EMILY PERRY BSc Hons MSc

CAUSES AND CONSEQUENCES OF SLEEP DISTRUBANCE IN YOUNG PEOPLE

Section A: What are the psychosocial challenges faced by young people with delayed sleep phase disorder? A systematic review of the literature

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Section B: A grounded theory of how the covid-19 pandemic has affected, and continues to affect, the sleep of adolescents.

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Summary

Section A presents a systematic review of the literature exploring the psychosocial challenges faced by young people with delayed sleep phase disorder (DSPD). The review found that young people with DSPD experience psychosocial challenges beyond those of their peers, including poorer cognitive performance and mental health and increased difficulties in social and family relationships. Implications for clinical practice were that clinicians should consider the presence and impact of DSPD in formulations to inform best treatment. Further UK-based research would be beneficial, with a particular focus on qualitative research to explore the young person's inner experience.

Section B presents a study exploring adolescents experience of sleep during the covid-19 pandemic and proposes a theory of how sleep problems may be perpetuated. Grounded theory was used to analyse the interviews of eleven adolescents who had experienced changes in their sleep since the start of the pandemic. A theoretical model suggested that ways of coping with the pandemic had a detrimental impact on participants sleep, with the way in which this was managed in the longer term affecting recovery of their sleep. The model provides a framework for clinicians when working with adolescents with sleep problems in the wake of the pandemic.

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MAJOR RESEARCH PROJECT

Section A: What are the psychosocial challenges faced by young people with delayed sleep phase disorder? A systematic review of the literature.

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Abstract

Objective: Young people's natural shift in circadian rhythm to a preferred later sleep time often conflicts with societal demands and expectations. However, in some cases, this natural shift is so extreme that it indicates a sleep disorder known as delayed sleep phase disorder (DSPD). The research on the specific psychosocial challenges faced by this subset of young people is limited, so this review aimed to critically review the current literature in this important area.

Methods: A systematic review of the literature using electronic databases was conducted. Quality assessment tools assisted with the critique of eligible studies. Findings were synthesised and research and clinical implications were considered.

Results: Fourteen relevant studies were identified and reviewed. Results were varied, although there was evidence to suggest that young people with DSPD experience a number of psychosocial challenges beyond those of their peers. However, the validity and generalisability of the results were reduced by methodological limitations.

Conclusions: The evidence provides some understanding of the psychosocial challenges experienced by adolescents and young people with DSPD. Due to the lack of homogeneity within the studies, further research is needed to understand how young people with DSPD can be supported.

Keywords: sleep, circadian rhythm disorder, delayed sleep phase disorder, adolescents, young people

Introduction

The review introduces the topic of sleep and examines psychological theory relevant to people who experience sleep disorders. It then discusses the impact of poor sleep on adolescents and young adults (collectively termed 'young people' for the purpose of this review) and provides a rationale for examining the current literature on the impact of delayed sleep phase disorder (DSPD) on young people. The literature is briefly outlined, and the quality of the studies are reviewed using quality checklists to allow for consistent evaluation. Study findings are then collated to identify the psychosocial challenges faced by young people with DSPD. Consideration is given to the implications of the research within both research and clinical contexts.

Sleep and the two-process model of sleep regulation

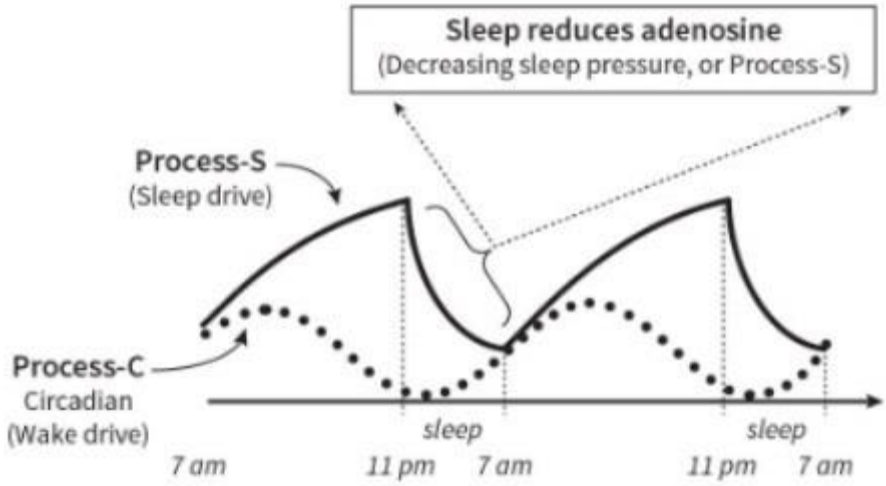
Sleep is defined as 'the resting state in which the body is not active, and the mind is unconscious' (Cambridge Dictionary, n.d.) and is essential for intellectual, behavioural, emotional and physical development. In recent years, sleep research has expanded exponentially (Worley, 2018), with researchers recognising the importance of sleep and the detrimental impact of inadequate sleep on our lives. The Institute of Medicine state that seven to eight hours of sleep is recommended each night, although over 35% of adults report not achieving this due to lifestyle and work factors, or sleep disorders (Colten & Altevogt, 2006).

The two-process model of sleep regulation (Borbély, 1982), presented pictorially in Figure 1, theorises that sleep is regulated by the interaction of a homeostatic sleep and wake process (Process S) and a circadian pacemaker process (Process C). Process S reflects our need to sleep the longer we are awake (Hagell, 2012). When we are awake, this process is at a lower threshold and when sleep occurs, this process is at an upper threshold (Borbély, 1982). Process C acts as a 'gatekeeper' for sleep, based on signals from the environment, such as light (Hagell, 2012). In modern day life, these processes are often disrupted, which

can result in sleep disturbance. For example, drinking caffeine or alcohol has been evidenced to negatively impact on sleep (Garcia & Salloum, 2015).

Figure 1

The two-process model of sleep regulation from Walker (2018)



What happens when sleep is disturbed?

It has been well documented that sleep is important for our health and wellbeing by, for example, assisting with motor skill learning, memory formation, energy conservation, emotion regulation, cognition and performance (Assefa et al., 2015; Siegel, 2005; Zielinski et al., 2016), as well as maintaining our physical health (Perry et al., 2013). Insufficient sleep (less than 7 hours per night) has been associated with numerous physical health conditions, including, obesity, diabetes, and cardiovascular disease, and has been found to be a risk factor for stroke, cancer and dementia (Cappuccio et al., 2008; Cappuccio et al., 2011; Colten & Altevogt, 2006; Markt et al., 2015; Reutrakul & Van Cauter, 2018; Sprecher et al., 2017).

It has also been well documented that sleep disturbance has a negative impact on our mental health and our relationships with others. For example, those that are sleep-deprived have been found to take more risks and struggle more emotionally and socially, responding

similarly to low stress as the non-sleep-deprived respond to high stress (Killgore, 2015; Minkel et al., 2012; Weaver et al., 2018). A randomised controlled trial (RCT; Freeman et al., 2017) of university students with insomnia, found insomnia to be a causal factor of psychotic experiences and that treatment of insomnia can result in an improvement in anxiety, depression, and prodromal symptoms, with improvements sustained over time. Given this, it is clear that sleep treatment should be given a higher priority in mental health services (Freeman et al., 2017).

Daytime sleepiness is one of the major consequences of insufficient sleep, with slower reaction times, and an increase in drowsiness within the classroom or at work, medical errors, and motor vehicle accidents (Colten & Altevogt, 2006; Centers for Disease Control and Prevention, 2011; Vaca, 2005). Consequently, sleep deprivation raises a public health risk (Perry et al., 2013).

Sleep in the adolescent years

In the case of adolescents, eight to 10 hours of sleep per night is considered the optimal sleep duration (Suni & Dimitriu, 2022). This helps adolescents to maintain their emotional wellbeing, physical health and performance at school (Suni & Dimitriu, 2022). However, a 2013 survey found that nearly 69% of adolescents obtain inadequate sleep (Suni & Dimitriu, 2022). This lack of sleep can have a huge impact on the young person's mood, academic performance and behaviour and can cause excessive daytime drowsiness (Curcio et al., 2006; Fallone et al., 2002). It has also been associated with an increased likelihood of engaging in risky behaviours due to sleep deprivation affecting the frontal lobe, which is critical for controlling impulsive behaviours (Wheaton et al., 2016).

Adolescents are at a time in their lives when they are exploring their independence and identity (Erikson, 1980), and with this comes less parental influence over when they go

to sleep (Carskadon, 1990). Particularly, increased access to social media and technology, increased homework, extracurricular activities and intrinsic factors such as puberty within these years are factors associated with insufficient sleep (Carskadon, 1990; Manber et al., 1995; Moore & Letzer, 2008; Smaldone et al., 2007).

During adolescence, the circadian timing system (Process C), goes through developmental changes (Crowley et al., 2007). This often leads to a shift in adolescents' circadian rhythm and a tendency towards being a "night owl", where later sleep and wake times are preferable (Suni & Dimitriu, 2022). Research has also suggested that there is a slower build-up of sleep drive in adolescents', meaning they do not feel sleepy until later in the evening (Suni & Dimitriu, 2022). Gradisar et al. (2011b) conducted a meta-analysis to review the literature on adolescents sleep worldwide. Their review identified 41 surveys, published between 1999 and 2010, which found a world-wide pattern of delayed sleep phase (DSP) amongst adolescents, increasing with age. This included a restricted school night sleep and bedtimes that were two or more hours later, but longer in duration, at weekends (Gradisar et al., 2011b). Through the lens of cognitive behavioural theory, these physiological changes may influence adolescent's thoughts, feelings, and behaviours in relation to their sleep. For example, if they feel less tired, they are more likely to prioritise activities that delay their sleep, such as use of social media, which leads to later sleep times and shorter sleep duration.

It is suggested that adolescents would achieve their optimal amount of sleep should they be allowed to create their own schedules. However, with societal demands, such as school start times, adolescents are expected to wake earlier than they would naturally choose, so are unable to achieve the recommended eight to 10 hours of sleep. This leads to a sleep debt, where adolescents end up catching up on lost sleep at weekends. However, paradoxically, this can exacerbate delayed sleep schedules (Suni & Dimitriu, 2022). As sleep deprivation in adolescents has been found to be the strongest predictor of suicidal ideation

and suicide (Lee et al., 2012; Liu, 2004), sleep is clearly an issue that warrants further investigation. The perfect storm model (Carskadon, 2011) explains that the combination of the circadian shift with societal and psychosocial pressures produces insufficient and inappropriately-timed sleep. This puts adolescents at risk of developing a more severe form of DSP - DSPD (Leu & Rosen, 2009).

