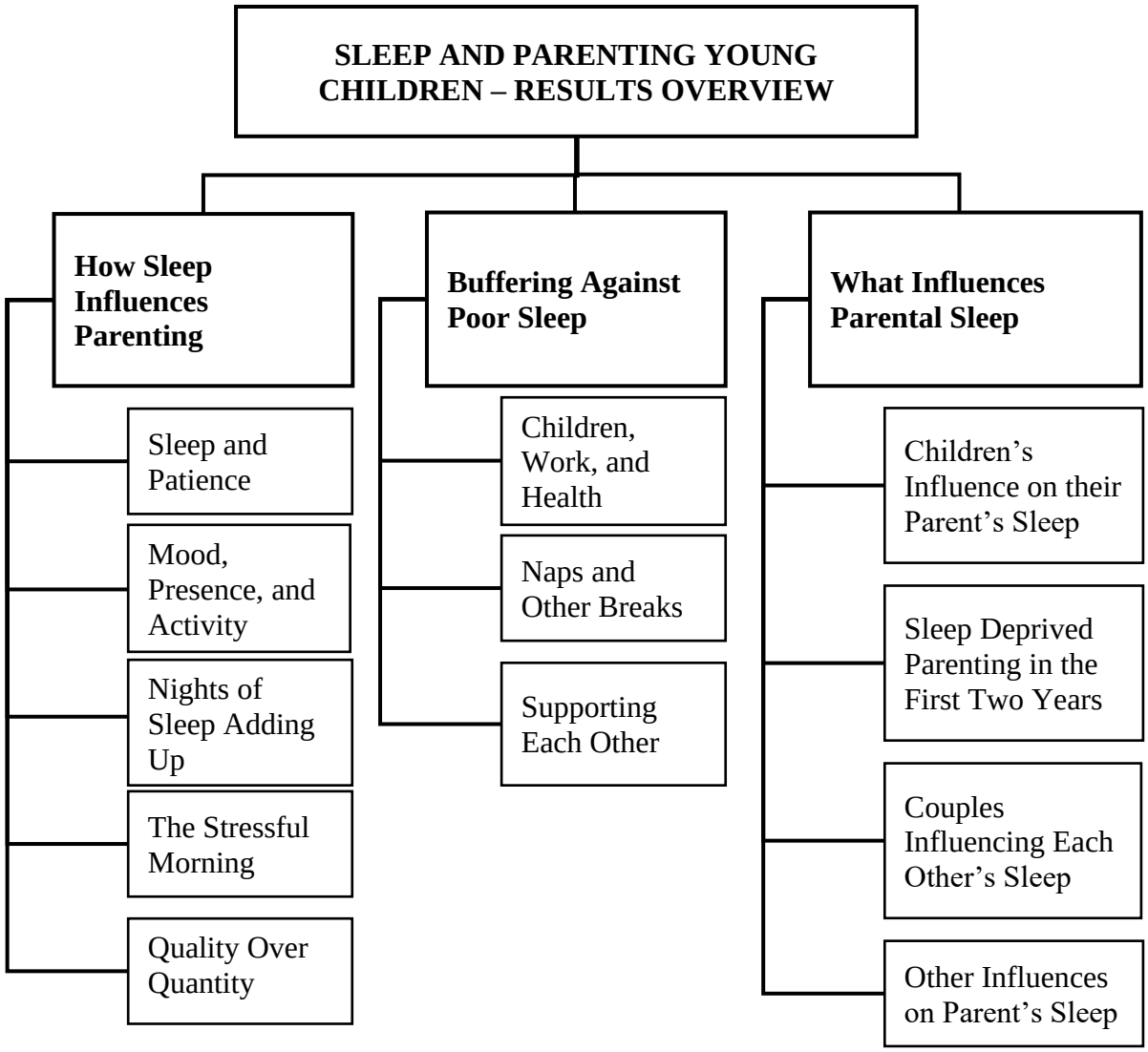

Figure 8: Overview of themes

How Sleep Influences Parenting

This theme describes how sleep influences parent's self-perceived parenting. Throughout the three weeks of the present study parents reported a considerable connection between their previous night's sleep and their next day parenting. More specifically, following a poorer night's sleep parents frequently and consistently described experiencing less patience, more irritability, poorer mood, and less enjoyment when spending time with their children. Furthermore, parents claimed that when they were tired, the array of tasks they could perform with their children decreased significantly.

Views on the impact of one night of poor sleep were mixed, as some parents described a single night of poor sleep as manageable, while others began noticing how challenging it was for them to control their emotions and their emotional expressions following their first night of poor sleep. However, all participants agreed that the more nights of consecutively poor sleep occurred, the more it influenced their parenting. Other studies have made similar findings, stating that the effects of poor sleep accumulate over time (Banks & Dinges, 2007; Finan et al., 2015). The number of consecutive nights of poor sleep needed to influence participants` parenting varied; however, all parents revealed at one time having been exposed to enough poor sleep to whiteness their abilities and functioning diminish.

A good night of sleep appeared to have the opposite effect. A good night's sleep would give parents the resources they required to manage the challenges of the following day. In fact, parents usually did not notice the effects of a poor night's sleep until additional resources were required. In line with current research, sleep thereby appeared to serve more as a buffer against negative emotions for parents helping them deal with the challenges of parenting on the upcoming day (Hamilton et al., 2008; McQuillan et al., 2009). However, in line with recent studies, even on less challenging days most parents reported that below average sleep

influenced their activity levels which may have influenced their parenting behaviour (Bai et al., 2020).

The quantity and quality of sleep required for participants to rate their sleep positively varied between individuals. This is in line with current sleep research which has highlighted the multiplicity of factors that influence how much sleep people require (Ferrara & De Gennaro, 2001). As such, the results of this study primarily rely on participant ratings of their previous night's sleep. Actual average sleep time in the present study ranged from six hours and one minute (Lucy), to seven hours and 56 minutes (Tara). All but one participant had an average sleep time of between seven and eight hours over three weeks. This is within the seven to nine hour range that some researchers have defined as 'adequate sleep' and is within the timeframe recommended by the New Zealand National Sleep Foundation (Banks & Dinges, 2007; Hagen et al., 2013; "Sleep tips for adults", 2018).

The following section will discuss the perceived impact of what participants rated as a poor night's sleep in comparison with what they rated as a good night's sleep. Specifically, these sections will describe the effects of sleep on parent's patience, mood, and their ability to be present and active with their children. Afterwards this paper will describe how nights of sleep can add up and why mornings are particularly stressful for parents. Finally, the section will conclude by contrasting sleep quality with sleep quantity.

Sleep and Patience

A decrease in patience was the most frequently stated consequence of poor sleep. Parents described this shortened sense of patience by saying that there is a "*fragility*" (Nate) to their parenting. Past studies have already established that individuals who sleep poorly have stronger reactions to stress (Mezick et al., 2014; Troxel et al., 2007). As such, it is not surprising that parents described a shortened sense of patience. Most participants agreed that while they were still able to parent after one night of poor sleep, they began noticing that their parenting

was beginning to be influenced. These first signs included inconsistencies in their emotional resilience, frustration, and even increases in their likelihood of "snapping" at their children.

> *Nate-4[1]: Yeah, so I think definitely from a sleep perspective, it's you can … definitely still parent well with the lack of sleep, it's just the concentration isn't really there and you're, there's a fragility to it … the weird things like just get too frustrating and you're like, … that sort of snapping…*

While most parents reported that sleep strongly influenced their patience, how this manifested itself varied significantly from parent to parent. Most agreed that one of the principal ways their lack of patience presented itself was through their inability or willingness to repeat instructions multiple times to their children. In addition to being less able or willing to repeat instructions, some parents would also be more likely to become vocal if they slept poorly. This could include yelling at the children or a general "*shortness*" (Nate) with the children. Nate continued:

> *Nate-4: …snapping in terms of verbally yelling at the kids, you know like 'Stop it!', that kind of stuff like 'get in!' 'just!' … your patience is shorter than if you're not tired.*

Regardless of what parents reported as their usual level of composure, a poor night's sleep had the potential to impact all participants' parenting by decreasing their ability to remain patient with their children. In addition to increasing parental "*shortness*", self-reported "*impatient*" parents also found themselves being more likely to take the path of least resistance with their children. That meant that they were more likely to let their children do things they would not normally permit. This is in line with Tu and colleagues' (2018) research that found parents who slept poorly were more permissive. Lucy for example found herself being more permissive than she would have been if she had slept well.

> *Lucy-3: Yeah he was like, I want to eat, I want to eat these biscuits in the car in the morning. I was like fine, eat the biscuits, get in the car.*

[1] The name and number preceding participant quotes describe the name of the participant and the interview in which the quote originated. In this example, the quote originated in Nate's fourth interview.

The effects of a poor night's sleep were especially noticeable when both partners slept poorly. One participant reported that when his wife is being vocal with their children, he is usually able to jump in and diffuse the situation. However, if he is tired as well, he is far more likely to escalate to his wife's level of stress.

> *Mark-3: When I pick up that she's stressed always with the kids, what I do is either I try to defuse the situation and I try to make it, things more calm. … But sometimes I am also stressed or tired at the same time and then I see that she is and I just I actually I jump on board with her in being stressed with the kids. So I don't even give them a chance or anything.*

In summary, parents consistently reported that sleep had an impact on their ability to be patient with their children. The more poor nights of sleep parents experienced in a row, the less patient they became. While their partner could at times serve as a buffer for them, when both parents sleep poorly the children aren't even given "*a chance*". Given this apparent inability of parents to control their patience and the influence this has on their parenting, parents should not underestimate the importance of a good night's sleep. This is in line with Hubbs-Tait et al.'s (2006) conclusion, which states that "What matters to the parent is having the physical and emotional energy first, to be patient with the child's demands and, second, to respond appropriately to them." (p. 491). In fact, parents themselves even highlighted the positive effects patience has on their parenting.

> *Nicole-4: This week was really good, yeah. Because I think that I sleep very well, I realized that I, we, I have more patient and I stay with them. Talk to, talk with them.*

Interestingly, in contrast to Kelly et al.'s (2021) findings, the present study did not find any gender difference in harsh parenting practices.

Mood, Presence, and Activity

In addition to patience, participants reported that their mood, as well as their ability to be present and active with their children, were also influenced by sleep. The more nights of below average sleep participants experienced, the more likely they were to report poor mood,

decreased activity levels, or a decrease in their ability to be present when spending time with their children. This presence was described as having the ability to "*connect*" (Nate) with children.

Multiple studies have already found evidence of a relationship between sleep and mood. A meta-analysis by Pichler and Huffcut (1996) concluded that mood is significantly influenced by sleep deprivation. Equally, studies have found that sleep influences mindfulness, which can be described as the ability to be in the present moment (Campbell et al., 2018). Moreover, studies have also found that parents that slept less and had more sleep variability were less emotionally available with their children (Bai et al., 2020). This section will describe the ways in which sleep, mood, presence, and activity were found to be interconnected in the current study.

Parent's mood appeared to be affected by how much was required of them on a day following sub-par sleep. If expectations remained low, parents were able to stay in control of their emotions and their mood could be unaffected. However, if participants were expected to multitask, or their children required more of their parents than they could give, the parent's mood would quickly begin to shift (see Figure 9). This is in line with Mezick et al.'s (2014) research which found that following poor sleep people react more strongly to stressful events and have a harder time recovering from them. As such, the same "*fragility*" (Nate) following poor sleep that parents experience in regard to patience also appears to be apply to their mood. In addition, a number of parents reported feeling slowed down by the effects of poor sleep, making it more likely for them to be overwhelmed by their children or other demands, thereby further increasing the chance of the parent's mood being impacted.

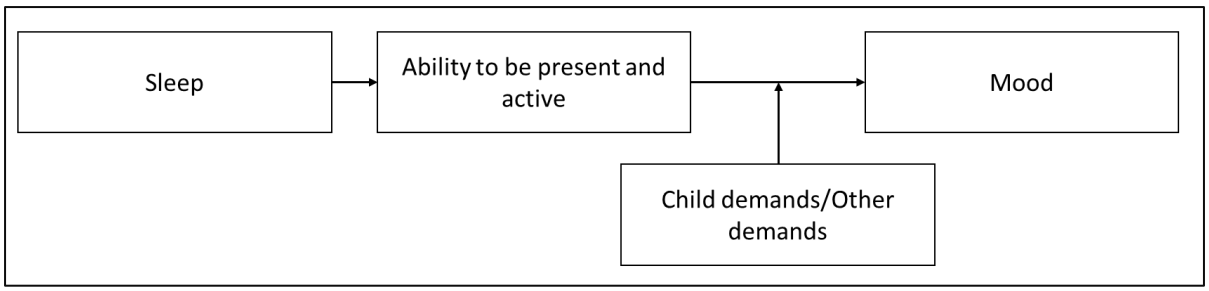

Figure 9: Sleep and mood diagram

One of the primary changes a number of parents noticed following a poor night of sleep was a reduction in the diversity of tasks they were able to conduct with their children. Nearly all parents reported that if they slept poorly, they would be more likely to engage in non-demanding tasks with their children. For some parents this meant a reduction in physical activity, including increasing their preference for watching TV or reading books when spending time with children. As Lucy describes, following a few nights of poor sleep she was able to watch TV and lie down with her children but had no desire to go outside to the park.