Delayed Sleep Phase Disorder

One of the most common types of circadian rhythm sleep disorders is DSPD (Nesbitt, 2018), which is the most commonly diagnosed sleep condition in adolescents (Moreno-Galarraga & Katz, 2019) due to the natural shift in circadian rhythm at this age (Moturi & Avis, 2010). Estimates on the prevalence of DSPD range from 1 to 16% in adolescents (American Academy of Sleep Medicine, 2014; Lovato et al., 2013), although few studies have used the International Classification of Sleep Disorders (ICSD-2) diagnostic criteria for DSPD when estimating this, which could explain the large range.

DSPD is a biopsychosocial disorder (Wilhelmsen-Langeland et al., 2012), where individuals exhibit a chronic inability to fall asleep and wake up in line with requirements of everyday schedules (American Academy of Sleep Medicine, 2014; Weitzman et al. 1981). Should they be able to sleep to their preferred schedules, the individual with DSPD is likely to sleep between 2am and 6am and wake up between 10am and 1pm (Fahey & Zee, 2008). However, as adolescents are expected to wake up for school, their sleep schedule is out of sync with their chronotype, which means they are having to wake up in their subjective night-time (Carskadon et al., 1998). This can lead to an inability to wake up early to meet daytime expectations. Factors maintaining this delayed sleep-wake cycle may include family or social dysfunction or late-evening activities (Crowley et al., 2007), technology use, excessive exposure to artificial lights, caffeine use and napping (Moreno-Galrarraga & Katz, 2019).

To receive a diagnosis of DSPD, the following criteria must be met, according to the American Academy of Sleep Medicine (2014).

1) Chronic inability to fall asleep and wake up at conventional hours,
2) Ability to achieve the normal quantity and quality of sleep should they be able to choose their ideal schedule,
3) Actigraphy monitoring or sleep logs demonstrate seven days of delayed timing of the sleep period,
4) Sleep disturbance is not better explained by medication use, another sleep disorder, mental health disorder, medical disorder or drug intake.

It should be noted that DSPD is different from insomnia, where the individual has problems initiating sleep at all times and has poor sleep quality (American Academy of Sleep Medicine, 2014; Nesbitt, 2018). Most research on sleep in young people focuses on the effects of chronic insomnia, which considering DSPD is the most commonly diagnosed sleep disorder in adolescents, is surprising. At present, there is a lack of understanding of the functional impairment of DSPD. Considering the developmental tasks faced by adolescents, and the relatively high prevalence of DSPD in this population, it seems imperative to review the current literature on the psychosocial challenges faced by young people with DSPD.

In understanding the impact of DSPD we go some way to understanding how society can help to support adolescents with DSPD. It may also help medical professionals, teachers, psychologists and parents to understand that the sleep-wake problems and difficulties at school associated with DSPD are not just behavioural or motivational in nature, but are real challenges faced by the severe shift in circadian rhythm. Without this understanding, the young person may internalise the view of themselves being the problem, therefore adding to the problem (Dagan & Eisenstein, 1999).

Aims and scope of the review

To the author's knowledge there is currently no review of the literature on the challenges faced by young people with DSPD. Clinical samples are often excluded from investigations of sleep problems (Preckel et al., 2011), which means the evidence base for DSPD is lacking and highlights an important knowledge gap. Therefore, this review aims to synthesise the literature on DSPD to understand the challenges faced by young people that experience DSPD and to highlight areas of possible development in this area of research.

Method

A scoping search of five electronic databases was conducted in November 2021, with a final search of Applied Social Sciences Index and Abstracts (ASSIA), Cochrane Database of Systematic Reviews, Medline (Web of Science), PsychInfo and PubMed conducted in December 2021. The following search terms were combined in the search: (delayed sleep phase disorder* OR DSPD OR delayed sleep-wake phase disorder OR delayed sleep phase syndrome* OR DSPS OR delayed sleep phase type* OR DSPT) and (child* OR adolescen* OR teenager* OR teen* OR youth* OR young people OR young person). No date limits were applied.

The search identified 793 studies. Based on the inclusion and exclusion criteria below, titles, followed by abstracts, were screened. Full-texts of remaining studies were then reviewed to confirm eligibility. This search identified eleven eligible papers. A broader search using relevant journals (Sleep Medicine, Journal of Sleep Research and SLEEP) and Google Scholar was performed, and the references from relevant studies were hand-searched. This identified three more studies. Full search details can be found in Figure 2 and eligible studies are summarised in Table 1.

Inclusion criteria

- Only studies written in the English language were included.
- Research utilising qualitative and quantitative designs were included in the review as the integration of qualitative studies can enhance the reviews utility and impact (Harden, 2010) and increases the scope of the study.
- Both published and unpublished research studies were included to reduce the effects of publication bias.
- Studies that included adolescents and young adults aged 10-24 were included. This was due to the classification of adolescents as individuals aged 10-19 and youths as individuals aged 15-24 (World Health Organisation (WHO), 2014). In addition, Sawyer et al. (2018), suggest including the ages of 10-24 years in the definition of an adolescent, corresponds more closely to what we know to be adolescent growth and understandings of this life phase. Studies including young people a year or two older than this will only be included should the average age (and standard deviation) of participants fall within the reviews target age range.
- Due to the paucity of research available, DSPD intervention studies that analysed the outcome of the intervention on the young person's psychosocial functioning were included to understand whether any improvements in the condition could improve the young person's daytime functioning.

Exclusion criteria

- Studies that focus on a decrease in sleep duration, rather than delayed sleep. Although a decrease in sleep duration during the week is a symptom of DSPD, papers that write purely about a lack of sleep could be capturing other factors, rather than it being a

shift in their circadian rhythm, for example, pain or illness or behaviourally induced insufficient sleep syndrome.

- Papers that focus on DSP, as DSP is a subclinical form of DSPD (Elovainio et al., 2020).

Figure 2

PRISMA flow diagram of search process for this review (Page et al., 2021)

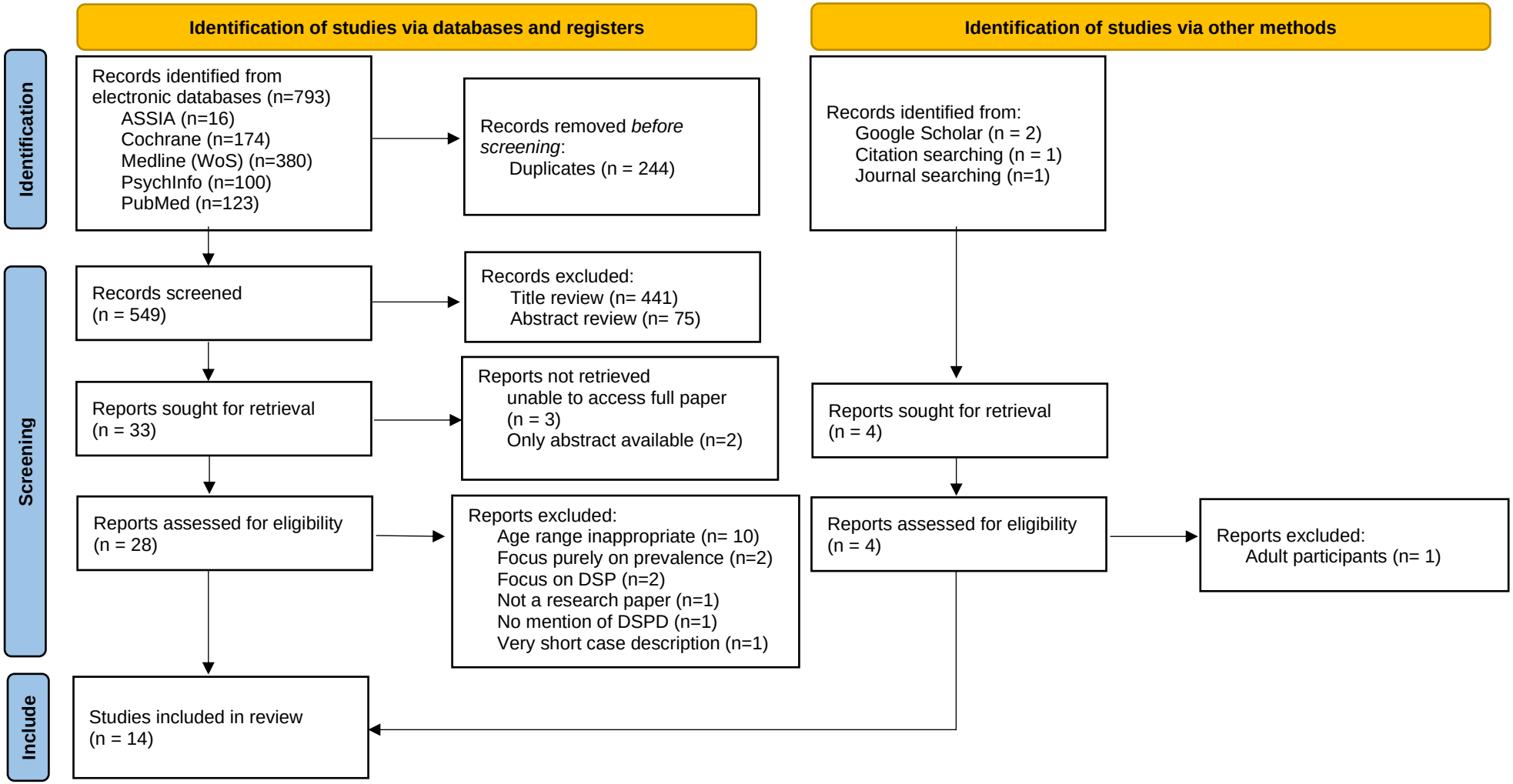


Table 1

Summary of study characteristics

Study	Objectives	Sample	Study Design and Methodology	Measures *(references in table note)*	Analysis	Key Findings
Danielsson et al. (2016), Uppsala, Sweden	To investigate the prevalence of DSP and DSPD To investigate factors associated with DSP and DSPD	671 participants aged 16-26 years old (M=21.8, ±3.1) 55.3% females Randomly selected from the Swedish Population Register	- Cross-sectional study -Questionnaires was sent to 1000 young people about their sleep and health	- MEQ - ISS - ESS - HADS - Worry Questionnaire - SFRS	- t-tests to compare means - chi-squared to compare dichotomised demographic data - binary logistic regression to investigate associations and account for possible covariates	- Prevalence of DSPD was 4% (n=27) - Prevalence of DSP was 4.6% (n=31) - Higher worry and rumination scores were reported by participants with DSPD, as well as greater levels of depression and anxiety. - DSPD participants more likely to report a psychiatric condition
Gradisar et al. (2011a), Child & Adolescent Sleep Clinic, Adelaide, South Australia	To investigate the effectiveness of cognitive-behaviour therapy (CBT) and bright light therapy (BLT) for adolescents with DSPD.	49 adolescents aged 11-18 years diagnosed with DSPD (mean age 14.6 ± 1.0 y, 53% males); 16% not attending school	- Randomized controlled trial - DSPD diagnosis confirmed via a 7-day sleep diary and clinical interview	- 7-day sleep diary at each time point - PDSS - FFS - Short MFQ - Clinical sleep history interview developed by the authors to assist diagnosis of	- Complete-case analysis - independent samples t-tests - 2-way mixed model ANOVA to test whether CBT plus BLT provided greater	- CBT plus BLT is effective for improving DSPD and daytime impairments, immediately and in the longer term. - All participants reported poor school attendance and/or performance.

		Recruited via adverts in school newsletters and local newspapers 23 completed treatment, 17 in wait-list (WL) control	- 6 sessions of CBT plus BLT - measurements at each time-point measuring sleepiness, fatigue, and depression symptoms	paediatric sleep disorders.	improvements than WL control - One-way repeated measures ANOVA to test long-term effects	- 2 out of 4 adolescents in the intervention group returned to school.
Iwamitsu et al. (2007), Japan	To examine the psychological characteristics of participants with DSPD and school refusal	22 participants aged 13-18 years (M=16.0 ± 1.4) with a diagnosis of DSPD and school refusal for over one month (or attending only a few days a month) 13 boys and 9 girls Analysed 21 participants for the efficacy of their treatment	- Pre-post design - Participants given social time cues with planned sleep and wake times. - Participated in group therapy in the morning, 5 days a week	- The Rosenzweig picture-frustration study (P-F study) to measure the types of aggression	- Measured sleep-wake improvement and the frequency of school refusal - Calculated the mean scores on the three outcomes of the P-F study - One-way ANOVAs	- Improvements in sleep-wake schedules were found in all participants, and 57% attended school after the intervention. - DSPD participants were less assertive, less aggressive compared to non-DSPD participants. - DSPD participants compromised and repressed their emotions and thinking more than non-DSPD participants.
Langevin et al. (2014), Canada	To investigate the effectiveness of a light therapy device on DSPD	10 participants aged 15-18 years old (mean age = 16.3 years) affected by DSPD	- Experimental single blind placebo-controlled design	- Teen Sleep Diary - PDSS	- Nonparametric Mann-Witney U tests to compare the effect of the treatment - 2-way ANOVA	- Significant improvements in the experimental group, with respect to daytime sleepiness, the delay of sleep onset and sleep

		3 girls and 7 boys, Recruited via posters and flyers distributed at a community centre	- Diagnosis of DSPD was established - Data collected using two questionnaires			quality, compared to the control group
Lovato et al. (2013), Adelaide, Australia	To establish whether participants with DSPD are more impaired in daytime functioning and engage in poorer lifestyle choices than participants with good sleep	374 Australian adolescents aged 13-18 years (M=15.6, SD=0.95), 59% male Only 4 met criteria for DSPD Recruited from 8 schools – stratified sample based on SES	Cross-sectional design Participants completed a 7-day sleep diary, wore wrist actigraphy, and completed questionnaires to assess DSPD	- ISI - PDSS - School Sleep Habits Survey - Centre for Epidemiological Studies Depression Scale	- Assessment of DSPD - Between group nonparametric comparisons to assess differences between adolescents with and without DSPD	Similar daytime functioning and lifestyle habits reported by adolescents with DSPD than those with some or no symptoms of DSPD
Montie et al. (2019). The Netherlands	To investigate the impact of DSPD on the lives of adolescents and their families	6 adolescents aged 12 to 17 years, who were undergoing treatment for DSPD at the Centre for Sleep Medicine, and one of their parents.	Qualitative design: 1-hour semi-structured interviews conducted by the lead researcher	N/A	Thematic analysis – open coding of interviews, followed by interpretative coding.	Five themes identified: (1) Impact on adolescents: school results and social life; (2) Impact on parents: feeling guilty and powerless; (3) Impact on the family: conflicts and misunderstanding; (4) Impact on parents: being tired of everything; and (5) Factors determining

						or mediating the severity of impact DSPD affects the adolescent's mental health, social life, and cognitive functioning, as well family life, and parental wellbeing.
Richardson et al. (2018a), Adelaide, Australia	To investigate the difference in the cognitive performance of adolescents with DSPD and those without. To measure changes in adolescents' cognitive performance following treatment for DSPD	63 adolescents met ICSD-3 criteria for DSPD: 53 completed pre-treatment data on cognitive functioning (M=15.68 years ± 2.1 years, 65% female), 51 completed the treatment analyses (M=15.7 years ±2.1 years, 61% female) 40 adolescents (13-24 years) met 'good sleeper' criteria (M=15.9 years ±2.4 years, 75% female) Participants referred via GP referrals, advertisements in schools, newsletters,	Cross-sectional design followed by an RCT *(beyond the scope of this review)* Completion of questionnaires Cognitive performance assessed (computerised) Sleep treatment for DSPD participants Sleep, cognitive performance and daytime functioning	- Clinical sleep history interview to diagnoses DSPD. - Self-report of memory, concentration, attention, and school grades as a result of poor sleep - Sleep diary - Wrist actigraphy monitor - PDSS - FFS - SDS - Cognitive performance tasks measuring working memory and processing speed - Perception of cognitive	- Analysis of Covariance (ANCOVA) - Independent samples t-tests - Effect sizes to establish the scale of between-subject differences.	- Those with DPSD reported significantly later sleep timing, greater fatigue and daytime sleepiness and less total sleep time compared to non-DSPD adolescents - Cognitive performance did not differ significantly between the groups - Those with DSPD rated their subjective performance on tests significantly worse than non-DSPD adolescents - Processing speed and working memory performance significantly improved

		community notice boards or social media	measured 3 months after treatment.	performance (5-point Likert scale)		following treatment for DPPD
Richardson et al. (2018b), Adelaide, Australia	To investigate the effectiveness of BLT and morning activity for the treatment of DSPD	60 adolescents and young adults, aged 13-24 years (mean age = 15.9 years, 63% female), diagnosed with DSPD Families contacted the Child & Adolescent Sleep Clinic in response to community advertisements or following referral from their GP	- RCT - Four treatment conditions - Sleep diaries and questionnaires completed during treatment and follow-ups (1 and 3 months). - Three weekly sleep therapy sessions.	- Wrist actigraphy - Sleep diary - Clinical sleep history interview - PDSS - FFS - SDS	- Linear Mixed Modelling - Effect sizes (Cohen's d)	- No significant differences in outcomes between treatment groups - Significantly improved sleep onset latency, sleep timing, and daytime functioning were reported following treatment. - Improvement was maintained at the 3 month follow-up.
Richardson & Gradisar (2021), Adelaide, Australia	To compare sleep, repetitive negative thinking (RNT) and symptoms of depression in young people with DSPD, with and without a diagnosis of depression	103 participants aged 13-24 years 63 young people with DSPD (mean age 15.8 years ±2.2 years, 63.5% female), with (n=30) and without (n=33) self-reported doctor-diagnosed depression.	Cross-sectional design followed by an RCT *(beyond the scope of this review)* Initial assessment with a psychologist at a Child and	- Wrist actigraphy - Sleep diary - Clinical Sleep History Interview - Short MFQ - 2 subscales of the Sleep Anticipatory Anxiety Scale-Adolescents - Self-reported diagnosis of depression	- Chi-squared tests - One-way ANOVA - Non-parametric post hoc tests and Cohen's d calculations - Hierarchical linear regression analyses - Spearman rho correlations	- Increased RNT and depression symptoms and worse sleep was found in young people with DSPD compared to 'good' sleepers. - Significantly higher symptom severity of depression in young people with DSPD and a diagnosis of depression than those

		40 'good' sleeping young people DSPD (mean age 15.9 years ±2.4 years, 63.5% female), 60 adolescents with DSPD enrolled in the subsequent RCT (recruited as part of a larger RCT)	Adolescent Sleep Clinic. Completion of questionnaires		- Missing data handled using linear mixed modelling	without a diagnosis of depression - Symptoms of RNT, depression, and sleep onset difficulties in young people with DSPD, which significantly improved following treatment
Saxvig et al. (2019), Norway	To investigate habitual sleep, day-to-day variations in sleep, and social jetlag in young people with DSPD compared to those without To investigate morning and evening performance on a sustained reaction time task	61 participants aged 16-25 years 40 participants with DSPD (M=20.7 ± 3.1 years; 70% female) 21 healthy controls (M=21.2 ± 2.2 years; 71.4% female).	Case-control study Subjective and objective sleep were measured over 7 days 10-min sustained reaction time test (RTT) in the evening (10pm) and the following morning (10am)	Daytime functioning (scale from 1 = very good to 5 = very poor) Sleep diaries	T-tests and ANOVAs	- DSPD group had later sleep times than controls, but there was no difference in social jetlag, sleep duration, and standard deviation in sleep timing. - The DSPD group reported poorer sleep quality, sleep efficiency and daytime functioning, and longer sleep onset latency - RTT performance was similar in the evening for both groups, but the DSPD group performed poorer than the controls in the morning.