> *Lucy-3: Yeah. Just don't ask me to go outside to the park or anything like … I'm not in the mood. … mommy will sit there and lie down and like, oh, yeah, 'watch TV with us, mommy', yeah 'watch this movie with us', 'Sure! Okay!', you know.*

For other parents, like Lucy's husband Nate poor sleep was followed by a decrease in emotional presence. Nate described that with a lack of sleep he finds himself to be more introspective and self-focused, endlessly thinking about how "*tired*" he is. Following multiple nights of poor sleep he finds himself focused only on core needs of the family such as feeding them, rather than interacting with them. On the other hand, following a good night's sleep he finds himself "*more available*" rather than "*stuck in his head*".

In either case, as long as the children's demands remained low, the consequences of a poor night's sleep were not immediately noticeable. As long as children were happy to watch TV in Lucy's case, or if they did not need anything from Nate when he was tired, parents' decreased ability to interact with their children would remain inconsequential. However, if the

children required more of their parents' emotional, cognitive, or even physical resources, the negative influence of sleep on parent's mood would become visible. One such example of sleep and parental ability to function was described by Lucy who reported being able be "*there emotionally*" for her children, however strongly favouring non-demanding tasks with them.

> *Lucy-4: Well, probably because … I was there emotionally for [the kids], but it was like hey, let's, let's lie down on this couch together and have cuddles … or 'let's just lie down and read a book'…but there was no 'come on, let's go to the park'… which was what we probably would have done previously … it was just kind of like, 'can you guys please just sit there and not talk? For one hour while mummy makes the dinner'.*

Lucy went on to describe how if her children had been more demanding, especially physically, she likely would have become "*frustrated*". However, as her partner was available to take over these more challenging tasks, she was able to remain calm and emotionally present for her children.

> *Lucy-4: This is my physical activity threshold. The minute you pass it, okay go to your dad [laughs].*

Most parents appeared to be aware of their limitations following poor sleep. As such, they were more likely to purposefully "*fly low*" thereby keeping their "*fragile*" mood unaffected. By putting less pressure on themselves and reducing the number of tasks and responsibilities they had, parents were sometimes able to remain in control of their emotional expressions.

> *Tara-4: …on the third like on the third week, I realized, okay, if I haven't rested much I need to fly low [laughs]. Just to be more nice with the kids, and I did, and it was a success.*

Another example of this was presented by Lucy who was able to predict the effects of poor sleep on her next day which allowed her to adapt her behaviour and thereby remain in control of her emotions. By realizing she will sleep poorly and thereby will have less emotional and physical resources, she limited her activity to only what was strictly necessary on the next day. As a result, she managed to remain in control of her mood and her emotional expression.

*Lucy-3: I'd already kind of mentally prepared myself when I went to sleep the night before that, like oh crap, it's 1:30 [am], okay, I'm probably gonna be up at 5:30 or 6:00, and it's gonna be a s**t day tomorrow because of it. So I kind of already wake up with that mindset that okay, we just need to get through.*

Nevertheless, the more tasks parents had and the less time they had to complete them in, the harder it became for them to remain patient and in control of their emotions and behaviours following a poor night's sleep. As tired parents were less able to multitask, increased demands and decreased support led to more changes in their mood and their behaviour.

Tara-3: ... like I could be exhausted, ... It really depends if I have to do extra things on top of parenting. So if I'm like, just with them, I can be like playing with them and like no problem.

On the other hand, following a good night's sleep, parents described themselves as "*full with energy*", ready and able to manage the challenges of the subsequent day. Following good sleep, Tara, for example, found herself able to cope with a challenging day when her family was sick. Tara had described how having a sick family usually weighs on her quite heavily; however, in this case it did not appear to influence her negatively.

Tara-4: Woke up full with energy. But [youngest child -1.4M] started developing cold symptoms, so then I was worrying about that. Also Oscar was unwell. So towards the evening, I was like trying to do as much as I could, like very empathic to both of them and trying to nurture [youngest child -1.4M] as much as I could. But the other two kids were great. So it was good, good day.

Interestingly, when demands increased, some parents described feeling an obligation to "s*hake off*" (Honda) their exhaustion, even if they did not sleep well. They described that it is a parent's responsibility to be there for their children the way the children need their parent to be, regardless of how tired the parent actually is. As Oscar reflects, parents have to be responsive to their children even when the parents are tired, and this doing "*what you have to do*" is part of being a committed parent.

Oscar-4: I think that that's one thing. The other is that, that long, long term thinking and what resources you have available, and then you need to make the most

…

> *in general, you have to do what you have to do and then you do it. I mean if you're a committed parent…*

Arguably though, parents do not possess a unique ability to transcend their tiredness by "*shaking* [it] *off*" in order to "*do what* [parents] *have to do*". Instead, it appears that parents are able to prioritize where they utilize their remaining energy. Even in Oscar's example he describes a prioritisation of resources rather than an ability to transcend his tiredness. Therefore, instead of possessing a unique ability to overcome their human limitations, parents may simply have the ability to choose when and how to utilize their resources. That includes resources which are more limited following a night of poor sleep. A good example of this can be found in Honda's interviews. Honda argues that parents have a responsibility to "*shake off*" their exhaustion.

> *Honda-4: To shake off the exhaustion is going to take some time and you have to plough through as a parent. You have to, regardless there's a minimum threshold you do, aside from feeding them or making sure they got everything they need to get through the day, that emotional side, there is a level of emotional engagement for them regardless of how you feel it's always there.*

However, even Honda submits that the extent to which a parent can support their children does "*fluctuate*" with tiredness or exhaustion.

> *Honda-4: But the level at which you can contribute and be present and support them does definitely fluctuate with how exhausted or tired you are. Without a doubt.*

In fact, in other interviews when attempting to "*shake off*" his exhaustion, Honda described himself as less "*present*" with his children or as having exhausted himself to a point where he can no longer continue without a nap.

> *Honda-3: So I felt I had good quality time with the kids in the evening. But I think if I was fresher, I would have been a fraction more present with them.*

> *Honda-4: [Following a terrible night's sleep] we went swimming … we took the kids out to an exhibition … it was a really good afternoon out. And then when I came back, I had to have a nap.*

In summary, sleep noticeably influenced parents` activity levels on days following poor sleep. In addition, if a parent's available energy was insufficient to deal with the demanded activity on the following day, parents noticed changes in their mood as well as their ability to be fully present for their children. In fact, participants claimed that at times poor sleep influenced their ability to think, feel, and behave in regard to interactions with their children. As a result, poor sleep impacted how participants perceived their parenting following nights of poor sleep. While parents appear to be able to overcome their ability to be present, this effect is short-lived and usually followed by an increased demand for sleep. These findings add to current research which has found that a good night's sleep appears to serve as a buffer to the next day's negative events (Hamilton et al., 2008).

Nights of Sleep Adding Up

The present study also found that a night of sleep influences more than just the following day. In fact effects of one night of poor sleep remained visible for up to three days. While one night of sleep rated as "Poor" or "Terrible" had an effect on most participants, this effect was not always noticeable and it did not always influence parenting. However, the more consecutive nights of "Poor"/"Terrible" sleep participants experienced, the less likely they were to report positively about the next day and the more the effects of a below average sleep would become evident. Studies on sleep have come to similar conclusions, finding that the effects of poor sleep accumulate over time (Banks & Dinges, 2007; Finan et al., 2015; Hamilton et al., 2008). In fact, studies have established that the effects of both poor sleep quality and quantity accumulate over time. The following section will describe how participants in the present study experienced consecutive nights of poor sleep. Adding to current research, this section will conclude with a description of how a night of sleep effects more than just the following day.

How participants of the present study were affected by multiple nights of what they rated as "Poor" or "Terrible" sleep varied. A number of participants mentioned that they could still

remain in control of their emotions and their emotional expression following one night of "Poor" or "Terrible" sleep; however, as nights of poor sleep added up, remaining in control became increasingly difficult. This was especially true when parents were interacting with their children. As parents were more likely to use their "*reserves*" (Honda) with their children in an attempt to remain in control of their emotions, it sometimes took more than one day for the effects of poor sleep to influence parenting. However, eventually poor sleep caught up with all parents, inevitably also influencing their parenting.

> *Tara-4: I think I can take one day without sleeping, it's just when it's two days in a row then I fail… Like, I have no patience, like I could do like the extra, it's not like running a kilometre, like I could be nicer to the kids the second day than I have, it's like. … Moody, yeah. I'm moody in general like yeah.*

Many parents like Tara managed to stay somewhat in control following a single night of sub-par sleep. However, some parents experienced a more gradual loss of control starting on day one. For others multiple nights of poor sleep were a rare occurrence, as their body would not let them continue beyond two nights of poor sleep. Instead, at a certain point their body would simply begin to shut down.

> *Mark-4: But then after two or three nights, what usually happens is that on the third or fourth night … I crash and go to bed really early or, or then if it's a Saturday or Sunday then I just sleep in for longer.*

No matter how much participants tried, sleep always eventually caught up with them in some shape or form. This finding highlights the necessity of sleep for proper human functioning. Whether changes in mood, irritability or simply "*crashing*", sleep appears to be a necessity as crucial as food or water, without which people cannot function properly. Intriguingly, like in the case of longer periods without food or water, following a longer drought one 'regular' event does not sufficiently make up for lost resources. Specifically, one 'regular' night of sleep does not make up for multiple nights of poor sleep, just like one 'regular' meal would not make up for multiple days without food. Instead, on recovery nights following multiple nights of poor sleep participants needed an increased amount and better quality of sleep to rate their sleep positively than following favourably rated nights.

In fact, following multiple poor nights of sleep was not the only instance where the effects of sleep were visible beyond the following day. Instead, remnants of participants' past night's sleep would be visible for up to three days. The extent to which past night's sleep appeared to influence parents decreased with each passing night, meaning that participants appear to be exceedingly influenced by more recent nights of sleep. The relationship appeared to be particularly strong with consecutively below average or consecutively above average nights of sleep.

This means that if, for example, a participant had a string of positively rated nights of sleep, they would be buffered against not just the events of the next day. Instead part of this buffer would also transfer to the day after and at times even a third day. The same was true for a night of poor sleep. If participants slept poorly for consecutive days, one night of "Good" or even "Excellent" sleep would not provide enough of a buffer for the upcoming day. Nate described how he noticed this effect after monitoring his own sleep for two weeks.

> *Nate-3: … last time that we spoke about when you have a s***ty night sleep, it keeps with you and it tracks with you for a period of time, like you still feel tired for days afterwards, but I think on the flip side, if you can get a good night, good couple of nights sleep that also stays with you for a period of time.*

A number of other participants also described experiencing instances of this effect. Following a night of good sleep which was preceded by a string of poor nights of sleep parents described their day positively. However, later on in the day they described themselves as "*tired*" (Honda) or "*impatient*" (Lucy).

> *Lucy-2: … I started getting a little impatient, towards the end of the day, so everything's good in the morning and then sort of like when you get to the end of the day, that's when I really notice that I start getting, or I did.*

Similarly, a person who has not eaten for days and has finally received a satisfactory meal would likely become hungry again earlier than if they had been eating regularly for some time.

As could be expected, the longer poor sleep continued for, the more it impacted the upcoming days, even if parents' sleep had already begun stabilising.

> *Lucy-4: Sunday I was feeling really flat but I think, but I couldn't understand why because I had some good sleep. … it might have been because last week was a big week with no sleep*

One participant presented a particularly good example for both nights of sleep adding up and sleep affecting not just the following day. On the day following a night's sleep rated as "Terrible", which was immediately preceded by a night of sleep rated as "Poor", Honda described himself as "*a zombie*". He recalled having to resort to calling off work early and taking a nap as he could no longer function.

> *Honda-2: Yeah, it was really awful. … My brain was just, yeah, not functioning and it's very seldom that I call off work. I can't remember the last sick day I had at this, at this work. So yeah, in terms of me, I had a nap in the afternoon after I called off work…*

Following his recovery nap and two nights of sleep which he rated as "Adequate" nights, he reported still not being able to fully recover from the effects of his "Poor and "Terrible" sleep at the beginning of the week. While he once again had access to reserves which enabled him to improve his parenting, he still felt "*rundown*".

> *Honda-2: … I felt very tired but surprisingly was very there for the kids. And so I was tired and rundown, a rundown parent but had the love and reserve and found the reserve energy.*

The influence of the past night's sleep was also visible when observing participant's sleep ratings. In fact, a clear pattern emerged when contrasting participants' previous night's sleep to the ratings of their next day. The available data shows that the worse participants rated their previous night's sleep, the more likely they were to rate their following night of sleep more negatively as well. The same was true for nights of sleep rated positively. For example, participants were most likely to rate the following night of sleep as "Good" if the preceding night was rated as "Excellent", but less likely to do so if the preceding night was rated as "Good", and so on (see Figure 10 (a) and (b)).