Sivertsen et al. (2013). Hordaland County, Norway	To investigate the prevalence of DSPD in adolescents To examine the association of DSPD with insomnia and school attendance, and if this could be accounted for by co-occurring depression. To investigate any gender differences	9338 adolescents aged 16–19 years (M=17 years; 54% girls) Adolescents in secondary education	Cross-sectional design Questionnaires sent via email for participants to complete during school hours.	- Self-reported data on a range of sleep parameters. - Data on school non-attendance provided by self-report as well as official registers - Quantitative Criteria for Insomnia - MFQ	- Between-group effect sizes were calculated using Cohen d. - Chi squared tests - Independent sample t-tests - Logistic regression	Adolescents with DSPD (n=306) had significantly poorer school attendance. Boys had higher odds of school absence than girls. Adolescents with DSPD reported more depressive symptoms those without
Wilhelmsen-Langeland et al. (2012). Norway	To investigate the experience of DSPD from the young person's perspective	9 participants aged 16-23 years (M=18.2, SD=2.4), with a diagnosis of DSPD	Qualitative study – semi-structured interviews focused on the challenges of having DSPD.	N/A	Systematic text condensation	Three themes that identified challenges were identified: 1) to give something up; 2) to blame something or someone and 3) to have a problem or not.
Wilhelmsen-Langeland et al. (2013), Norway	To investigate the short- and long-term effects on cognitive functioning and	40 participants aged 16-25 years (M=20.7±3.1years) with DSPD	- RCT - Four treatment conditions in the short-term intervention, followed by a	- 7 day sleep diary - KSS - Norwegian version of the ESS - Norwegian version of the FQ	- One-way ANOVA - t tests for independent samples	Gradually bringing rise times forward was successful in improving cognitive performance and subjective sleepiness

	subjective and objective sleepiness of BLT and melatonin treatment		long-term intervention (3 months) - Participants woken at 7am to arrive at the sleep centre for 8am. Test sessions began every hour from 9am to 1pm to simulate a typical school or work day	- AAT - CPT-II - Three subtests of the WAIS-III - 3 subtests of the D-KEFS.	- Pearson chi-squared test - Two-way ANOVA	and fatigue in treatment of DSPD.
Wilhelmsen et al. (2019), Norway	To investigate whether young people with DSPD report poorer executive functioning compared to a control group	60 participants aged 16-25 years 40 diagnosed with DSPD (M=20.7±3.1 years; 28 girls) 20 healthy controls (M=21.3±2.2 years; 15 males)	Cross-sectional design Participants completed the BRIEF questionnaire	BRIEF-A BRIEF-SR	Independent samples t-tests to compare participants with and without DSPD	Young people with DSPD reported significantly poorer executive functioning (EF) compared young people without DSPD.

Note. MEQ = Morningness-Eveningness Questionnaire (Adan & Almirall, 1991); ISS = Insomnia Severity Index (Bastien et al., 2001); ESS = Epworth Sleepiness Scale (Johns, 1991); HADS = Hospital Anxiety and Depression Scale (Zigmond & Snaith, 1983); WQ = Worry Questionnaire (Berle et al., 2011); SFRD = Symptom Focused Rumination Scale (Bagby & Parker, 2001); PDSS = Pediatric Daytime Sleepiness Scale (Drake et al., 2003); FFS = Flinders Fatigue Scale (Gradisar et al., 2007); MFQ = Short Mood and Feelings Questionnaire (Angold et al.,

1995); The Rosenzweig picture-frustration study (Rosenzeig & Rosenzweig, 1976); School Sleep Habits Survey (Wolfson et al., 2003); SDS = The Sheehan Disability Scale (Sheehan et al., 1996); Centre for Epidemiological Studies Depression Scale (Radloff, 1997); Clinical Sleep History Interview (Gradisar et al., 2011a); Sleep Anticipatory Anxiety Scale (Bootzin et al., 1994); Quantitative Criteria for Insomnia (Lichstein et al., 2003); KSS = Karolinska Sleepiness Scale (Akerstedt & Gillberg, 1990); Norwegian version of the ESS (Pallesen et al., 2007); Norwegian version of the Fatigue Questionnaire (Loge et al., 1998); ATT = Alpha Attenuation Test (Stampi et al., 1995); CPT-II = Conners' Continuous Performance Test version 2 (Conners & Staff, 2004); WAIS-II = Weschler Adult Intelligence Scale-III (Wechsler, 1997); DKEFS = Delis-Kaplan Executive Function System (Delis et al., 2001); BRIEF-A = Behaviour Rating Inventory of Executive Function – Adult self-report version (Roth et al., 2005); BRIEF-SR = Behaviour Rating Inventory of Executive Function-Self-report version (Guy et al., 2004).

Data extraction and analysis

The quality of each paper was analysed using data extraction forms, taking into account the papers' objectives, methods, participants, evaluation and results. Two papers included in the review were qualitative studies and the remaining were quantitative studies. As the studies varied in their methodologies, they were critiqued using different checklists: the CASP qualitative checklist (CASP, 2018a; Appendix A), the Appraisal Tool for Cross-Sectional Studies (AXIS; Downes et al., 2016; Appendix B), the CASP case-control checklist (CASP, 2018b; Appendix C), the CASP cohort checklist (CASP, 2018c; Appendix D), and the CASP Randomised Controlled Trial checklist (CASP, 2020; Appendix E). The lack of methodological homogeneity meant that a meta-analysis was not appropriate, and therefore, a systematic review was conducted.

Critical Review

The critique is based on the researchers understanding of qualitative and quantitative research and the results from the quality appraisal checklists, for a balanced perspective.

Overview and critique of qualitative studies

Two studies included in the current review adopted a qualitative approach to their research (Montie et al., 2019; Wilhelmsen-Langeland et al., 2012). Both studies conducted semi-structured interviews with young people (aged 12-23 years old), with Montie et al. (2019) also interviewing one of the parents of each young person. Both papers clearly outlined their aims and identified there to be a lack of research into young people's subjective experience of what it means to have DSPD and the impact that DSPD had on their lives.

Context and sample

Montie et al. (2019) conducted semi-structured interviews with six young people who were undergoing treatment for DSPD at a tertiary referral centre for sleep medicine in The Netherlands, and separately, an interview with one of their parents (five mothers and one

father). Although this meant there were 12 participants in total, only the experiences of six young people were explored. Wilhelmsen-Langeland et al. (2012) also conducted semi-structured interviews but with nine young people. These seem like small numbers of participants to understand such a big concept, however, both research groups state that they followed a qualitative approach to recruitment and ceased recruitment when data saturation occurred, which is positive.

Montie et al. (2019) adopted a purposive sampling strategy, which could introduce a sampling bias, with the possibility that young people were recruited based on certain characteristics. Although this population was readily available to the researchers and meant there was no query as to whether the young person had DSPD or not, results can only be generalised to young people seen in similar centres. It also may not equate to the challenges that young people with DSPD that is not 'severe' enough to be accessing services are experiencing or those whose difficulties had not come to the attention of services for reasons such as systemic support or financial means.

Wilhelmsen-Langeland et al. (2012) recruited their participants from a pool of participants that were already part of a RCT they were conducting. Six of these participants were recruited through convenience sampling. This may mean that participants who voluntarily participated were more motivated to change than those who did not volunteer, introducing a possible source of bias. The final three participants were recruited through critical case sampling, based on the young person having "possession of good reflexivity and verbal proficiency" (Wilhelmsen-Langeland et al., 2012, p. 52). This criterion seems particularly restrictive and questions the generalisability of the young person's responses. It is understandable why the researchers would be looking to recruit young people that could talk in depth about their experiences, however, they may be missing key information from young people who are, perhaps, from more diverse backgrounds.

Both studies appear to be missing demographic information, with Montie et al. (2019) reporting only the age range of the participants, making it almost impossible to generalise the results. Wilhelmsen-Langeland et al. (2012) was more comprehensive, reporting the age and gender of each participant as well as their educational level, living situation and school grades. However, neither study reported on the ethnicity of their participants which makes any conclusions difficult to generalise to the population as a whole. The way in which DSPD may be experienced by the young person may depend on cultural values and beliefs and environmental factors, for example.

A particularly positive point of the two papers is that they both used ICSD criteria to diagnose DSPD. They also state that the young people had been screened for other sleep disorders and were interviewed using the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I) to screen for other conditions that may affect their sleep, helping to reduce the possible effect of confounders.

Design and research issues

Taking a qualitative approach felt like the most appropriate approach to answering the research aims and allowed for free-flowing responses and a deeper understanding of the subject matter. Both Montie et al. (2019) and Wilhelmsen-Langeland et al. (2012) used semi-structured interviews in their research. This method is a good way of allowing the young person to lead the conversation, where the researcher has more flexibility to follow up particular themes (Adams, 2015) allowing for richer data extraction. However, like other research, it is not possible to completely rule out bias and subjectivity when interpretating the interviews. Montie et al. (2019) did well to minimise this possible limitation and to assure data quality by having all interviews analysed by two or more researchers and triangulated with sleep medicine specialists. Another good point was that Montie et al. (2019) gave the young person a choice of where the interview was conducted allowing the young person to be

in their most comfortable environment and therefore feel relaxed in the interview, possibly answering more honestly. On the other hand, Wilhelmsen-Langeland et al. (2012) did not consider the researchers' potential influence on the participants.

From their descriptions, it appeared that data analysis was sufficiently rigorous in Montie et al.'s (2019) study but it was difficult to tell in Wilhelmsen-Langeland et al.'s (2012) study. The latter study presented detailed information on each of the themes that presented themselves, however, it is stated that these themes were not part of the "researcher's preconception". This brings into question whether there was additional information that had not been presented. It would be important to provide all information extensively to not just gain new information but also to corroborate, or disconfirm, current research in the subject area. Additionally, it was also unclear why Wilhelmsen-Langeland et al. (2012) chose to use systemic text condensation, so we do not know whether this was the most appropriate way to analyse and interpret the data, which could undermine the value of the findings.

Both studies were ethically approved, however, Montie et al. (2019) did not provide information on confidentiality, consent or withdrawal procedures. It was unclear whether it was made clear to the participants that they had the right to withdraw and that it would not affect their medical care. This brings into question whether participants felt they had no option but to take part.

Outcomes

Both qualitative papers had some methodological flaws which affect the generalisability and validity of the results. However, overall, they go some way in helping us understand the significant challenges that young people with DSPD face in their everyday lives. In particular, it was identified that DSPD impacts on the young person's school performance and social life, where fatigue is related to school absences and a less extensive

social life, as well as impacting on the parents' wellbeing and creating conflicts within the family (Montie et al., 2019). Wilhelmsen-Langeland et al. (2012) found that for the young person, DSPD meant having to lose out on either sleep, school, time to do schoolwork, or social activities. These conflictual obligations appeared to have consequences for young people's self-image and increased the chance of interpersonal conflict and self-blame. As recognised by Wilhelmsen-Langeland et al. (2012) interviewing adolescents without DSPD may help us to understand whether these are challenges also experienced by young people without DSPD. Montie et al. (2019) considered recognition of the problem and support from professionals and the family's social system as moderating factors between DSPD and psychosocial challenges, which has important clinical implications.

Overview and critique of quantitative studies

Twelve quantitative studies were included in this review (Danielsson et al., 2016; Gradisar et al., 2011a; Iwamitsu et al., 2007; Langevin et al., 2014; Lovato et al., 2013; Richardson et al., 2018a; Richardson et al., 2018b; Richardson & Gradisar, 2021; Saxvig et al., 2019; Sivertsen et al., 2013; Wilhelmsen-Langeland et al., 2013; Wilhelmsen et al., 2019). One of the cross-sectional studies that compared cognitive performance of adolescents with and without DSPD also went on to measure cognitive performance following treatment for DSPD (Richardson et al., 2018a). Although it is beyond the scope of this review to analyse the effectiveness of interventions for DSPD, by including intervention studies (Gradisar et al., 2011a; Iwamitsu et al., 2007; Langevin et al., 2014; Richardson et al., 2018b; Wilhelmsen-Langeland et al., 2013), we can see whether improvements to DSPD symptoms can reduce the psychosocial challenges, and therefore understand the possible association between these variables. This will be the focus for these studies rather than focusing on the effectiveness of the interventions themselves.

Sample

The studies took place in either Australia, Norway, Sweden, Japan, Canada or The Netherlands. None of the studies were conducted in the United Kingdom (UK), making generalisation to a UK population troublesome. Participants ranged from 13-26 years old. Although four of the studies breached the age range of 10-24 years, they were included in the review due to the mean age and standard deviation falling within the target age range. Due to the small number of studies that specifically focus on the challenges experienced by those with DSPD, it felt important to include these studies.

There appeared to be missing demographic information for all the studies particularly in relation to ethnicity and socio-economic status (SES), with most studies including only age and gender or the young people's living situation in addition. Only one study reported on SES (Richardson et al., 2018a). With poor reporting on demographics, we do not know whether the results apply to the general population.

In general, the sample size of the studies were small, ranging from 22 (Iwamitsu et al., 2007) to 63 young people with DSPD and 40 'good sleeping' controls (Richardson & Gradisar, 2021), apart from three studies. Lovato et al. (2013) and Danielsson et al. (2016) recruited 374 and 671 participants respectively, but their final DSPD sample consisted of only four and 27 participants, respectively. This suggests very underpowered studies and without a power analysis calculation, we cannot rule out there being a Type II error (a false negative). The study that recruited the highest number of participants was the study by Sivertsen et al. (2013), who conducted a prevalence study of DSPD in adolescents in the Hordaland County of Norway. They recruited a total of 9338 adolescents, finding there to be a prevalence of 3.3%. This meant their final analysis, looking at the association of DSPD with insomnia and school attendance, included 306 participants. Although this sounds like a

high number, no power analysis was conducted so we do not know if the study was sufficiently powered.

Two studies recruited purely from school samples (Lovato et al., 2013; Sivertsen et al., 2013). Considering Gradisar et al. (2011a) found that 16% of young people seeking support for DSPD were not currently attending school, these studies may not include adolescents who were more severely impacted by DSPD and, therefore, did not attend school. Using more robust sampling strategies is likely to reduce the risk of bias. Overall, recruitment strategies of the studies were not well explained, which raises the possibility of recruitment bias. An example of this is that the four studies conducted in Norway were all from the same pool of participants who had been recruited as part of a larger study protocol (Wilhelmsen-Langeland et al., 2013). Some of those who participated in this study, volunteered to take part in further studies (Saxvig et al., 2019; Wilhelmsen-Langeland et al., 2012; Wilhelmsen-Langeland et al., 2019). It is possible that those who were struggling more with the effects of DSPD were less likely to take part. This should be considered when interpreting the results.

Wilhelmsen-Langeland et al. (2019), Richardson et al. (2018a), and Richardson and Gradisar (2021) did not provide information on non-responders, raising the question as to whether there were significant differences between those who did and did not respond, which could potentially bias the results. Sivertsen et al. (2013), Lovato et al. (2013) and Danielsson et al. (2016) did provide this information. Danielsson et al. (2016) found a significant difference in gender between those who did respond (55.3% female) and those who did not (39.6% female). However, to reduce the possibility of bias, they included gender as a covariant in the analysis which was positive. In terms of attrition, many of the studies did report on those that were not included in the final analysis, but Richardson et al. (2018a) did not. They said that missing data was handled but no information on the demographics and reasons for attrition were provided, raising the possibility that there were systematic

differences between those that chose to continue with the study and those that did not, introducing bias. For example, if those with more 'severe' DSPD dropped out of the study this could affect the generalisability of the results.

Design and measures

All studies addressed a clear research question and the study designs seemed appropriate to the aims of each of the studies. Seven studies adopted a cross-sectional design, where participants completed self-report measures, comparing those with DSPD to those that did not meet DSPD criteria (Danielsson et al., 2016; Lovato et al., 2013; Richardson et al., 2018a; Richardson & Gradisar, 2021; Sivertsen et al., 2013; Wilhelmsen et al., 2019). Cross-sectional studies are quick and inexpensive to conduct but do not allow a causal relationship to be established, nor for the longer-term impact to be examined (Wang & Cheng, 2020). However, the direct comparison between those with DSPD and those without, allowed us to see the added challenges faced by those with DSPD. One study employed a case-control design (Saxvig et al., 2019) and the remaining studies utilised a pre-post design where self-report measures and/or validated assessment scales were used pre and post treatment for DSPD (Gradisar et al., 2011a; Iwamitsu et al., 2007; Langevin et al., 2014; Richardson et al., 2018b; Wilhelmsen-Langeland et al., 2013).

Most of the measures used were reliable and valid measures for the populations included in this review. Danielsson et al. (2016) used a number of measures that were validated for their population, other than the HADS, which was validated for use in a hospital medical outpatient clinic. Results from this particular questionnaire should, therefore, be considered with caution. Wilhelmsen-Langeland et al. (2019), did well to use two versions of the BRIEF (child and adult versions) appropriate to the age of each participant. However, comparing the results from both questionnaires is perhaps not helpful, and results may have

been better off split by age. Additionally, it is unclear whether the participants knew their DSPD status. If they did, there may have been a possible response bias, with participants answering more favourably if they were in the "good sleepers" group. Although most of the studies reported on the reliability and validity of the measures, this information tended to be brief and Lovato et al. (2013) did not report on this at all, purely describing the measures they used. However, it does appear that most of their measures were appropriate for their population (adolescents aged 13-18 years old), other than the ISS, which was validated for use for people aged 17-82 years old (Bastien et al., 2001). Wilhelmsen-Langeland et al. (2013) used a Norwegian version of the ESS and FFQ which is important considering these questionnaires were not originally validated in a Norwegian population.

Operationalisation of DSPD

There were differences in how DSPD participants were identified. To receive a diagnosis of DSPD, a wrist actigraphy and 7-day sleep diary, a device that measures movement and light to determine sleep-wake patterns (Lawrence & Muza, 2018), should be used (Meadows & Rehman, 2021). Most robustly, Lovato et al. (2013), Saxvig et al. (2019), Richardson and Gradisar (2021), Richardson et al. (2018a) and Richardson et al. (2018b) used these two measures to categorise their DSPD participants, with the latter two studies conducting an additional clinical sleep history interview. Langevin et al. (2014) used a structured interview and sleep diary. Wilhelmsen-Langeland et al. (2019) used sleep diaries alone. Gradisar et al. (2011a) provided no information on how they categorised DSPD participants but did state that they made use of sleep diaries at each time point.

Saxvig et al. (2019), Wilhelmsen-Langeland et al. (2013) and Wilhelmsen-Langeland et al. (2012) stated that they used criteria from the ICSD-2 (American Academy of Sleep Medicine, 2014) to diagnose those with DSPD. Sivertsen et al. (2013) and Danielson et al. (2016) were the only two studies to make use of purely self-report data to make a diagnosis

of DSPD, which raises questions as to how reliably the two groups were defined. It is possible that participants may have been included or excluded incorrectly. In the studies where participants went into the study without a diagnosis of DSPD but went on to receive this diagnosis, there was no information as to whether these young people were provided with support following the research study, raising an important ethical issue.

Summary of findings

DSPD and cognitive performance

Five studies focused on cognitive performance (Montie et al., 2019; Richardson et al., 2018a; Saxvig et al., 2019; Wilhelmsen-Langeland et al., 2013; Wilhelmsen-Langeland et al., 2019), with mixed results. Richardson et al. (2018a) measured objective and subjective measures of working memory and processing speed, finding that participants with DSPD rated their performance on these tests to be worse than good sleepers. This could highlight a negative expectancy bias (Courtauld et al. 2017). Objective measures of these cognitive tests did not significantly differ between groups. This does not appear to be in line with research on reduced sleep duration or restriction which indicates challenges in these areas (Gradisar et al., 2008; Lo et al., 2016). However, the tests were administered at different times for the two groups based on their wake-up times. This does not consider the challenges faced by young people with DSPD when required to wake up at socially conventional times, and therefore lacks ecological validity and could explain the negative result. The DSPD group underwent sleep treatment, after which their performance on these tasks significantly improved.

Saxvig et al., (2019) found that young people with DSPD performed poorer on a 10-minute sustained reaction time test in the morning but similarly in the evening. This is in line with research that those with DSPD are less alert in the morning as they are out of sync with their normal circadian rhythm (Gradisar & Crowley, 2013). Wilhelmsen-Langeland et al. (2013) found there to be an improvement in attention tests and objective sleepiness following

a bright light therapy (BLT) and melatonin treatment for participants with DSPD. Finally, Wilhelmsen-Langeland et al. (2019) found that participants with DSPD reported poorer executive functioning than their peers without DSPD. However, as this was a self-report measure only, this may again highlight a negative expectancy bias. An objective measure of executive function would be less biased and more reliable.

What appears to be missing from these results are higher order objective tests of cognitive functioning and as each study focuses on different aspects of cognition, there is limited evidence to the collective challenges on cognitive performance for young people with DSPD. It has however, been evidenced that those with DSPD have poorer school attendance, as described below, and Montie et al., (2016) found that young people with DSPD reported an impact on their school performance, such as dropping grades and trouble focusing due to fatigue, where fatigue is related to school absences.

DSPD and daytime impairment

Nine studies investigated the association between DSPD and daytime impairment, with varying degrees of explanation around what this term meant (Gradisar et al., 2011a; Iwamitsu et al., 2007; Langevin et al., 2014; Lovato et al., 2013; Richardson et al., 2018a; Richardson et al., 2018b; Saxvig et al., 2019; Sivertsen et al., 2013; Wilhelmsen-Langeland et al., 2013).