(a) (b)

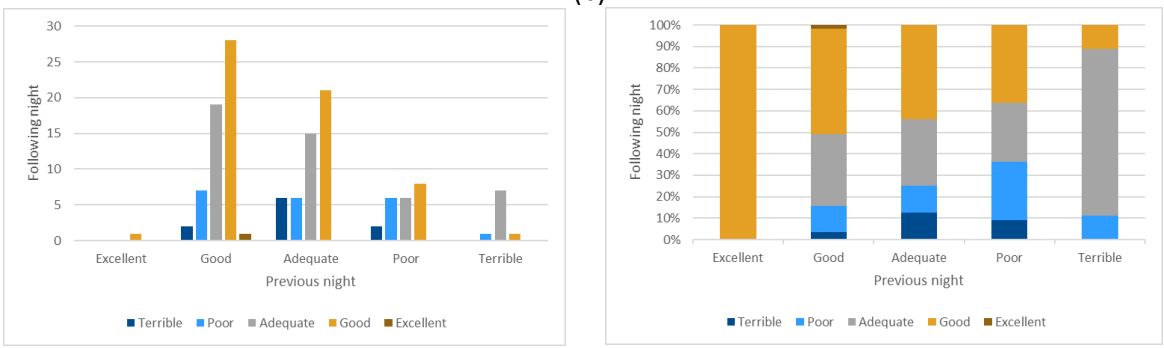

Figure 10 (a) and (b) : Frequency of individual following night sleep ratings based on previous night sleep ratings[2]

Equally, participants' following night of sleep would give some indication of what their previous night of sleep looked like. Meaning that for example, if a participant rated their night of sleep as "Good", it was likely that their previous night of sleep was at least "Adequate" (see Figure 11 (a) and (b)). Interestingly, "Terrible" nights of sleep were usually followed by "Adequate" nights of sleep. This was likely due to the increased exhaustion leading parents to prioritize sleep on nights following "Terrible" sleep.

(a) (b)

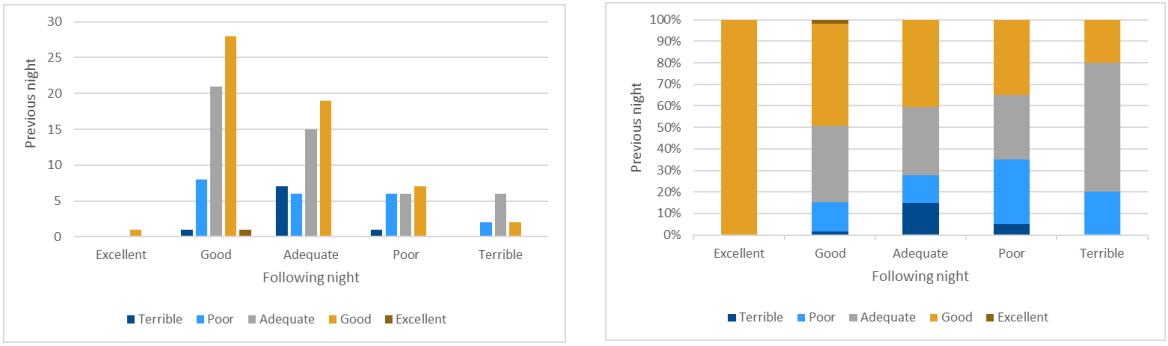

Figure 11 (a) and (b): Frequency of individual previous night sleep ratings based on following night sleep ratgs[2]

Participants were highly unlikely to rate a night of sleep as "Terrible" after having a "Good" night of sleep. In fact, this occurred in only two instances, both of which were due to unique circumstances. The first "Terrible" rating included less than three hours of sleep, while the

[2] Note. Emma's ratings were not included in either of the above figures as her ratings were either consistently good, or in her words "not related to sleep" but rather to a diet that she was on during the study.

other “Terrible” sleep was made up of the most interruptions out of all of the parent’s nights of sleep and the individual’s second shortest sleep time.

The influence of past night’s sleep was also visible when contrasting parents’ sleep ratings with their sleep quality and quantity. The time and quality of sleep participants required to provide a positive or negative rating appeared to relate not only to the night in question, but also to the past few nights. This means that on nights following a string of below average night’s sleep participants would need more hours of sleep and/or better quality sleep than usual to rate their sleep positively. An example of this can be seen in one participant’s sleep overview (see Table 1). It would appear that at no point in three weeks did the participant rate their sleep as “Good” after a “Terrible” night’s sleep. This was true even if the participant did not experience any interruptions and slept for more than 8 hours, which appeared to usually be the conditions for a “Good” rating. The only “Good” rating given by the participant followed a string of “Adequate” nights of sleep.

Table 1: Participant’s sleep overview 1

Day	Date	Time Asleep	Time Awake	Sleep duratio	Total sleep ti	Sleep Interrupti	Sleep Quality Self-F
Monday	16/05/2022	22:45	7:15	8:30	8:18	2	Adequate
Tuesday	17/05/2022	22:30	7:07	8:37	8:24	1	Poor
Wednesday	18/05/2022	23:30	7:29	7:59	7:54	1	Terrible
Thursday	19/05/2022	23:00	7:03	8:03	8:03	0	Adequate
Friday	20/05/2022	23:31	7:31	8:00	8:00	0	Adequate
Saturday	21/05/2022	23:51	7:44	7:53	7:23	3	Adequate
	Variation						
Sunday	22/05/2022	0:30	7:45	7:15	7:15	0	Adequate
Monday	23/05/2022	22:46	6:51	8:05	7:52	1	Adequate
Tuesday	24/05/2022	22:30	6:46	8:16	8:16	0	Good
Wednesday	25/05/2022	22:46	6:45	7:59	7:59	0	Adequate
Thursday	26/05/2022	23:45	7:11	7:26	7:26	0	Adequate
Friday	27/05/2022	23:15	7:30	8:15	8:15	0	Adequate
Saturday	28/05/2022	0:27	7:00	6:33	6:30	2	Terrible
	Variation						
Sunday	29/05/2022	0:01	7:45	7:44	7:44	0	Adequate
Monday	30/05/2022	22:30	6:27	7:57	7:53	1	Terrible
Tuesday	31/05/2022	22:45	7:00	8:15	8:15	0	Adequate
Wednesday	1/06/2022	23:21	7:22	8:01	7:56	1	Adequate
Thursday	2/06/2022	23:44	7:06	7:22	7:22	1	Adequate
Friday	3/06/2022	0	7:34	7:34	7:22	1	Adequate
Saturday	4/06/2022	23:15	4:00	4:45	3:59	1	Terrible
Sunday	5/06/2022			0:00			0

A second example can be seen in another participant's sleep overview (see Table 2). Although the ratings of this participant were rarely the same on consecutive nights, at no point did the individual rate a night of sleep as "Good" unless the previous night of sleep was at least rated as "Adequate". Furthermore, at one point it would appear that "Adequate" nights of sleep added up to a good night of sleep. Even though total sleep time on Sunday the 29th was shorter and the participant experienced one more interruption than on the night before, their rating was better on Sunday the 29th than it was on Saturday the 28th. These results should be interpreted with caution as sleep stages and sleep hygiene, could also have played a role.

Table 2: Participant's sleep overview 2

Day	Date	Time Asleep	Time Awake	Sleep durati	Total sleep t	Sleep interrupt	Sleep Quality Self-
Sunday	22/05/2022	20:00	6:56	10:56	9:53	4	Adequate
Monday	23/05/2022	21:07	7:05	9:58	8:18	3	Poor
Tuesday	24/05/2022	22:02	6:56	8:54	7:59	3	Poor
Wednesday	25/05/2022	21:56	6:39	8:43	8:29	2	Adequate
Thursday	26/05/2022	21:07	6:45	9:38	9:38	0	Good
Friday	27/05/2022	21:19	6:45	9:26	9:09	1	Adequate
Saturday	28/05/2022	22:14	6:09	7:55	7:55	0	Adequate
	Variation						
Sunday	29/05/2022	23:21	7:01	7:40	7:25	1	Good
Monday	30/05/2022	21:50	6:14	8:24	8:24	0	Good
Tuesday	31/05/2022	23:00	6:45	7:45		1	Adequate
Wednesday	1/06/2022	20:21	5:05	8:44	7:08	3	Poor
Thursday	2/06/2022	20:39	6:15	9:36	8:47	3	Adequate
Friday	3/06/2022	22:36	6:59	8:23	7:58	2	Poor
Saturday	4/06/2022	1:21	6:55	5:34	5:19	1	Poor
	Variation						
Sunday	5/06/2022	23:10	7:28	8:18	7:50	2	Adequate
Monday	6/06/2022	22:19	6:55	8:36	7:56	3	Adequate
Tuesday	7/06/2022	20:23	6:29	10:06	9:17	2	Good
Wednesday	8/06/2022	23:04	6:13	7:09	6:09	4	Terrible
Thursday	9/06/2022	22:09	5:59	7:50	7:23	2	Adequate
Friday	10/06/2022	22:40	5:59	7:19	6:45	1	Poor
Saturday	11/06/2022			0:00			0

In summary, these findings clearly show the influence sleep has beyond the following day. This is the case for both positively and negatively rated nights of sleep. As nights do not just affect the next day, multiple consecutively poor or good nights of sleep have the potential

to add up. As such, consecutively poor nights of sleep exacerbate the effects of poor sleep on parents, making it increasingly difficult for them to be emotionally and physically available for their children. In addition, the duration and quality of recovery sleep required increases as poor nights of sleep add up. Parents and individuals should note that sleep debt adds up over time and increasingly longer and higher quality sleep will be required to satisfy one's sleep need.

The Stressful Morning

Multiple studies found that sleep influences the way people react to next day stress. Studies have found evidence for sleep impacting cortisol secretions, activation of the HPA axis, and high-frequency heart rate variability (Mezick et al., 2014; Troxel et al., 2007). Similarly, the present study has found sleep to influence participants` reactions to next day stress. This effect was most clearly visible on weekday mornings, which appeared to be the most stressful time for parents. This section will describe the effect sleep has on the stressful morning and parenting during the stressful morning.

Nearly all parents described weekday mornings as the most stressful time of day. As parents try to get their children ready for school and/or themselves off to work, there is usually not a lot of spare time. This lack of time increases the need for multitasking and further decreases parent's patience. As this paper has already shown, both patience and parent's ability to multitask are influenced by poor sleep. Parents reported that as a result on weekday mornings they are more likely for to interact negatively with their children. Parents described the mornings as a time where they just "*want kids to do the things they have to do*".

> *Mark-2: And it's usually more in the mornings that I'm I guess I lose, I lose my temper with the kids. Because there's that, like all of the, it's a very short time,… a lot of things are happening at home, …so I want the kids to do the things they have to do…*

Parents mentioned a number of reasons for why mornings are especially stressful. For some the increased time pressure was mentioned as one of the primary reasons, while for others this time was more difficult because only one parent is available for the children.

Emma-2: They bicker all the time, especially in the morning because Honda is not here.

An intriguing observation was made by Lucy during the study. She noticed that for her especially Mondays were difficult, as the children are readjusting from the relaxed weekend schedule to the tighter weekday schedule. She mentioned that during this time children appear to struggle the most.

Lucy-2: Monday morning. It's like no, you can't just, you know, sit around and watch TV and stay in your pyjamas. We have things that we need to be doing.

On one such stressful Monday morning Lucy made a conscious effort not to lose her temper. Interestingly, by making this change she realized that her youngest child was only "*making a fuss*" because he understood that the weekday morning routine meant that he would have to spend some time apart from his parents. This realization led to Lucy being more accepting of her child's Monday morning "*fussiness*". This acceptance inadvertently led to another realization for Lucy.

To manage this Monday morning "*fussiness*", Lucy began to relax her schedule in the morning by ensuring she had no early morning meetings at work. This additional time enabled her to not have to rush before work and gave her the space she needed to engage with her child. As a result, she reported that her stress levels significantly decreased and her interactions with her children noticeably improved. In fact, she argued that she was able to fully mitigate the negative effects of a poor night's sleep on her weekday mornings simply by relaxing her morning schedule.

Lucy-4: That! Yeah. It's the time thing where I need to be. And maybe that's why this week was good. Like maybe I didn't have to be anywhere at a certain time. And so it doesn't matter how much sleep I've had, as long as I don't have a meeting to be at … Whereas I can have 10 hours sleep, wake up late, be in a rush, have a really great sleep and I'll scream at my kids because I'll be like 'Hurry it up! I've got to go!' [laughs].

In summary, the influence of poor sleep is most visible in the morning when parents are under the most significant time pressure. Parents could possibly reduce the impact of poor sleep on their mornings by relaxing their morning schedule and thereby relieving this pressure. In fact, having additional time in the morning noticeably mitigated the effect of poor sleep for one participant. One of the possible mechanisms underpinning this relationships could be mindfulness, as studies have shown that mindfulness can influence affect as well as emotional resilience (Campbell et al., 2018). The mitigating effect of mindfulness is discussed in more detail later on in this paper.