Gradisar et al.'s (2011a) DSPD participants reported poor school performance or attendance, which improved in half following CBT plus BLT treatment. This study alongside Langevin et al. (2014), Richardson et al. (2018b) and Wilhelmsen-Langeland et al. (2013) reported improved daytime sleepiness and fatigue following sleep treatment. Similarly, Richardson et al. (2018a) found greater self-reported daytime sleepiness and fatigue in DSPD participants compared to good sleeping participants. The use of self-report questionnaires should be considered when interpreting this result. Saxvig et al. (2019) did not define daytime

functioning, instead only opting for rating this on a scale of one (very good) to five (very poor), which makes it impossible to know what this was measuring or whether participants interpreted this differently themselves when answering.

Lovato et al. (2013) found that adolescents with DSPD reported comparable daytime functioning and lifestyle habits (sleepiness, grades, school absence, completion of homework and extracurricular activities) to those with some or no symptoms of DSPD, however, with only four participants, this study is significantly underpowered, which could indicate a Type-II error. Sivertsen et al. (2013) used official registers and self-report to identify school attendance, finding that there was a higher odds ratio of non-attendance to school from participants with DSPD and these odds were higher in boys compared to girls. Iwamitsu et al. (2007) also found school attendance to improve following sleep treatment for DSPD, although a lot of information was missing in this study and generalisability was unclear, so this result should be considered with caution. Overall, the results regarding daytime functioning appeared to be in line with research on DSPD (Saxvig et al., 2012) and a brief case example of a 12-year-old girl whose DSPD had led to 31 absences over the academic year and conflicts within the family home (Garcia et al., 2001).

DSPD and mental health

Six studies reviewed the association between DSPD and mental health (Danielsson et al., 2016; Iwamitsu et al., 2007; Montie et al., 2019; Richardson & Gradisar, 2021; Sivertsen et al., 2013; Wilhelmsen-Langeland et al., 2012). Due to most of these studies being cross-sectional, we do not know whether there is a causal relationship. Previous research suggests that the relationship between poor sleep and mental health is likely to be bidirectional (Suni & Dimitriu, 2020).

Danielsson et al. (2016) was the only study to compare young people with DSP to those with DSPD. They found a non-significant relationship between DSPD and mental

health difficulties compared to DSP and mental health difficulties, but both of these groups had elevated levels of anxiety, depression and rumination compared to participants without DSP or DSPD. They did, however, find there to be a higher frequency of participants with DSPD reporting a psychiatric condition compared to participants with DSP. Similarly, Sivertsen et al. (2013) found that those with DSPD reported more depressive symptoms than those without.

Richardson and Gradisar (2021) found that young people with DSPD were at a greater risk of depression due to an increase in repetitive negative thinking in this group, which has been found to predict the onset of depression (Abela & Hankin, 2011; Wilkinson et al., 2013). Iwamitsu et al. (2007) found that participants with DSPD tended to repress their emotions and thoughts more, and Montie et al. (2019) found that according to young people with DSPD and their parents, miscomprehension of sleep challenges resulted in mood fluctuations and frustration. Finally, Wilhelmsen-Langeland et al. (2012) found that self-blame was quite common in those with DSPD which could lead to a negative self-image. In general, the results are in line with research on sleep problems and DSP, that have found there to be a significant association between sleep problems and DSP, and symptoms of anxiety and depression in children and adolescents (Alfano et al., 2009; Saxvig et al., 2012).

DSPD and social challenges

None of the quantitative studies focused on social challenges faced by young people with DSPD. This is surprising, considering both qualitative papers found relationships to be a significant problem for their participants (Montie et al. 2019, Wilhelmsen-Langeland et al., 2012). They found that adolescents with DSPD were more likely to experience conflict with parents and difficulties in maintaining social relationships due to fatigue, particularly due to challenges in attending school or social activities, unless they sacrificed their sleep.

Discussion

Considering that DSPD is the most commonly diagnosed sleep disorder in adolescents, the lack of research in this area is surprising and highlights an important knowledge gap. The aim of the current review was to synthesise the literature on DSPD to date to understand the challenges faced by young people with DSPD and to highlight areas of possible development in this field of research. The findings add to the evidence that poor sleep in young people leads to increased stress, poorer academic performance and a poorer ability to manage their emotions and social relationships (Killgore, 2015; Minkel et al., 2012; Suni & Dimitriu, 2022; Weaver et al., 2018) and leads to slower reaction times and daytime sleepiness (Centers for Disease Control and Prevention, 2011; Colten & Altevogt, 2006). The review found that young people that experience DSPD were more likely to experience psychosocial challenges than their peers without DSPD, both at school and in their personal lives. The review presents the additional difficulties that young people with DSPD face, which highlights the importance of supporting these young people to improve their sleep and wellbeing.

Methodologies, basic data, measures and study limitations were largely described across the studies included in this review. However, the studies appeared to be lacking in demographic data for their samples. Although some studies did better with this, none of the studies provided information on the ethnicity of the participants and only six commented on other aspects such as the young persons living arrangements or family structure.

Descriptions of the sampling process were limited and none of the studies reported a power analysis. It appeared that many of the studies were statistically underpowered, questioning the reliability of the results. Consideration of non-response bias was also limited. Although there were flaws in the methodologies of the studies, there was a general trend to

suggest that there are a number of psychosocial challenges that are experienced by young people with DSPD, beyond those experienced by young people without. The limitations of the current review and its implications clinical practice and research are discussed below.

Limitations of the review

Seven of the studies were cross-sectional and many relied heavily on self-report data which can lead to a response bias. This was particularly pertinent in the studies that relied on a self-reported measure of DSPD and depression (Danielsson et al., 2016; Richardson & Gradisar, 2021; Sivertsen et al., 2013; Wilhelmsen-Langeland et al., 2019). Although this review focused on adolescents and young people aged 10 to 24 years old as these young people have similar social pressures, it is important to understand that chronotype over this range is likely to shift (Pacheco & Rehman, 2021) and supervision by parents is also likely to reduce with age. More studies that focus on a smaller age range, such as that by Sivertsen et al. (2013), would allow these differences to be taken into consideration and would help to identify patterns specific to each age group.

Another limitation of the review is that no UK-based studies were available, which could limit the generalisability of these results to the UK. Additionally, there was a lack of cultural and geographical diversity within the research studies with 10 of the 14 studies coming from two research teams; one in Australia and the other in Norway. Again, this limits the generalisability of the results to other populations and means the pool of participants is very limited, increasing the likelihood of bias. Further research with diverse samples is needed to produce more representative and transferable results.

Clinical Implications

Clinical Psychologists frequently encounter the result of sleep difficulties in their work. DSPD is often co-morbid with other psychological conditions, such as depression and

anxiety (Gradisar, 2014), which young people are more likely to present with. Given the psychosocial challenges faced by these young people, it would be important for psychologists working with young people to identify DSPD to develop a more holistic formulation that highlights the best and most appropriate treatment to treat the underlying problem (American Psychological Association, 2020). For example, it would be important to understand whether a young person is not attending school due to school avoidance or DSPD, as this is likely to involve different treatment recommendations.

Understanding there is a problem, parents and carers may be encouraged to support adolescent's sleep in practical ways. For example, through encouraging healthy sleep routines, establishing rules around sleep and technology use before bedtime, keeping devices out of bedrooms and developing their understanding of the impact of poor sleep (Gangwisch et al., 2010; Hale et al., 2018; Short et al., 2011).

It would also be important for clinicians to focus on the readiness to change model when working with young people with DSPD as perceived ability and desire to change are the best predictors of behavioural change (Micic et al., 2019). Thinking about training in sleep disorders, research has found that less than half of clinical psychology doctoral training programs offer didactic training in sleep disorders and sleep disorder treatment (Meltzer et al., 2009) which is of concern considering what we know about the importance of sleep.

Due to current societal demands and constraints, young people with DSPD often have to make a decision to lose out on sleep or lose out on social and academic opportunities (Wilhelmsen-Langeland et al., 2012). Given that school-aged children in the UK do not legally have a choice to miss school, it is often sleep that takes a back seat. Considering the results of this review, and previous research that sleep restriction is likely to have a significant impact in other areas of a young person's life, for example, school attendance and

performance, and at the extreme end, suicidal ideation (Liu & Buysse, 2006) neither of these seems like a good option. The young person is left with conflictual obligations where they are almost in a lose-lose situation, in line with the perfect storm model (Carskadon et al., 2011). It would be important to think about public health measures to prevent young people from having to make these sacrifices, for example better sleep education, accessible sleep services and later start times for school. Later school start times have been trialled and have found that even a modest change of half an hour can improve a young person's motivation, daytime sleepiness and fatigue and reduce depressed mood (see Minges & Redeker, 2016 for a review). The American Academy of Paediatrics (2014) also advocate for this change to allow young people to get the sleep they need, improving both physical and mental health. This should be thought about in UK settings.

Research Implications

There is an abundance of research in the area of sleep, however, considering the prevalence of DSPD, particularly in young people, and the impact that DSPD can have on daytime functioning, it is surprising there is a lack of research in this area. In particular, no studies focused on physical health and so conclusions could not be made on the biological challenges faced by young people with DSPD. More research is needed.

Future research should address the heterogeneity of methodologies in this area of research, as this limits its usefulness in informing health and social interventions and policies. As identified in this review, the operationalisation of DSPD is varied in the research. Without the use of sleep diaries and actigraphy, we cannot be sure whether the research is also capturing those with subclinical DSPD, particularly considering that DSP appears to have similar challenges associated with it (Saxvig et al., 2012). Considering that it can be difficult to distinguish DSPD characteristics from normal adolescent sleep patterns (Gradisar et al., 2011b), correctly diagnosing DSPD would be important in research going forward to make

sure that the research is not just capturing ‘normal’ teenage sleep. It would also be of interest to conduct further research on the difference between DSP and DSPD to understand the additional impact that DSPD may have on a young person. It may be that DSP is a result of a psychological difficulty, whereas DSPD is more a neurological disturbance, which is a more extreme version of DSP, when DSP has not been managed by the young person or their caregivers.

There is a lack of studies looking at the wider systems of the young person, for example, the impact of DSPD on the family. This systemic impact is assessed by one study, but no other study addresses the impact of DSPD on the family as a whole. It would be important to understand whether DSPD is likely to affect many areas of an individual's life to understand what may be maintaining sleep problems. With this knowledge, it may be possible to identify early interventions to protect against the longer-term impact of DSPD.