Quality Over Quantity

The following section contrasts sleep quality with sleep quantity. Much of the research on sleep suggests that both sleep quality and sleep quantity appear to have a noticeable effect on individuals (Kumari et al., 2009; Basset et al., 2015). However, when reflecting on their own sleep in the present study, participants unanimously concluded that uninterrupted sleep supports their recovery more than sleep duration. In other words, all participants unanimously agreed that sleep quality was more important than sleep quantity. With this, the present findings are more in line with Bassett and colleague's (2015) research which argued that sleep quality is related to next day stress. However, in contrast to Basset et al.'s research the present study also found some evidence for sleep duration influencing participants.

Participants consistently reported feeling better and more refreshed on nights following fewer interruptions. This was true even if their total sleep time was reduced.

> *Lucy-3: So I think it was the sleep, but the hours of sleep, uhm I feel like I still got a little bit of quality in that. Even though it was, they were short.*

Parents also stated that their sleep quality contributed more to their next day functioning than sleep quantity did.

> *Nate-2: Yeah, and uninterrupted chunk of sleep, yeah. So, I'm still, it's good to be able to, after that to be able to function, but on the other nights*

… when the sleep is broken up into parts that's particularly where you feel more tired coming out the other side of it.

However, parents were aware that sleep duration also influences their recovery especially once sleep duration is reduced below a certain point. Some participants claimed that five or six hours were still necessary for them to recover. Beyond this point quality was more important. This was true, even if the duration was well below their average amount of sleep, which for most was between seven and eight hours.

Nicole-4: I can sleep just, like just five hours with the quality if the quality is really good, yeah, make more difference.

Throughout the study, as participants monitored their sleep, they became even more convinced of the importance of sleep quality. However, parents added that the duration of interruptions also played a major role. They reported that short interruptions did not significantly interfere with their sleep, while longer interruptions had a more noticeable effect on their next day functioning. In addition to the duration remaining short, participants needed to avoid bright lights in order for the interruption not to noticeably influence them.

Nate-2: Yeah, short interruption are less bad. … if I can keep lighting down if I'm not like engaging in turning the, if I'm having to turn the lights on, that's when things are really bad…

The fact that sleep interruptions per se were not sufficient to influence an individual's sleep has already been well established. For this reason, past research on sleep disruptions has included an action that participants must complete every time they are awakened (Bonnet, 1985). Therefore, one could conclude that disruptions which require less brain stimulation would be less disruptive than those which require more. However, while the influence of short and low-stimulation disruptions may be lower, a multiplicity of these would possibly also have noticeable effects on the individual's upcoming day.

Another factor that according to participants influenced their sleep quality was their ability to reach all of the necessary sleep stages for a sufficient amount of time. For a number

of parents this was the most substantial hurdle to a positively rated night of sleep. As such, participants highlighted that they would prefer to sacrifice sleep duration if they could spend enough of their time asleep in deep sleep.

> *Lucy-4: I would prefer to have like four hours, but like an hour and a half of that is like deep sleep. And like, solid like four hours, five hours.*

In line with Lucy's statement, Oscar claimed that his lack of deep sleep severely influenced his sleep quality. Oscar attributed this lack of deep sleep to not being able to get deep sleep following his first interruption of the night. The sleep tracker used in the present study largely supported this claim, often showing a serious reduction in deep sleep following Oscar's first sleep disruption. Even though his sleep duration was not the lowest, the frequency of his sleep interruptions was higher and his sleep ratings were lower than any other participant in the present study.

> *Oscar-4: And sometimes if you see the sleep patterns. I've been in bed for nine hours. And I've been, I've been in light, which is, light is that I can see what is happening. You know, light sleep for six hours, so I wake up broken the next day.*

In summary, participants regarded sleep quality as more important for their next day functioning than sleep quantity. However, this was only the case beyond a minimum threshold of sleep time, which was approximately two hours less than their usual sleep time. As a result, this study found both sleep quality and quantity to be necessary for next day functioning.

Finally, it is worth noting that the negative aftermath of a poor night's sleep was reported on consistently, even if while being interviewed participants were unintentionally led to believe that their sleep had been different than it really was.

Buffering Against Poor Sleep

Repeatedly and consistently participants stated that sleep influenced their parenting as well as their overall functioning. However, they frequently added that there were a number of factors that buffered the effect sleep had on them. These factors included children, stress,

health, naps, receiving help from their partner, and being able to take a break. Previous studies have already made some of these connections, as they discovered that naps, child behaviour, health, and stress can influence individuals following a poor night of sleep (Lillis et al., 2018; Maugeri et al., 2018; Mezick et al., 2014).

In the present study the aforementioned factors primarily had an effect on parents with less than "Average" sleep. According to participants, the effect of some of these factors was so substantial that they at times completely reverted the effects of a poor night's sleep. The present study expands on these findings by highlighting the complexities of these relationships and how they relate to parenting.

This chapter will begin by exploring how children, work, and health influence the relationship between sleep and parenting. Then this chapter will continue by taking a closer look at the impact of naps and other breaks. Finally, this chapter will conclude with an overview of how working as a team can help parents moderate the effects of sleep on parenting.

Children, Work, and Health

The most commonly mentioned factors playing a role in the relationship between sleep and parenting were children, work, and health. Previous studies have already shown that all three of these factors are related to sleep, with sleep impacting health, children influencing sleep and both sleep and children influencing people's working ability (Lillis et al., 2018; Maugeri et al, 2018; Tietze et al., 2014). The present paper adds to these findings by expanding on the intricacies of these relationships. This study found that all three have the potential to both positively and negatively influence the relationship between sleep and parenting. As such, this section will describe the reported effects of children, work, and health on the relationship between sleep and parenting.

Children. In nearly half of all interviews, parents mentioned the influence of children. Children had the ability to impact their parents moods, behaviours, and energy levels both

positively and negatively. When children behaved well, performed well at school, or presented themselves well in front of others, their parents were more likely to report having made positive experiences throughout the day. Parents also described their children as a "*good moderator*" between sleep and parenting.

> *Nate-4: Yeah I mean, seeing the kids are doing so well, that's a good moderator too. So that is positive reinforcement for us …*

This was mostly true regardless of how parents slept on the previous day. At times, even when parents slept poorly and described themselves as "*exhausted*", they reported the capacity to have a "*good*" experience with their children as long as the children behaved well. An example of this is Oscar who reported on his "*good dynamic*" with his children following a poor night of sleep.

> *Oscar-3: So, in general very happy to be honest. I was exhausted but it was a good dynamic.*

Therefore, positive child behaviours had the potential to buffer against the effects of a poor night's sleep. The effects of positive child behaviours were also evident when parents slept well. In fact, participants spoke most positively of days where they both rated their sleep as "Good" or "Excellent" and their children behaved well.

> *Tara-2: Sunday was an amazing day. Yeah, it was adequate the sleep … and it was such a lovely day, it was sunny, we went out, the kids were so good, really good.*

This finding shows that a good night's sleep has the potential to amplify positive experiences and that children can positively influence their parents regardless of their previous night's sleep.

It should be noted that parents were more likely to note the positive effect of children on days following poor parental sleep rather than days following good parental sleep. In other words, it appeared that children had a stronger effect on parents when the parent's sleep was poor rather than good. One possible explanation for this is the increased potential for

improvement following poor sleep (i.e. a good day cannot get much better while a bad day can improve more noticeably).

However, not all of the effects children had on their parents were positive. Instead, children also had the capacity to influence their parents in negative ways. As Mark reports, even if he is in a good mood, if his children misbehave he "*get*[s] *stressed*" with them.

> *Mark-4: On the other hand, yeah even if I, I'm in a good mood I see that they are not behaving well … they're not obeying, then even if I'm in a good mood, I can't help but to also get stressed with them and yell at them because we want them to do their stuff.*

Other researchers found similar results when looking into the relationship between sleep and parenting (Lillis et al., 2018). Lillis and colleagues found that both the strongest positive and the strongest negative social interactions mothers reported on during their research included the mother's children.

Interestingly, in the present study the negative effects children had on their parents did not last as long as the positive effects. While children could positively influence their parents for the rest of the day, the negative effects of poor child behaviour were more short-lived.

> *Tara-4: I mean the attitude of the kids really affects you as well, but that's just more like moments. It doesn't alter you the whole thing, your whole feeling of the day. It's just that one long snappy moment and that's it.*

In fact, there even appeared to be an expectation that parents "*bounce back*" quickly from negative interactions or child misbehaviour, as young children had a tendency to move on quickly.

> *Nate-4: So even though I might be still annoyed that he didn't listen to me half an hour ago, he's beyond that, past that and so he's into another space and so they're always, they always bounce back and quite resilient. So that encourages me to be, similarly, to let go of when I'm annoyed.*

A child's ego-centric view, meaning that the child is unable to view the world around them through any lens but their own, would increase the importance of parents "*bouncing back*" at the same speed as the child (Rathus, 2010). If the child moves on while the parent does not, the

child could misinterpret the negatively charged responses of their parent who may still be harbouring some leftover negative emotions.

In summary, by influencing parent-child interactions, children have the ability to influence the effects of parental sleep on next day parenting. Specifically, if parents sleep well and have positive interactions with their children, they are most likely to report positively on their parenting; if parents sleep poorly but their interactions with their children are positive, they are likely to report positively on their parenting; if they sleep well but their interactions with their children are negative they are likely to report negatively on their parenting; if they sleep poorly and their interactions with their children are negative they are most likely to report negatively on their parenting. Therefore, children moderate the relationship between sleep and parenting. Moreover, the positive effects children have on their parents appear to be more long lasting than the negative effects.

Work and Health. Similarly to children, work also appeared to influence the sleep parenting relationship in a number of ways. On one hand, parents reported that going to work gave them an opportunity to switch off from their parental responsibilities. This time out, appeared to support their recovery from a poor night's sleep and seemed to make them more available for their children upon return from work. As Honda describes:

> *Honda-3: I went to work but I was very emotionally available for the kids when I returned. We played, we fought, we played board games I read books we cuddled we tickled, made dinner together and as a parent I felt joyful.*

On the other hand, when work is stressful, it can drain the limited resources parents have following a poor night's sleep, leaving parents exhausted and unable to be available for their children.

> *Nate-4: … had like performance reviews at work. [in addition to] that sort of big physical exertion day. Which that evening I had nothing, no energy for the kids.*

Other moderators mentioned by parents that influenced their sleep parenting relationship both positively and negatively were largely related to health and wellbeing. These included difficulties parenting when sick or the positive or negative effects of seasonal changes.

> *Tara-4: The morning the kids were pretty much on their own and behaving great, so it was good. Took them to the museum, but then I developed some discomfort like illness. So I was just snappy and eager to get them to bed so I could just like relax and be on my own.*

In either case parents agreed that it is usually a multiplicity of factors that either positively or negatively influences the sleep parenting relationship. Parents argued that while poor sleep "*exacerbates*" (Oscar) their poor experiences on the next day, by itself it is not enough to cause negative parent-child interactions. However, if children misbehave or something out of the ordinary occurs, parents who slept poorly are more likely to react poorly to the situation. Similarly, if work is tiring or parents are ill following a poor night's sleep, they are less likely to be available for their children. This was well summarized by Oscar during the last interview.

> *Oscar-4:… I think it's a combination of different things is how much or how type of a parent you want to be, where is your commitment to your kids, and then other factors like sleep stress, having time, their own emotions, so it's a, it's a combination of many things. I think sleep or the lack of sleep, exacerbates some of the other things that you have in your life. You know, it's that circle it's not necessarily a cause,… I would say that exacerbates things.*

Finally, it seems that mindfulness also helped buffer parents against the effects of poor sleep. This finding is in line with aforementioned research which found mindfulness-based practices to positively impact both affect and sleep (Campbell et al., 2018). In the present study a few parents described mindful behaviours that helped them be present for their children regardless of their sleep. One parent reported on his conscious effort to be "*present*" at key moments in the day for his children in order to create a safe and welcoming environment for them.

Nate-3: I've tried to be more present for when we leave in the morning, so try to be present at that point, saying goodbye. Try to be present for the initial reconnect. … I always try to keep those sort of, those, what are they, like key daily milestones like try to keep the connection there.

Naps and Other Breaks

Another frequently mentioned buffer between sleep and parenting were naps. Previous studies have already established that naps help people moderate the effects of poor sleep (Mezick, et al., 2014; Rathus, 2010). This is not surprising as naps by definition involve sleep and thereby in the very least help participants increase their overall sleep duration. However, naps appear to influence individuals in more ways than simply increasing the time people spend sleeping. This section will describe the primary reasons for, effects of, and limitations to naps in the present study. Afterwards, this section will report on an unexpected finding involving breaks from parenting that do not involve naps.

All participants reported taking naps during the present study. Nearly all naps happened on weekends and most lasted approximately 30-60 minutes. As parents did not wear their sleep trackers during the day as consistently as they did at night, the following results are primarily derived from participant self-reports.

Parents described two primary reasons for requiring naps: inadequate sleep and tiredness from parenting. Inadequate sleep left parents with an inability to recharge their energy at night, leading to an increased need to nap. Regarding tiredness from parenting, parents reported that their children drained their energy and as such interactions with children would increase parent's need to nap.

Emma-4: … it helps me during a weekend because they [children] are at home all the time. But during week, I don't need to have that nap, they're not here, you know, I'm able to preserve my energy levels until they come back.

In either case, a lack of energy was one of the key components to naps. In fact, the less energy parents had, perhaps through an extended period of poor sleep, the more they would

describe naps as a "*necessity*" (Tara). One example of this is Honda, who after three nights of poor sleep, found himself unable to continue being "*productive*" at work and needing a nap so he would have the necessary energy to fulfil his evening obligations.

> *Honda-2: Wednesday, I was feeling really exhausted. And I finished I pinged my boss about two o'clock, and I said look, I'm not being productive. I don't know what's up with me but I'm signing off for the day, and that has never happened. But yeah, I've been having really poor sleep. I think Monday, Tuesday, and Wednesday. It got progressively worse and yeah, Wednesday was really bad. So I had a nap.*

As a result of his nap, Honda felt "*re-energized*" enabling him not only to fulfil his evening obligations, but also to have "*good family fun time*" with his children later on in the day.

> *Honda-2: …and then I felt a bit better, like not amazing, but I took the kids to the park … came home and then we had a really good family fun time, we had the sofa arrive. So got everyone I got everyone involved in assembling the sofa … But again, I would not have touched the sofa unless I had that nap and I felt re-energized.*

A number of parents described their ability to get re-energized as the primary benefit of taking a nap. Frequently, this would give parents the energy they needed to interact with their children and parent the way they desire. For some parents this newfound energy also meant that they could continue working productively. In either case, naps reduced the effects of poor sleep by allowing parents to regain the resources they needed to manage the challenges of the day. These results support Mezick et al.'s (2014) findings, who discovered that naps positively impact individuals by reducing the effects of poor night's sleep.

Intriguingly, while children were one of the primary reasons for parents requiring naps, they were also one of the primary hindrances to naps. Most parents reported napping longer and more frequently before they had children. The more children parents had and the younger the children were, the more likely parents would report on their children preventing them from napping. Children under the age of two were especially highlighted as disruptive to naps, as they require more care. As such, when describing his experience with parenting children under

the age of two for nearly seven years, Oscar described himself as "*knackered on a regular basis*".

> *Oscar-2: Or then I had a nap. Or then I did nothing. I, I lay myself in the sofa for a, for two hours after work and then I recovered, but now he's like I don't have that luxury. There's never a free time, so I feel knackered on a regular basis, since seven years ago.*

Some parents reported struggling to take naps even if children did not require their immediate attention. Honda for example, described being unable to nap while the "*kids*" are "*running around*" in the house. This frequently left him tired and unable to recharge.

If parents did not nap, the effects of a poor night's sleep could take hold of them throughout the day. This could leave them less patient, less in control of their emotions, and less available for their children. With less opportunities to nap parents struggled to recharge the energy they required. However, in order to avoid the consequences of poor sleep, parents described becoming increasingly creative with their napping. Frequently parents would use quiet times in the home as opportunities to recharge their energy with a nap. Quiet times could include when the children were napping, or when the family watched a children's movie together.

> *Nicole-2: So sometimes I feel really tired during the middle of the day. And I want to have some, some naps like we have some, and so we have some movie, movie time during the week. So I was pretty sure that I'm going to sleep. I'm going to have some, some naps…*

Moreover, parents were also supportive of each other's need to nap. They would work as a team to ensure they each have an opportunity to recover. This could include taking the children out of the house like in Honda's case, or simply caring for the children in another room like in Oscar and Tara's case.

> *Oscar-3: Tara wasn't feeling well so I, I stayed with the kids.*

Furthermore, there was some indication that napping behaviours were related to people's napping habits, which in turn seemed to be connected to their cultural background.

This was particularly the case for the timing of naps, with the Spanish couple napping primarily around mid-day, while other participants were more likely to nap later on in the day. Moreover, the Spanish couple highlighted the importance of napping more consistently than any other couple. This couple was also more likely to create an environment for their partner that would enable napping.

> *Tara-1: On the weekends, there's always one of us that naps after lunch, right? Most of the weekends*

Finally, parents also highlighted the importance of taking a break, even if this did not include sleep. Some parents reported that for them taking a break from their parenting responsibilities and the pressures of consistently having to be ready to interact with their children aided their recovery nearly as much as napping.

> *Tara-4: Even if you're not like resting like asleep properly. You're resting and yeah, it helps a lot.*

In fact, additionally to describing sleep as a source to recharge their energy, parents also described taking time out as necessary for them to self-regulate their emotions. However, this effect of taking a break appeared to be more short-lived than naps suggesting that perhaps both elements of a nap, 'sleep' and 'taking a break', need to be present to help parents recover properly.

Intriguingly, in the present study men were far more likely to note the importance of taking breaks. While this could simply be a reflection of the fact that men were more likely to get 'breaks', as they were more likely to work outside of the home it could also suggest that such 'breaks' are more necessary for men. It is however also plausible that women had, but failed to mention, an equally high preference for naps.

In summary, the evidence suggests that naps as well as breaks have a positive effect on parents by helping them moderate the effects of poor sleep. Simultaneously, parenting responsibilities appear to be the largest hindrance to taking naps. Realizing this dilemma

parents in the present study were likely to look for creative solutions and work as a team to provide themselves and their partner with more opportunities to nap.

Supporting Each Other

Receiving support from one's partner was another frequently mentioned buffer in the relationship between sleep and parenting young children. All couples reported actively working together as a couple to manage the day-to-day challenges of parenting. In every weekly reflection most participants described multiple examples of how either they supported their partner, or their partner supported them if they had slept poorly or felt in any way unable to parent their children. The following section will expand on how parents supported each other by sharing parenting responsibilities, disciplining their children together, and ensuring the parents function as a cohesive unit where optimally at least one parent is always available. These findings are relevant for most parents, as most people who have children also live with a partner (Troxel et al., 2007).

Sharing the Load. The primary way couples in the present study supported each other was by sharing the workload at home. Couples reported splitting responsibilities evenly outside of regular business hours. This split of responsibilities occurred in a number of ways: taking turns looking after children; taking turns waking up with the children; each parent spending time with a different child; or even one parent looking after the children while the other looks after the household. In either case, over time the division of responsibilities usually worked out to an even split. The only exception to this even split was when one parent worked more hours than the other. In such cases the parent working less hours would be responsible for the children and the household while their partner was working.

> *Lucy-1: I think it's always at 50:50. So I might be gone for two nights a week. He might be gone for two nights a week, … but if we're here together and all the kids, and the kids are here together, then we sort of divvy up the jobs.*

As the responsibilities were shared at home, when one parent slept poorly and their energy levels were depleted the other parent was quickly able to step in and take over. As a result, one rested parent would usually be available for the children, ensuring that the children were minimally affected by the tired parent's decreased patience or mood. Equally, as shown in Nate and Lucy's example, this mutual support would give the tired parent an opportunity to catch up on their much needed rest.

> *Nate-4: I had two days out of the office for that big, the big day for the mountain biking and that sort of big physical exertion day. Which that evening I had nothing, no energy for the kids. So on that Tuesday, I was just not even [laughs] I wasn't even really trying at all. I got home sort of late as well, so I just left Lucy to put the kids to bed.*

All parents in the present study spoke adamantly about the importance of receiving support from their partner. As they understood the importance of receiving support, parents were ready to help their spouse whenever they needed help. In fact, parents would frequently weigh up who was more tired and more in need of a break to decide who will take care of the children while their partner takes time to recover.

> *Honda-3: I'd say we're both tired, but we just say when we need space. So like last Sunday, I think when we met on Saturday I remember I was pretty run down. So I think I don't, I don't often tell Emma, but I said look, you know, I need some time out on Sunday, and she took the kids then yeah.*

As all participants had been co-parenting with their partners for at least four years, they could sometimes predict when their partner needed support. Most parents also made consistent efforts to anticipate their partner's needs and were readily available to help take over for their spouse when such needs were identified. There were a number of instances through the three-week study where participants would support their partners by pre-emptively taking over responsibility for the children so their partner could rest. One example of this occurred in the last two weeks of the study. In week two Oscar realized Tara had slept poorly and pre-emptively took over all of the responsibilities in the home to give Tara a chance to rest. In return, Tara did the same for Oscar one week later.

Oscar-3: We already know, it's like you've had a bad night. If I see Tara waking up three times I know that she woke up three times. So I, I already know that the following morning and I try and go and dress the kids, or give them breakfast
Tara-4: …[Tara took the kids because Oscar wasn't feeling well] and then Oscar got to stay the whole day on his own like reading and in bed, so it took time to recover.

Unfortunately, parents were not always able to identify their partner's needs. In fact, the biggest obstacles that parents faced in regard to supporting each other was not asking for help when they needed it. Moreover, when parents slept poorly, they were often unaware of their own emotional state and needed some time to notice their own need for support. As a result, parents would at times fail to ask for help, leaving the responsibility for identifying this need to their partners.

Nate-4: There is a buffer with, with Lucy and the kids. The challenge is her ability to recognize that in me that I am not in that good space and then to be able to step in, particularly if she's in that busy tired space herself.

Worryingly, the lack of patience and decreased emotional self-control as a result of poor sleep was not limited to the parent-child relationship. Instead, especially when both partners slept poorly, interparental conflict arose. This finding is in line with previous research that found a relationship between sleep quality and relationship satisfaction (Maranges & McNulty, 2017; Troxel et al., 2007). In the present study once parents were able to catch up on their sleep their conflicts subsided.

Furthermore, nearly all couples agreed that they do not keep track of who has done how much work in the home. Instead, they supported their partner whenever they were unable to carry their share of the load or simply needed a break. By looking after themselves and their partner parents were able to help each other gather the resources they needed to look after their children. As described by Nate:

Nate-4: The most important pieces of, of the family is for me to be safe and good first, and then for me to look after Lucy number two, and then the kids number three. Because if I'm good, and then we're good, then the kids

are good. As opposed to just everything's about the kids because then you lose yourself and then actually you become more internal facing anyway…

Interestingly, and in almost direct contradiction with the knowledge of how important it is to look after one another, parents were least likely to make an effort to control their negative emotional expression with their partners. This was true even though they knew that their partner is their most valuable resource for the energy they need to parent. This is a concerning finding, given the negative impact family and marital conflict can have on young child development (Morris et al., 2007). Researchers have found that such conflict, even if it is not directed at the children, can leave children feeling less emotionally secure and hinder the development of their own emotion regulation. However, as mentioned above once parents had a chance to rest they were quick to reconcile with their partner. Moreover, in the present study parents appeared to avoid such conflict in front of the children.

Discipline. In addition to splitting the workload at home, parents in the present study also disciplined their children as a team, thereby frequently mitigating the effects of poor sleep. If a parent slept poorly and as a result was unusually harsh with the children, their partner would intervene by either taking over the parenting responsibilities or helping the tired parent recognize that they are being unusually harsh. The rested partner would thereby become the emotional filter that the other parent lost due to poor sleep. As a result, children could remain shielded from the negative effects of their parent's poor sleep.

Tara-3 : Like sometimes if I'm being very harsh on them, he will tell me and the other way around.

Parents would also serve as a buffer for each other against the effects of poor sleep in other ways. While in most couples one parent was the primary disciplinarian, these roles were flexible and highly circumstantial. Whenever one parent was disciplining a child, the other parent would be there to emotionally support that child through the disciplining process. This was not to reduce the discipline the child is receiving; instead, it enabled the child that was

being disciplined to see that while their behaviour was being punished, they as a person were still loved and supported. In other words, one parent would be available to explain that the other parent being mad does not mean the other parent does not love the child.

> *Honda-3: So in that respect you know, say if I was telling them off and there's tears, if it's directed at me, and I tell them off then generally Emma would comfort the person that's crying, kid that's crying.*

This collaborative approach further highlights the importance of both parents being well rested. If a parent sleeps poorly, their ability to be emotionally supportive while their partner is disciplining the child could be affected. As a result, the child would find themselves without an emotionally available parent, which could have dire consequences for the child. Past studies have highlighted the importance of emotionally available parents for the development of secure attachments (Cummings & Patrick, 1995).

Given the crucial role partners play for each other as emotional buffers, it is important for them to understand how they could best work together to parent their children. In the present study in each couple both parents had similar values but different parenting styles. However, parents spoke very respectfully of each other's parenting approaches, often adding that their different approaches complemented each other. Seeing the benefits of the other parent's approach enabled participants to parent as a cohesive unit. However, participants also highlighted how difficult it was to adapt to one another after their first child was born as the severe sleep deprivation made them less able to be considerate of their partner's approach.

> *Oscar-3: And then you don't know how to handle it, because we didn't know it's like. So I was trying something and she [Tara] was like, 'No, don't do that!', because whatever, and I was like, 'Well, how do you know?!' you know [Tara laughs a little]. So you're trying to adapt to the kid adapt to the new routine, all that with the pressures of no sleep.*

This increased difficulty in finding common ground when sleep deprived is not surprising, given the effects of sleep on mood and cognition (Banks & Dinges, 2007; Pilcher & Huffcut's, 1996). However, once sleep deprivation subsided and parents had an opportunity

to get to know more about their spouses as well as their own parenting styles, they were able to adapt to and even incorporate (Tara) each other's approaches.