Interestingly, there was a lack of focus on technology use and its impact on sleep in adolescents. Considering technology use has been associated with sleep disturbance and daytime sleepiness (Bartel et al., 2015; Crowley et al., 2007; Johansson et al., 2016), as well as with adverse behavioural and psychosocial outcomes, mediated through poor sleep (Cain & Gradisar, 2010; Lemola et al., 2015; Hale et al., 2019), research on the relationship between technology use and DSPD would be imperative.

Other areas that appear to be lacking in the research are measures that consider gender, age, and cultural variations in distress. Considering that none of the studies report on ethnicity and few on other demographics other than age and gender, samples from more diverse populations would allow for results to be more representative. Considering the studies included in this review were not conducted in the UK, further research within a UK setting would be crucial to protecting young people’s psychosocial wellbeing. Finally, most of the studies presented in this review take a quantitative approach to understanding the

implications of DSPD. Although this research is important, quantitative research does not tend to allow the inner experience of participants to be explored, like qualitative research does (Corbin & Strauss, 2008). Therefore, further research using a qualitative design would be imperative.

Conclusions

Although there were some reports to the contrary, most of the studies included in this review highlighted significant psychosocial challenges faced by young people with DSPD. In particular, those with DSPD were more likely to have increased school absences, poorer cognitive performance, such as memory, processing speed and attention, increased levels of daytime fatigue and depressive symptoms, and difficulties in their social and family relationships. These factors highlight an important public health issue. However, results should be considered with caution considering the small sample sizes and differing ways of operationalising DSPD. In understanding the challenges faced by young people and reducing the effects of DSPD, it is likely that other areas of the young person's life will improve. Public health interventions, such as later school start times may be a good place to start. Interventions such as this should be piloted further, and if the results indicate that this is useful for young people as a whole, then should be rolled out more broadly.

References

Abela, J. R. Z., & Hankin, B. L. (2011). Rumination as a vulnerability factor to depression during the transition from early to middle adolescence: A multiwave longitudinal study. *Journal of Abnormal Psychology, 120*(2), 259-271. https://doi.org/10.1037/a0022796

Adams, W. (2015). Conducting semi-structured interviews. In J. Wholey, H. Hatry, & K. Newcomer (Eds.), *Handbook of Practical Program Evaluation, 4th Edition* (pp. 492-505). Josey-Bass. https://doi.org/10.1002/9781119171386.ch19

Adan, A., & Almirall, H. (1991). Horne & Östberg morningness–eveningness questionnaire: A reduced scale. *Personality Individual Differences, 12*(3), 241–53. https://doi.org/10.1016/0191-8869(91)90110-W

Akerstedt, T., & Gillberg, M. (1990). Subjective and objective sleepiness in the active individual. *International Journal of Neuroscience, 52*(1-2), 29-37. https://doi.org/10.3109/00207459008994241

Alfano, C. A., Zakem, A. H., Costa, N. M., Taylor, L. K., & Weems, C. F. (2009). Sleep problems and their relation to cognitive factors, anxiety, and depressive symptoms in children and adolescents. *Depression and Anxiety, 26*(6), 503-512. https://doi.org/10.1002/da.20443

American Academy of Sleep Medicine. (2014). *The International classification of sleep disorders: Diagnostic and coding manual* (3rd ed.).

American Psychological Association. (2020). *Why sleep is important*. https://www.apa.org/topics/sleep/why

Angold, A., Costello, E. J., Messer, S. C., & Pickles, A. (1995). Development of a short questionnaire for use in epidemiological studies of depression in children and adolescents. *International Journal of Methods in Psychiatric Research, 5*(4), 237-249.

Assefa, S. Z., Diaz-Abad, M., Wickwire, E. M., & Scharf, S. M. (2015). The functions of sleep. *AIMS Neuroscience, 2*(3), 155-171. https://doi.org/10.3934/Neurosience.2015.3.115

Bagby, R. M., Parker, J. D. A. (2001). Relation of rumination and distraction with neuroticism and extraversion in a sample of patients with major depression. *Cognitive Therapy and Research, 25*(1), 91–102. https://doi.org/10.1023/A:1026430900363

Bartel, K. A., Gradisar, M., & Williamson, P. (2015). Protective and risk factors for adolescent sleep: A meta-analytic review. *Sleep Medicine Reviews, 21*, 72-85. https://doi.org/10.1016/j.smrv.2014.08.002

Bastien, C. H., Vallieres, A., Morin, C. M. (2001). Validation of the Insomnia Severity Index as an outcome measure for insomnia research. *Sleep Medicine, 2*(4), 297–307. https://doi.org/10.1016/s1389-9457(00)00065-4

Berle, D., Starcevic, V., Moses, K., Hannan, D. M., & Sammut, P. (2011). Preliminary validation of an ultra-brief version of the Penn State Worry Questionnaire. *Clinical Psychology and Psychotherapy, 18*(4), 339–346. https://doi.org/10.1002/cpp.724

Bootzin, R., Shoham, V., & Kuo, T. (1994). Sleep anticipatory anxiety questionnaire: A measure of anxiety about sleep. *Sleep Research, 23*, 188.

Borbély, A. A. (1982). A two-process model of sleep regulation. *Human Neurobiology, 1*(3), 195–204.

Cain, N., & Gradisar, M. (2010). Electronic media use and sleep in school-aged children and adolescents: A review. *Sleep Medicine, 11*(8), 735-742. https://doi.org/10.1016/j.sleep.2010.02.006

Cambridge Dictionary. (n.d.). *Meaning of sleep in English.* https://dictionary.cambridge.org/dictionary/english/sleep

Cappuccio, F. P., Cooper, D., D'Elia, L., Strazzullo, P., & Miller, M. A. (2011). Sleep duration predicts cardiovascular outcomes: A systematic review and meta-analysis of prospective studies. *European Heart Journal, 32*(12), 1484–1492. https://doi.org/10.1093/eurheartj/ehr007

Cappuccio, F. P., Taggart, F. M., Kandala, N. B., Currie, A., Peile, E., Stranges, S., & Miller, M. A. (2008). Meta-analysis of short sleep duration and obesity in children and adults. *Sleep, 31*(5), 619–626. https://doi.org/10.1093/sleep/31.5.619

Carskadon, M. A. (1990). Patterns of sleep and sleepiness in adolescents. *Pediatrician, 17*(1), 5-12.

Carskadon, M. A. (2011). Sleep in adolescents: The perfect storm. *Pediatric Clinics of North America, 58*(3), 637-647. https://doi.org/10.1016/j.pcl.2011.03.003

Carskadon, M., Wolfson, A., Acebo, C., Tzischinsky, O., & Seifer, R. (1998). Adolescent sleep patterns, circadian timing, and sleepiness at a transition to early school days. *Sleep, 21*(8), 871–881. https://doi.org/10.1093/sleep/21.8.871

Centers for Disease Control and Prevention. (2011). Unhealthy sleep-related behaviors — 12 States, 2009. *Morbidity and Mortality Weekly Report, 60*(8), 233–238.

Colten, H. R., & Altevogt, B. M. (2006). Extent and health consequences of chronic sleep loss and sleep disorders. In H. R. Colten & B. M. Altevogt (Eds.), *Sleep disorders and*

sleep deprivation: An unmet public health problem (pp. 55-136). The National Academies Press.

Conners, K., & Staff, M. H. S. (2004). *Conners' Continuous Performance Test (CPT II): Version 5 for Windows. Technical Guide and Software Manual.* Multi-Health Systems Inc.

Corbin, J., & Strauss, A. (2008). *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory* (3rd ed.). Sage. https://dx.doi.org/10.4135/9781452230153

Courtauld, H., Notebaert, L., Milkins, B., Kyle, S. D., & Clarke, P. J. F. (2017). Individuals with clinically significant insomnia symptoms are characterised by a negative sleep-related expectancy bias: Results from a cognitive-experimental assessment. *Behaviour Research and Therapy, 95*, 71-78. https://doi.org/10.1016/j.brat.2017.05.010

Critical Appraisal Skills Programme. (2018a). *CASP Qualitative Study Checklist.* https://casp-uk.net/wp-content/uploads/2018/03/CASP-Qualitative-Checklist-2018_fillable_form.pdf

Critical Appraisal Skills Programme. (2018b). *CASP Case-Control Study Checklist*. https://casp-uk.net/wp-content/uploads/2018/01/CASP-Case-Control-Study-Checklist-2018.pdf

Critical Appraisal Skills Programme. (2018c). *CASP Cohort Study Checklist*. https://casp-uk.b-cdn.net/wp-content/uploads/2018/03/CASP-Cohort-Study-Checklist-2018_fillable_form.pdf

Critical Appraisal Skills Programme. (2020). *CASP Randomised Controlled Trial Standard Checklist.* https://casp-uk.b-cdn.net/wp-content/uploads/2020/10/CASP_RCT_Checklist_PDF_Fillable_Form.pdf

Crowley, S. J., Acebo, C., & Carskadon, M. A. (2007). Sleep, circadian rhythms, and delayed phase in adolescence. *Sleep Medicine, 8*(6), 602-612. https://doi.org/10.1016/j.sleep.2006.12.002

Curcio, G., Ferrara, M., & De Gennaro, L. (2006). Sleep loss, learning capacity and academic performance. *Sleep Medicine Reviews, 10*(5), 323-337. https://doi.org/10.1016/j.smrv.2005.11.001

Dagan, Y., Eisenstein, M. (1999). Circadian rhythm sleep disorders: Toward a more precise definition and diagnosis. *Chronobiology International, 16*(2), 213-222. https://doi.org/10.3109/07420529909019087

Danielsson, K., Markström, A., Broman, J-E., von Knorring, L., & Jansson-Fröjmark, M. (2016). Delayed sleep phase disorder in a Swedish cohort of adolescents and young adults: Prevalence and associated factors. *Chronobiology International, 33*(10), 1331-1339. https://doi.org/10.1080/07420528.2016.1217002

Delis, D. C., Kaplan, E., & Kramer, J. H. (2001). *Delis-Kaplan Executive Function System (D–KEFS).* Pearson.