> *Tara-3: And now I have like incorporated more his style and he has incorporated more my style. While before it was like totally opposite.*

In summary, by stepping in to take over parenting responsibilities when their partner slept poorly parents were able to mitigate the effects of poor sleep on next day parent-child interactions. As parents in the present study shared their parenting responsibilities evenly, they were able to step in and support their partner at a moment's notice, thereby at times fully buffering against the effects of poor sleep. By also disciplining their children as a team parents were able to increase the likelihood of at least one parent being available to emotionally support their children at any time. As such parents appear to be an immensely valuable resource for each other.

What Influences Parental Sleep

Before concluding this chapter on the relationship between sleep and parenting, we need to consider what influences parent's sleep. Throughout the three week study participants reported multiple factors that influence both their sleep quality and sleep quantity. The primary cause for sleep disruption and shortened sleep were children, followed by spouses, work, and other stressors. According to participants children had by far the most substantial long and short term impacts on their parent's sleep quality and quantity. This chapter will describe the effects young children have on their parents before going into how children under the age of two impact their parent's sleep. Finally, this chapter will conclude with a closer look at other sources of sleep disruption for parents, including spouses, work, and other stressors.

Young Children's Influence on their Parents' Sleep

Children influenced the sleep quality and quantity of all parents in the present study. Sleep quantity was impacted most noticeably, as parents claimed that their children reduced their overall sleep time by approximately one to two hours. This number was substantially

higher than the on average less than 10 minutes reduced parental sleep duration associated with parenting young children that other studies found (Hagen et al., 2012). In the present study young children reduced their parent's sleep time by both delaying their fall asleep time at night and advancing their waking time in the morning. Young children woke up consistently in the morning, forcing at least one parent to wake up with them, no matter what time they fell asleep on the previous night.

Lucy-2: … you can never sleep in. Yeah, 7:00, 7:00am is a sleep in.

Interestingly, parents seemingly forgot this on weekends as they were likely to go to sleep later even though their children would wake them up at the same time next morning. Most parents had to manage this loss of sleep with daytime naps.

Nate-4: So it was like staying up late because it's a long weekend to watch TV. I can, you know this is okay because it's a long weekend, but the kids still wake up early in the morning so there's no sleep in … from a sleep perspective, it was not, it was not good (laughs).

Moreover, children influenced their parents' bedtimes. This effect was more indirect as children as a rule went to sleep at around 8:00pm, well before their parents. However, as children forced their parents to delay their "*wind down time*" (Honda) they ultimately delayed their parents bedtimes.

Honda-2: I definitely go to sleep later. And so typically before kids, come back chill out, relax, watch TV, go onto the computer, make phone calls, and do all that relaxing stuff I need to do or I want to do. But now when you come back from work, your priority is to look after the kids engaged with them, have fun with them. … So then that chill time is compressed, it's less but added on and that, because it's added on, it's stretched out, the evenings are later, and then my sleep is less…

In line with past research, the present study likewise found that children also impacted their parent's sleep quality (Angelhoff, et al., 2017). All but one parent in the present study noted at least once that their children influenced their sleep quality. While for most parents this was a fairly regular occurrence, for others these day-to-day interruptions were less common.

Moreover, some parents reported that their children led to permanent alterations to the parent's sleep depth. This was attributed to the novel responsibilities of parenting, such as breastfeeding, changing children at night, or supporting them when they were sick. Honda framed this as being "*reprogrammed"* while Nate described it as being "*attuned to listening for*" children.

> *Nate-2: Yeah I was a, I feel like I was a much deeper sleeper when before the kids, but now because you're sort of attuned to listening for them, so I'm much more hearing, hearing the kids crying or hearing the kids make noise, to wake up and see what's going on*

The younger children were, the more they would disrupt or shorten their parents' sleep. This is not surprising as younger children are less self-sufficient and therefore require more attention from their parents (Rathus, 2010). One of the couples (Nate and Lucy) presented an ideal example of this. Over the three weeks of the study their youngest child, who had recently turned two, had transitioned from interrupting his parent's sleep every night to waking his parents up early in the morning. Finally, in the third week he began waking up at a more convenient time for his parents.

> *Nate-4: …and so during this three weeks, he stopped doing that so he doesn't wake up in the night now. … That stopped and then it was sort of like the very early wake up, which was like a 5:30. So that was in that week two, which was still sort of disrupting the sleep. To this week now, where the kids are probably I think [youngest child – 2M] is now getting up at about 6:30 which is about the time I get up. … which just meant I've been able to sleep for these eight-hour blocks*

Interestingly, one participant stated that their sleep duration had increased since having children. The participant attributed this to the increased demand of parenting. As mentioned in previous chapters, this increased demand was echoed by a number of parents.

> *Participant-1:…since having kids I do appreciate those extra two hours because you know, during the week I'm mainly with the kids and, and while I'm with them, you know it can be exhaustive, so I need that better sleep.*

Based on this finding it would appear that while parents' sleep need increases after they have children, for most parents actual sleep quality and quantity decreases. Worryingly, this would

exacerbate the imbalance between sleep need and actual sleep. As a result, parents would presumably be more likely to experience poor sleep than non-parents.

Sleep Deprived Parenting in the First Two Years

Parenting children in or close to the pre-operational stage of development enabled parents participating in the present three-week study to experience variation in sleep quality and quantity. As a result, the researcher was able to explore the effects of different nights of sleep in the same individuals. Yet, when asked about sleep deprivation, most parents referred to their experience with parenting children under the age of two. Parents described this as the hardest part of parenting, frequently marked by prolonged periods of poor sleep, which had significant effects on their ability to function. For some parents this sleep deprivation would mean more irritability, while for others it would result in becoming more "*withdrawn*" (Nate) or "*absent*" (Honda). These early years of parenting were described as something one just has to "*get through*" (Nate) or "*survive*" (Oscar).

Furthermore, based on parent reports, it would appear that with every new child parents have an equal parts easier and harder time parenting their children under two. On the one hand, parents know what to expect from their children and each other when they have their second child. Moreover, with the second child parents also know that the difficult time would not last forever. On the other hand, parents stated that with every new child they become a little bit more tired and less able to deal with the challenges of raising infant children. For Emma she described the first six months as extreme, suffering from the effects of what she described as sleep deprivation.

> *Emma-4: I was physically and mentally exhausted. I was not able to cope with any thinking. I was not able to make any like, you know, decisions. I was absent and it was just the worst experience in my life, deprivation.*

Other parents added to this by describing these early days with a new child as "*mentally exhausting*" (Oscar), a time when "*kids destroy your mind*" (Oscar), or reflected on how this effected their relationships with their partners.

The finding that the younger children are the more they influence their parent's sleep time has already been described by Hagen and colleagues (2013). However, it appears that Hagen et al. have vastly underestimated the effect children can have on their parent's sleep and their functioning. While Hagen and colleagues found parents to experience more daytime sleepiness and dozing off during daily activities, what participants in the present study described appeared to be vastly more debilitating. In either case, both studies found that the younger children are the more they influence their parent's sleep. As parents reported that sleep influences their patience and mood and as a result their parent child-interactions, it would seem that children may also indirectly impact parenting by influencing their parent's sleep.

As described above, for the parents in this study the severe sleep deprivation lasted for a number of months after their children were born, with parents regaining control of their sleep as their children got older. In some cases, sleep-training was used to reduce the overall amount of time parents were sleep deprived for. According to Emma and Honda, this helped them regain their sleep quality and thus be more present and patient with their children.

> *Emma-1: So because we've sleep trained our son and daughter, that's why I was able to quickly come back with my sleep kind of quality*

Couples Influencing Each Other's Sleep

In addition to children influencing their parent's sleep, parents also influenced each other's sleep. This finding is in line with Troxel and colleague's (2007) research which found that co-sleeping objectively decreases sleep quality. Troxel et al. added that their participants often subjectively felt that they slept better when they did not sleep alone. This was not the case in the present study, as participants appeared to be well aware that their partner's negative influence on their sleep.

In most couples one person was a light sleeper while the other was a heavy sleeper. As could be expected, lighter sleepers were more likely to suffer from poorer sleep and were more likely to be interrupted by their partner. Interestingly, light sleepers being more likely to wake up also had an effect on the heavier sleeper as heavier sleepers would frequently alter their behaviour to avoid waking up the lighter sleeper. Whether this included sleeping in separate rooms, not using a phone at night, or closing all of the doors in the morning so the blow-dryer sound becomes muffled, parents went out of their way to support their partner's sleep. The most innovative approach to support each other's sleep was described by Lucy and Nate. They alternated which side of the bed each parent slept on and taught their children to wake up the parent closest to the bedroom door, giving each parent a chance to rest every other night.

Sleep interruptions weren't always one-sided though. One of the couples (Mark and Nicole) negatively influenced each other's sleep. Both parents reported having different sleep schedules from one another, which led to them waking their partner up at different times. One parent would interrupt the other when coming to bed, while the other would wake the person who comes to bed later up in the morning.

There were even a few instances where couples would intentionally influence each other's sleep. Examples of this included compelling their partner to delay their bedtime to watch television or interrupting the partner's sleep at night to ask them to tend to their children. However, intentional interruptions or delays of the partner's bedtime were not the norm.

> *Oscar-3: And Tara decided to punch me in my back when [youngest child – 1.4M] woke up like at midnight like [makes punching motion and sound effect] give him the bottle please. [Tara laughs]. So I went. It was like, it really destroyed me because I was very tired.*

While couples negatively influenced each other's sleep in a number of ways and participants agreed that their sleep quality and quantity was better when they slept alone, most participants slept in the same bed. However, taking into account their considerate behaviour at

night and the support parents provided for each other during the day, couples by in large influenced each other positively.

Other Influences on Parents' Sleep

In addition to children and spouses parents reported multiple additional elements that influenced their sleep throughout the present three week study. These included stress, family concerns and naps. This section will offer a brief overview of these elements before describing what participants found positively influences their sleep.

Stress was frequently highlighted as a contributing factor to poor sleep. For working parents this usually involved work stress. As stay-at-home parents viewed childcare as their work, they would experience a similarly large impact to their sleep when their children were not doing well.

> *Tara-3: For me when one of them is sick is a major thing in my head … And for him [Oscar] it's mostly work, well this is my work so, it's my job so, makes sense. [Laughs]*

Apart from stress, wider family concerns, such as an ill family member, a poor or disruptive sleep environment caused by an unsatisfactory mattress, or ingestion of substances such as caffeine and alcohol before bedtime also influenced participant's sleep.

> *Mark-2: I think that other things that do affect the quality of my sleep is of course when I drink alcohol before going to bed or during the night.*

Moreover, sleep also influenced participants' sleep. A few parents reported that if they nap too long during the day, they struggle to fall asleep at night which delays their bed-time. This is concerning especially since, as mentioned above, children wake up their parents at the same time every day regardless of when they went to sleep.

> *Nate-2: … Like half an hour's normally good if you start pushing, if I start pushing out towards an hour then I'm still okay. But if I slip into like an hour, after an hour, it can start to mess with my night sleep…*

Another factor negatively influencing parental sleep was poor sleep behaviour. The aforementioned delayed fall asleep times on weekends would be a good example of poor sleep

behaviour, wherein parents would reduce their overall sleep duration due to their delayed bed-time. Recent studies have already shown that poor sleep behaviours could impact parenting quality (Bai et al., 2020). According to Bai and colleagues, later fall asleep times, along with irregular sleep times and fewer overall sleep hours, negatively influenced parenting quality and parental emotional availability.

Interestingly, it appears that a number of the causes of poor sleep outside of children and spouses are within one's control. While it may be difficult to predict an increase in stress or the sudden illness of a loved one, there are steps that parents can take to improve their sleep behaviour. This could involve staying away from alcohol before bedtime or not forcing oneself to finish a movie at night and instead going to sleep. As such, parents can start fostering productive habits that improve sleep quality and quantity.

In fact, as parents in the present study were aware that they were in a study that focused on sleep, some decided to use this as an opportunity to trial behaviours that would help them improve their sleep. This included breathing exercises, going to sleep at the same time every night, or even self-care through proper diet and hydration. The more of these productive behaviours were being utilized, the more likely participants were to experience a good night of sleep.

> *Oscar-3: So because if you, if you don't keep your, your sleeping pattern and your, the time you go to bed and how you go to bed and the habits, you push, things change.*

In summary, the results of this study show that there are a number of factors that impact parental sleep. While in the present study children were by far the largest cause for sleep disruptions and reduced sleep time, their influence decreases as they get older. With every new child parents seem to face the same disruptions and reduction in sleep time and though parents are more prepared for what to expect with every new child, this unfortunately does not help them avoid the consequences of poor sleep. In addition, partners, stress, family concerns, and

poor sleep behaviours all have the potential to influence parent's sleep. As a result, parents in a couple with young children report sleeping between one and two hours less than they did before they had children.

Discussion

The present study followed participants for three weeks to explore the relationship between sleep and parent's perception of their parenting. Based on the claims of the participants it would seem that sleep has an effect on their perceived parenting. The present chapter will briefly summarize the findings of this study before describing the implications of the relationship between sleep and parenting for young children. Finally, this chapter will conclude with a description of this study's limitations and offer directions for future research.

The key findings of the present study are reflected in the participants' reports that sleep primarily influenced their patience, mood, and ability to be present and active with their children. When observing this relationship over time, it became apparent that the effect was minor following one night of poor sleep. However, as nights of sleep added up, the impact of sleep multiplied. Moreover, sleep quality appeared to have a stronger effect on parents than sleep quantity, though the less parents slept, the more important sleep quantity became. The present study also found a number of buffers such as children, naps, and partner support that helped parents manage the consequences of poor sleep. Interestingly, these sources of support were also some of the primary factors that negatively influenced sleep. In fact, children were most frequently mentioned as the cause for both reduced sleep duration and quality.

Furthermore, sleep also appears to influence parent-child interactions. With less patience, poorer mood, and a decreased ability to be present and active with their children, parents' ability to support and guide their children seemed to be impacted. The following section will focus specifically on the implications of poor parental sleep on young children between the ages of one and seven.

Implications

Children Mapping the World Around Them

Young children between one and seven are at a crucial developmental age. At this time, children increase their mobility and their exploration presenting parents with new everyday challenges (McQuillan et al., 2019; Rathus, 2010). In what Piaget called the pre-operational stage of development, young children are building early maps of the world around them depending on their parents to guide them through this process (Morris et al., 2007; Rathus, 2010). With every new stimuli they are learning more about what is right and what is wrong.

In fact, most developmental theories highlight the importance of early childhood (Rathus, 2010). Lev Vygotsky's sociocultural theory of development for instance argued that children especially at a young age develop as a result of their social interactions. Vygotsky added that at a young age children's development is also dependent on the social support they receive. As such, parents need to be particularly vigilant and attuned to their children's needs, factors which as the present study shows are directly influenced by sleep.

Moreover, according to Piaget, at this young age children are ego-centric and are only able to focus on one element of a situation at a time (Rathus, 2010). As a result, they are highly likely to take situations at face value, unable to account for background mechanisms such as intent or mood. As young children also spent most of their time with their parents, the children are thereby organizing their world views and understanding of right and wrong on face value interactions with their parents. If these interactions are negative because parents are less patient due to poor sleep, children can be left with incorrect maps of the world.

This is important as parents in the present study have repeatedly stated that they are more likely to be less patient and resort to harsh parenting practices like yelling at their children if they as the parents slept poorly. Kelly and colleagues (2021), similarly found that fathers were more likely to be physically or psychologically aggressive with their children following

poor sleep. Albert Bandura has already shown that children are likely to copy aggressive behaviour if they are exposed to adults who behave aggressively (Rathus, 2010). Therefore, if children see their parents behaving aggressively or yelling due to poor sleep, children are likely to copy these patterns of behaviour, thereby increasing their own proneness to aggressive behaviour or yelling. As a result, children would also be more likely to behave aggressively towards their parents. Simultaneously, if children see a sibling being yelled at for instance, they are more likely to view yelling at the sibling as appropriate behaviour and as a result are more likely to yell at their sibling. It is therefore vital for parents to be rested in order for them to decrease the likelihood of negative parent-child interactions and to avoid modelling aggressive behaviour.

Another way in which poor parental sleep could influence young children's understanding of the world around them is through young children's understanding of the connection between actions and consequences. Before age five children are still unable to fully comprehend the connection between actions and consequences (Rathus, 2010). As such, children will more likely interpret parental behaviour as parental behaviour, rather than a reflection of the child's actions. Even once children do understand this connection they still have no consideration for intent. Therefore, if parents are not in control of their emotions they can easily lead children to overestimate or underestimate the severity of a situation or even misunderstand the situation entirely. If, for example, a child breaks a glass, but due to poor sleep the parent reacts harsher than they would if they had been well rested, a child at age three may learn that their parent is harsh, while a six year old child may learn that breaking a glass is worse than it actually is. In both cases children are not receiving the correct information and will therefore likely build incorrect maps of the world.

Lack of Activity and Presence

Another way in which participants claimed sleep influenced parenting was a decrease in their presence and activity with their children following poor sleep. At times parents were able to access reserve energy and overcome their lethargy, but sooner or later their activity levels and presence began declining. However, as mentioned above, young children are reducing their time asleep and increasing their exploration and therefore need their parents to be present and active in order to guide them. In fact, studies have shown how children's executive functioning can benefit from guidance at a young age (Mulcahy, et al., 2021). The positive effects were often found to last more than a decade. Thus, in order to be able to support their children, it is crucial for parents to get the rest they require.

For some parents this lack of energy following poor sleep led to more permissive behaviour. Tu and colleagues had already described the connection between sleep and permissive parenting in their 2018 study. They added that these findings are concerning as permissive parenting could over time lead to problematic behaviours in children. Though rare occurrences of permissive parenting are unlikely to have any long term implications.

The Couple and Child

In addition to parent-child interactions, poor sleep also negatively influenced how parents behaved towards each other. In fact, as mentioned in the results section, parents were least likely to control their behaviour around their partners. These findings are concerning, as parental conflict can also influence children in addition to the more obvious impact on the couple's relationship (Cummings & Patrick, 1995; Troxel et al., 2007). Cummings and Patrick (1995) have shown how children viewing their parents' conflicts as destructive can have a significant impact on a child's feelings of security. This could lead to children becoming more emotionally vulnerable and reactive, which once again influence how they map the world around them.

Moreover, parents should also be mindful of the difficulties of co-parenting their first child. Most participants in the present study mentioned that the first months of parenting their first child led to difficulties collaborating as a couple due to the consistent sleep deprivation. Ideally, parents could plan how to manage disagreements in anticipation of this new chapter in their lives. Parents should also note that the difficulties of the first weeks and months eventually subside. Such preparation could help reduce conflict within the couple and enable parents to provide the supportive buffering role to each other that all parents of the present study regarded as markedly valuable.

Beyond the Next Day

Especially concerning is the finding that sleep affects parents beyond just the next day. Parents in the present study were at least in part aware of the effect sleep had on them. On days following a poor night's sleep they would be more likely to make an effort to remain in control of their emotions, or use their reserves, knowing the cause of their lethargy or lack of emotional self-control. However, parents were vastly less aware that one night of above average sleep would not help them fully recover from one or more nights of poor sleep. As a result, parents would find themselves caught off-guard by their lack of patience, inability to be present with their children, or their poor mood. This would make parents even more vulnerable to the effects of poor sleep and would increase the likelihood of poor parent-child interactions.

Awareness

In the course of the present study being prepared for the consequences of poor sleep appeared to have a positive effect on parenting. When parents expected that they would sleep poorly and as a result would struggle on the following day, they were able to take steps to mitigate some of the effects of poor sleep. They did this by relaxing their morning schedule, sharing some of their responsibilities with their partner, or by practicing mindfulness throughout the next day. This observation is in line with other studies which have found that

mindfulness-based practices can influence affect (Campbell et al., 2018). Therefore, even if parents cannot avoid sleeping poorly, simply knowing what to expect following a poor night's sleep could support their next day parenting. Given these findings, parents would benefit from being more aware of the progressive effects of poor sleep on mood, patience, presence, and overall their parent-child interactions. Parents should note the growing impact of sleep on parenting and that one night of poor sleep can influence more than just one day. This knowledge could support parents in understanding their emotions and thereby support them in managing their behaviours.

Furthermore, understanding the consequences of poor sleep should help parents weigh up decisions regarding self-care against care for others. The more nights of poor or terrible sleep occur in a row, the more parents should prioritise self-care, as they are more likely to be impatient, be in a poor mood, and be absent around their children. At the very least parents should be aware that more consecutive nights of sub-par sleep are more likely to influence their self-control and thereby increase their chances of having poor interactions with their children. Moreover, given the buffering effect of partners and naps, parents should be encouraged to ask for or to take a break if they slept poorly.

Limitations and Future Research

The present study is not without limitations. First, two different models of smart watches were used to measure participant's sleep. The watches used were late model Apple watches and Fitbit Charge 4's. Participants noted that the Apple watches were less accurate than the Fitbits. Specifically, parents noticed that the Apple watches did not track the occurrence or the duration of all sleep interruptions. While this could have had an impact on the sleep data, this impact was mitigated with the use of multiple sleep measures. Parents who used Apple watches announced the sleep disruptions not captured by the sleep tracker directly to the researcher. Nevertheless, future sleep research should consider using the Fitbit Charge 4

over Apple watches to track sleep. Moreover, in line with other studies this researcher recommends the use of multiple methods for assessing sleep (Bai et al., 2020; Tu et al., 2018).

Second, qualitative research brings the potential for a number of biases. One of these is researcher bias, which was mitigated with the use of semi-structured interviews. Such interviews were found to give people the chance of describing their experiences in their own words (Ajjawi & Higgs, 2007). Another possible bias is social desirability bias. However, given that participants answered consistently and at times not in line with the researcher's expectations, it is likely that this bias was also not a major concern in the present study. Additionally, selection bias could also have played a role. Especially as this study demanded multiple hours from participants over the span of three weeks, participation could be limited to participants more likely to take part in longer term studies. However, considering that a number of participants had very busy working lives and reported that they usually would not participate in similar studies, this is likely also not a major concern.

Third, while the present study focused on sleep quality and quantity, it did not assess sleep hygiene. Analysing the effects of sleep hygiene likely would have been redundant for a number of reasons. In the present research parents repeatedly claimed, and the data also shows, that daily wake up times remained similar for most parents throughout the three weeks of this study. Moreover, all instances of variability in fall asleep or wake up times could be traced back to a variation in sleep quantity and were categorized as such. In addition, all participants were asked to rate their sleep every night; therefore, any patterns not explained by the already present sleep quality and quantity measures would have been noticed. However, studies have found sleep hygiene to influence sleep recovery and even parent-child relationships (Bai et al., 2020, Chehri et al., 2022, Richardson et al., 2022). Therefore, future researchers exploring sleep and parenting should be attentive to sleep hygiene of both parents and children.

Fourth, the above research focuses purely on the parents` perspective and does not include child reports. Future research could add to this by considering the child's perspective when looking at the relationship between sleep and parenting. As Kelly et al. (2020) highlighted, parents may, for example, underreport their own harsh parenting. Equally, the opposite could be true, as some participants could rate their parenting more harshly than they ought to.

Fifth, the duration of the study led to some complacency amongst participants. While participants took thorough notes in the first two weeks of the study, a number of them admitted being less diligent in the last week of the study. Many were convinced that they no longer needed to take such thorough notes as they would "*remember the details of the week*" (Honda). However, this was not the case and as a result the last week's interviews offered less detail than the two weeks prior. Fortunately, as the last week's interview focused primarily on overarching questions which considered the entire three weeks of the study and participant's experiences beyond these three weeks, this complacency was not a major concern. Nevertheless, future research should consider that after two weeks participants may begin to become complacent. As such, researchers should reduce their study duration to two weeks or take steps to increase participant activity at that point in time.

Sixth, the present study only used nuclear families with children that did not have severe sleep problems or require observation during the night. Future research could also explore single parent families, same sex couples and families with chronically ill children who require medical or other observations during the night. In addition, studies focusing on different cultures and family units that include grandparents, aunts or uncles, and extended family members would also be useful.

Seventh, as mentioned in the literature review, mindfulness based practices have been found to positively influence sleep (Campbell et al., 2018). Mindfulness was also found to

affect some of the possible consequences of poor sleep such as affect. Even in the present study parents reported that mindfulness influenced their ability to remain in control of their emotions and behaviour. Therefore, mindfulness interventions deserve further research.

Eighth, future research could benefit from the approach taken in this research with the mix of quantitative data and qualitative data gathered over a period of time. Sleep is both a subjective construct in terms of how people feel about sleep and how they rate sleep but also a physiological reality that can be measured. Thus, the mix of data collection methods seems to be highly relevant in sleep research.

Finally, approximately half of the parents in the present study highlighted weekday mornings as the most stressful time of day. Parents were least likely to remain in control of their emotions and mood at this time. One parent noticed that in her case this was at least in part due to the time pressure parents experience in the morning. Future research could contrast the effects of lost sleep against morning time pressure in parents. Perhaps, if parents woke up 15-30 minutes earlier in the morning they would find that their time pressure decreases and as a result would experience less negative parent-child interactions. Further research including interventions on other aspects of sleep and parenting would also be advantageous. Studies could, for example, use interventions to contrast the effects of sleep duration against sleep hygiene on parenting.

Conclusion

The present research shows that if children do not require more than the bare minimum from their parents, parents can get away with sleeping poorly for a night or two. With the help of their partner taking over the more physical parts of parenting like taking the children outside to play, it might at times even seem that a good night's sleep is not as important as getting one more work email in in the evening or spending some more time on social media before going to bed. However, unfortunately humans have not yet mastered the ability to reliably predict how challenging the next day will be. When parents sleep poorly, their patience, mood, and activity levels are noticeably affected. As a result, a slight increase in stress or mild child misbehaviour, can more easily lead to poor parent-child interactions. Parents should be mindful of this, especially since early childhood appears to be one of the most crucial times for development (Piaget, 1964; Rathus, 2010). Unfortunately, at least during this study, calm non-stressful days when children did not demand energy from either parent were not the norm. Therefore, based on the results of this study, parents should prioritise their sleep in order to be ready and able to manage the challenges of parenting their young children.

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Appendix A

Evening Note Sheet

When completing this sheet, please remember that this study is about sleep, and we are not rating or passing any judgement on your parenting whatsoever. As these are your notes, they can only reflect your views. We have no hidden agenda and are only studying what we report to be studying.
These are notes for you and will only be seen by you. Keeping a daily log of your experiences will be critical for the study's weekend interviews. ***The questions contained on this sheet are only prompts. Please do not attempt to answer all questions as not all will be relevant for every night.*** *Please feel free to take notes that do not relate to these questions but still relate to your sleep and your perception of your parenting. This part should only take 5- 10 minutes to complete.*

(Note: The following questions only refer to today)

How **emotionally available** were you for your child(ren)? Did your children struggle with anything? Were you able to **be there for your children** the way you would have liked to?	
How did you **feel as a parent** today (e.g. stressed, happy)? Did you have **time to spend** with your child(ren)? How was this experience? Did the **kid('s) mealtimes** happen when they usually do? Did your child(ren) spend more or less time with the **iPad/Screens/TV**?	
Anything else you'd like to make note of (e.g. notable events)?	
How did you sleep/did you take any naps? Did it **change any answers** to the questions above?	

Please feel free to add further comments. Use the back side of this paper if needed.

Appendix B

Interview Guides

Interview #1 – background on couple, children, and who does what with regards to childcare. (Couple Interview)

Intro	*Why are we here?* - *Confidentiality!* - *Masters Thesis* - *Research on Sleep and Self-assessed parenting*	*Important information* - *Sleep trackers, Daily notes & Question* - *4 interviews (~20min.) – 2 couple, 2 solo*
Back-ground Children	- How many children do you have? Gender? Age?	

Parental Presence	- Who is home more?
	- Who feeds the children?
	- Who usually spends more time with the children?
	  o Weekdays
	  o Weekends	

Parenting/ Sleep	- Who puts the children to bed? - Who wakes up at night when the children cry or wake up (weekdays/weekends)? o How often does this happen? - Who wakes up in the morning with the children?	

Parenting Respon-sibility	- Who plays with the children?
	  o Weekdays
	  o Weekends
	- Who disciplines the children?	

Parenting attitudes and style	- What is your culture's view of sleep and parenting?
	- What parenting style do you usually follow (Demand/Responsiveness)?
	  o D: How much do you demand from your children 1-10?
	  o R:Cooking vs child wants something from higher shelf
		

Other	- Anything you'd like to add on parenting responsibilities or the way your parenting is usually divided?	

Interview #2 – Sleep patterns of yourself and your partner (in typical and non-typical times e.g. sickness, holidays). Sleep patterns of the children. (Individual Interview)

Usual sleep	- How many hours do you sleep at night (now vs before children)? - What is the quality of your sleep like (now vs before children)? - When do you usually go to sleep/wake up? - Do you take any naps during the day?
Sleeping arrange-ment	- Does anyone sleep next to the children? - If so, does that impact your sleep?
Weekly reporting on evening notes*(questions here are just a guide to get insights on the sleep and behaviour people have been tracking for themselves)*	
This week	- How did you sleep this week? o Have you noticed any differences in your parenting on days where your sleep quality or quantity was better? (ex. emotional availability, enjoying your time, parenting stress) o Does sleep quantity have a different effect than quality?
Notes	- What are the highlights from this week? (any highlights in your notes?)
Naps	- Did you take any naps? Have they made an impact?
Other	- Anything else you'd like to add in relation to your week's sleep and how that impacted your parenting?

Interview #3 – sleep and the couple. (Couple Interview)

This week I'd like to get to know you better as a couple	
Couple sleep setup	- What is your sleeping arrangement? Do you sleep in the same room? - Do you impact each other's sleep? If so, how?
Couple parenting set-up	- Do you and your partner often discuss how to raise and discipline your children and does it ever lead to disagreements? - How would you assess your co-parenting (parenting as a team)? Why? - Were there any changes in the last 2 weeks to the way you usually divide your responsibilities at home?
Sleep and couple parents	- Does/Did your sleep/sleep deprivation impact (in general/this week) o the way you divide parenting responsibilities o on your relationship o on your communication to each other (fewer disagreements on rested days?) o on your communication to the children (fewer fights on rested days?) o ability to parent as a team (e.g. disagreements over children) o the way you act towards each other
Weekly reporting on evening notes(questions here are just a guide to get insights on the sleep and behaviour people have been tracking for themselves)	
This week	- How did you sleep this week? o Have you noticed any differences in your parenting on days where your sleep quality or quantity was better? (ex. emotional availability, enjoying your time, parenting stress) o Does sleep quantity have a different effect than quality?

Notes	- What are the highlights from this week? (any highlights in your notes?)
Naps	- Did you take any naps? Have they made an impact?
Other	- Anything else you'd like to add in relation to your week's sleep and how that impacted your parenting?

Interview #4 – reflections on sleep diary, using the sleep tracker, how sleep deprivation makes you feel, any last thoughts. (Individual Interview)

This week I would like to start with the weekly notes if that's ok with you	
Notes	- Any noteworthy notes from the last week?
Experience 3 weeks Parenting stress	- How did you **experience** your sleep and parenting in the last **3 weeks**? o Any **variation**? Was **sleep** involved in the relationship? ▪ Ups and downs ▪ iPad time ▪ Perceived activity level of children ▪ Etc.
Enjoyment	- Did you enjoy your time with your children in the last 3 weeks? o Any **variation**? Was **sleep** involved in the relationship? ▪ Play time ▪ Trips ▪ Feeding ▪ Etc.
Emotional availability	- How **emotionally available** would you say you were for your children? o Any **variation**? Was **sleep** involved in the relationship? ▪ How?
Naps	- Did you take any **naps**? Have they made an **impact**?
Quality vs Quantity	- Difference in the effect of **sleep quantity** and **sleep quality**?
Highlights	- What are the **highlights from the last 3 weeks?** - What are the highlights from **your notes/your diary**?
Finally, I would like to get more detail about how you experienced the last three weeks.	
Study experience	- How did you **experience** the sleep diary? o What **patterns** emerged for you? - Did the sleep tracker **effect your sleep**, make you aware of your **behaviour** during the day?
Sleep deprivation experience	- Have you been **sleep deprived** over the last weeks? o Has it impacted your **behaviour**? o How does sleep deprivation **make you feel**?
Mediators/ Moderators	- **Sleep → X → Parenting** o Were there any other stressors that may have been influenced by your sleep and may have? ▪ Parenting style, Finances, Work stress, etc. o Did they influence your experience as a parent?

Closing question	- **Anything else you'd like to add** before we conclude the last interview? o Sleep, Parenting, Experience, etc.

Appendix C

Information Sheet and Consent Form

INFORMATION SHEET

Kia ora and greetings. My name is Dominick and I am doing a study on sleep and its relationship to parenting young children as part of my Masters. This research will help us better understand parent's needs and challenges of parenting young children. I would like to talk to couples who have children between the ages of 15 months and 7 years.

What will participation look like?

If you decide to participate, we will schedule four 20-30 minutes (approximately) in-person interviews with you. Two individually and two together with your partner (4 interviews per person and 6 interviews per couple). These can be face to face or on-line depending on COVID restrictions and your preferences. Additionally, between the interviews, you will be asked to wear a sleep tracker overnight and to answer a few brief questions in the morning and in the evening about your sleep (and your children's sleep). This should not take up more than 5-10 min./day. Overall, the time commitment is expected to be approximately 6 hours over the span of 3-4 weeks.

Before the first interview, we will invite you to complete a consent form which will cover the overall study period. Please feel free to ask us any questions about the project and/or to consult with people you trust before you decide to participate.

Participation is ***completely voluntary*** – if you do not want to participate, you do not have to. You can also choose to:

- Stop participating at any time before or during the interview/data collection phase
- Withdraw your data up until two weeks after you have received your transcript for review

What are the benefits of participating?

Benefits could include enjoying talking about and reflecting on your own experiences and the effect different sleep patterns have on you. This project can also inform parents about the importance of sleep and the impacts of shorter or more interrupted sleep. As the researcher is

not an expert on sleep, help is available to find a sleep clinic if participants are experiencing a substantial problem.

To acknowledge the time requirement and participation I will offer up to 4 hours of babysitting for each couple, to thank you for your time. The babysitting service and time of use may be selected by the couple and may cost up to $100. Parents will be asked to select a babysitting service, date and time and will send the researcher the bill. In case you are not comfortable with a babysitter, each couple may also opt to receive a 100$ Countdown voucher instead.

What are the risks of participating and how are they being managed?

Risks to participation are minimal; you are welcome to share as much or as little as you want in response to questions and to not answer questions that make you feel uncomfortable. There is the potential for you to feel upset discussing your experiences if they were challenging for you. Should any distress arise for you, there is also a list of resources at the end of this form.

What will be done with my information?

Interviews will be audio recorded and transcribed by hand and using the Otter AI app. Recordings will be stored on password protected computers. The Otter AI app uses automatic encryption software. If any identifiable data is shared within the research team, we will use secure (password protected) means to do this. If any printouts are made, they will be kept in a locked cabinet in my supervisor, Dr Kathryn McGuigan's office on the Massey University Albany campus.

Recordings and transcripts will be securely deleted 5 years after the close of the research.

Analysed data may be used in any of the following ways:

- My Master's thesis
- Academic publications
- Academic and/or community presentations
- Policy briefings
- Knowledge translation outputs (e.g. blog posts, infographics, webinars, etc.)

You will be invited to choose a pseudonym (fake name) that will be used to identify you in any outputs from the research. If you do not have a preferred pseudonym, we will select one for you.

Note: An attempt will be made to deidentify information to an extent that even spouses will not be able to recognise it; however, the I cannot guarantee that your partner might not recognise a quote from you from an individual interview.

Note: Please note that sleep tracking devices have their own consent forms and may store and access your data. If you were supplied with the Fitbit charge 4, you will have the option to delete your data at the end of the study, as the Fitbit enables this option. If you will be using your own device for sleep tracking and you are concerned that your tracker does not have the option of deleting the data after the study is complete, please discuss this with the researcher so an alternate sleep tracker can be made available.

Participant's Rights

You are under no obligation to accept this invitation. You have the right to decline to answer any particular question or to withdraw your data or any part thereof at any time until two weeks after you have received your transcript for review.

Project Contacts

If you have any questions about the research, please contact:

Student Investigator: Dominick Sorz, School of Psychology, Phone +64 [redacted] Email [redacted]

Supervisor: Dr Kathryn McGuigan, Lecturer, School of Psychology, College of Humanities & Social Sciences, Massey University, Albany Campus

Phone +64 9414 0800 ext. 43115 Email K.mcguigan@massey.ac.nz

This project has been reviewed and approved by the Massey University Human Ethics Committee: Northern, Application NOR 22/14. If you have any concerns about the conduct of this research, please contact A/Prof Fiona Te Momo, Chair, Massey University Human Ethics Committee: Northern, telephone 09 414 0800, x 43347, email humanethicsnorth@massey.ac.nz.

Support Resources

A full list of mental health crisis teams is available here:
https://www.health.govt.nz/your-health/services-and-support/health-care-services/mental-health-services/crisis-assessment-teams

Lifeline
0800 543 354 (0800 LIFELINE)
or free text 4357 (HELP) 24/7

1737 Need to Talk?

Depression Helpline

Free call or text 1737 for support from a trained counsellor

0800 111 757 or text 4202

Anxiety Helpline

0800 269 4389 (0800 Anxiety)

Healthline

0800 611 166

Centre for Psychology

Level 3

North Shore Library Building (off Kell Drive)

229 Dairy Flat Highway

Albany Village, Auckland

Tel: (09) 213 6095

Fax: (09) 414 7328

Email: Centreforpsychology@massey.ac.nz

Massey Health and Counselling Centre

(For Massey Students and Staff Only)

09 213 6700

Studenthealth@massey.ac.nz

https://www.massey.ac.nz/massey/student-life/services-and-resources/health-counselling-services/counselling/counselling_home.cfm

MASSEY UNIVERSITY
COLLEGE OF HUMANITIES AND SOCIAL SCIENCES
TE KURA PŪKENGA TANGATA

CONSENT FORM

I have read and I understand the Information Sheet. I have had the details of the study explained to me, any questions I had have been answered to my satisfaction, and I understand that I may ask further questions at any time. I have been given sufficient time to consider whether to participate in this study and I understand participation is voluntary and that I may withdraw from the study until two weeks after I receive my transcript for review.

I agree to the interview being sound recorded.

_ Yes

_ No

I agree to the interview being transcribed using the Otter AI App.

_ Yes

_ No

I wish to have my recordings, or a copy of my transcript returned to me.

_ Yes

_ No

I wish to receive a summary of study findings.

_ Yes

_ No

I agree to participate in this study under the conditions set out in the Information Sheet.

_ Yes

_ No

Declaration by Participant:

I_____ hereby consent to take part in this study.

Signature: _____

Date: _____