Downes, M. J., Brennan, M. L., Williams, H. C., & Dean R. S. (2016). Development of a critical appraisal tool to assess the quality of cross-sectional studies (AXIS). *BMJ Open, 6*, Article 011458. https://doi.org/10.1136/bmjopen-2016-011458

Drake, C., Nickel, C., Burduvali, E., Roth, T., Jefferson, C., & Badia, P. (2003). The Pediatric Sleepiness Scale (PDSS): Sleep habits and school outcomes in middle-school children. *Sleep, 26*(4), 455-458. https://doi.org/10.1093/sleep/26.4.455

Elovainio, M., Kuula, L., Halonen, R., & Pesonen, A-K. (2020). Dynamic fluctuations of emotional states in adolescents with delayed sleep phase—A longitudinal network modelling approach. *Journal of Affective Disorders, 276*(9), 467-475**.** https://doi.org/10.1016/j.jad.2020.07.050

Erikson, E. H. (1980). *Identity and the life cycle*. W. W. Norton.

Fahey, C. D., & Zee, P. C. (2008). Circadian rhythm disorders. In H. R. Smith, C. L. Comella, & B. Högl (Eds.), *Sleep Medicine* (pp. 56-77). Cambridge University Press. https://doi.org/10.1017/CBO9780511545085

Fallone, G., Owens, J. A., & Deane, J. (2002). Sleepiness in children and adolescents: Clinical implications. *Sleep Medicine Reviews, 6*(4), 287–306. https://doi.org/10.1053/smrv.2001.0192

Freeman, D., Sheaves, B., Goodwin, G. M., Yu, L., Nickless, A., Harrison, P. J., Emsley, R., Luik, A. I., Foster, R. G., Wadekar, V., Hinds, C., Guley, A., Jones, R., Lightman, S., Jones, S., Bentall, R., Kinderman, P., Rowse, G., Brugha, T., … Epsie, C. A. (2017). The effects of improving sleep on mental health (OASIS): A randomised controlled trial with mediation analysis. *Lancet Psychiatry, 4*(10), 749–58. https://doi.org/10.1016/S2215-0366(17)30328-0

Gangwisch, J. E., Babiss, L. A., Malaspina, D., (2010). Earlier parental set bedtimes as a protective factor against depression and suicidal ideation. *Sleep, 33*(1), 97–106. https://doi.org/10.1093/sleep/33.1.97

Garcia, J., Rosen, G., & Mahowald, M. (2001). Circadian rhythms and circadian rhythm disorders in children and adolescents. *Seminars in Pediatric Neurology, 8*(4), 229-240. https://doi.org/10.1053/spen.2001.29044

Garcia, A. N., & Salloum, I. M. (2015). Polysomnographic sleep disturbances in nicotine, caffeine, alcohol, cocaine, opioid, and cannabis use: A focused review. *The American Journal on Addictions*, *24*(7), 590–598. https://doi.org/10.1111/ajad.12291

Gradisar, M. (2014). Shining a light on delayed sleep phase disorder during adolescence. *InPsych*, *36*(2). https://psychology.org.au/inpsych/2014/april/gradisar

Gradisar, M., & Crowley, S. (2013). Delayed sleep phase disorder in youth. *Current Opinion in Psychiatry, 26*(6), 580–585. https://doi.org/10.1097/YCO.0b013e328365a1d4

Gradisar, M., Dohnt, H., Gardner, G., Paine, S., Starkey, K., Menne, A., Slater, A., Wright, H., Hudson, J. L., Weaver, E., & Trenowden, S. (2011a). A randomized controlled trial of cognitive-behavior therapy plus bright light therapy for adolescent delayed sleep phase disorder. *Sleep, 34*(12), 1671-1680. http://dx.doi.org/10.5665/sleep.1432

Gradisar, M., Gardner, G., & Dohnt, H. (2011b). Recent worldwide sleep patterns and problems during adolescence: A review and meta-analysis of age, region, and sleep. *Sleep Medicine, 12*(2), 110-118. https://doi.org/10.1016/j.sleep.2010.11.008

Gradisar, M., Lack, L., Richards, H. Harris, J., Gallasch, J., Boundy, M., & Johnston, A. (2007). The flinders fatigue scale: Preliminary psychometric properties and clinical sensitivity of a new scale for measuring daytime fatigue associated with insomnia. *Journal of Clinical Sleep Medicine, 3*(7), 722-728. https://doi.org/10.5664/jcsm.27030

Gradisar, M., Terrill, G., Johnston, A., & Douglas, P. (2008). Adolescent sleep and working memory performance. *Sleep and Biological Rhythms, 6*(3), 146–154. http://doi.org/10.1111/j.1479-8425.2008.00353.x

Guy, S. C., Isquith, P. K., & Gioia, G. A. (2004). *Behaviour rating inventory of executive function - self report version.* Psychological Assessment Resources.

Hagell, A. (2012). *Adolescent sleep: AYPH research update no.10*. Association for Young People's Mental Health. https://www.youngpeopleshealth.org.uk/wp-content/uploads/2015/07/Sleep.pdf

Hale, L., Kirschen, G. W., LeBourgeois, M. K., Gradisar, M., Garrison, M. M., Montgomery-Downs, H., Kirschen, H., McHale, S. M., Chang, A-M., Buxton, O. M. (2018). Youth screen media habits and sleep: Sleep-friendly screen-behaviour recommendations for clinicians, educators, and parents. *Child and adolescent psychiatric clinic of North America, 27*(2), 229-245. https://doi.org/10.1016/j.chc.2017.11.014

Hale, L., Li, X., Hartstein, L.E., & LeBourgeois, M. K. (2019). Media use and sleep in teenagers: What do we know? *Current Sleep Medicine Reports, 5*(1), 128–134. https://doi.org/10.1007/s40675-019-00146-x

Harden, A. (2010). *Mixed-Methods Systematic Reviews: Integrating Quantitative and Qualitative Findings. Technical Brief No. 25*. National Center for the Dissemination of Disability Research (NCDDR). https://ktdrr.org/ktlibrary/articles_pubs/ncddrwork/focus/focus25/Focus25.pdf

Iwamitsu, Y., Ozeki, Y., Konishi, M., Murakami, J., Kimura, S., & Okawa, M. (2007). Psychological characteristics and the efficacy of hospitalization treatment on delayed sleep phase syndrome patients with school refusal. *Sleep and Biological Rhythms, 5*(1), 15–22. https://doi.org/10.1111/j.1479-8425.2006.00252.x

Johansson, A. E. E., Petrisko, M. A., & Chasens, E. R. (2016). Adolescent sleep and the impact of technology use before sleep on daytime function. *Journal of Pediatric Nursing, 31*(5), 498-504. https://doi.org/10.1016/j.pedn.2016.04.004

Johns, M. W. (1991). A new method for measuring daytime sleepiness: The Epworth sleepiness scale. *Sleep, 14*(6), 540–545. https://doi.org/10.1093/sleep/14.6.540

Killgore, W. S. S. (2015). Sleep deprivation and behavioural risk-taking. In R. Watson (Ed.), *Modulation of sleep by obesity, diabetes, age and diet* (pp. 279-287). Academic Press. https://doi.org/10.1016/B978-0-12-420168-2.00030-2

Langevin, R. H., Laurent, A., & Sauve, Y. (2014). Preliminary assessment on the effectiveness of the Luminette in adolescents with a delayed sleep phase syndrome (DSPS): Randomized single blind placebo-controlled study. *Medecine du sommeil, 11*(2), 91-97. https://doi.org/10.1016/j.msom.2014.03.003

Lawrence, G., & Muza, R. (2018). Assessing the sleeping habits of patients in a sleep disorder centre: A review of sleep diary accuracy. *Journal of Thoracic Disease, 10*(1), 177–183. https://doi.org/10.21037/jtd.2017.12.127

Lee, Y. J., Cho, S-J., Cho, I. H., & Kim, S. J. (2012). Insufficient sleep and suicidality in adolescents. *Sleep, 35*(4), 455-460. https://doi.org/10.5665/sleep.1722

Lemola, S., Perkinson-Gloor, N., Brand, S., Dewald-Kaufmann, J. F., & Grob, A. (2015). Adolescents' electronic media use at night, sleep disturbance, and depressive symptoms in the smartphone age. *Journal of Youth and Adolescence, 44*(2), 405–18. https://doi.org/10.1007/s10964-014-0176-x

Leu, R., & Rosen, C. L. (2009). Sleep and paediatrics. In H. R. Smith, C. L. Comella, & B. Högl (Eds.), *Sleep Medicine* (pp. 208-223). Cambridge University Press.

Lichstein, K. L., Durrence, H. H., Taylor, D. J., Bush, A. J., & Riedel, B. W. (2003). Quantitative criteria for insomnia. *Behaviour Research and Therapy, 41*(4), 427–445. https://doi.org/10.1016/s0005-7967(02)00023-2

Liu, X. (2004). Sleep and adolescent suicidal behaviour. *Sleep, 27*(7), 1351-1358. https://doi.org/10.1093/sleep/27.7.1351

Liu, X., & Buysse, D. J. (2006). Sleep and youth suicidal behaviour: A neglected field. *Current Opinions in Psychiatry, 19*(3), 288-293. https://doi.org10.1097/01.yco.0000218600.40593.18

Lo, J., Ong, J., Leong, R., Gooley, J., & Chee, M. (2016). Cognitive performance, sleepiness, and mood in partially sleep deprived adolescents: The need for sleep study. *Sleep, 39*(3), 687–698. https://doi.org/10.5665/sleep.5552

Loge, J. H., Ekeberg, O., & Kaasa, S. (1998). Fatigue in the general Norwegian population: Normative data and associations. *Journal of Psychosomatic Research, 45*(1), 53-65. https://doi.org/10.1016/s0022-3999(97)00291-2

Lovato, N., Gradisar, M., Short, M., Dohnt, H., & Micic, G. (2013). Delayed sleep phase disorder in an Australian school-based sample of adolescents. *Journal of Clinical Sleep Medicine, 9*(9), http://dx.doi.org/10.5664/jcsm.2998.

Manber, R., Pardee, R. E., Bootzin, R. R., Kuo, T., Rider, A. M., Rider, S. P., & Bergstrom, L. (1995). Changing sleep patterns in adolescents. *Sleep Research, 24*, 106.

Markt, S. C., Grotta, A., Nyren, O., Adami, H.O., Mucci, L.A., Valdimarsdottir, U. A., Stattin, P., Bellocco, R., & Lagerros, Y. T. (2015). Insufficient sleep and risk of prostate cancer in a large Swedish cohort. *Sleep, 38*(9), 1405–1410. https://doi.org/10.5665/sleep.4978

Meadows, A., & Rehman, A. (2021). *Delayed sleep-wake phase syndrome*. Sleep Foundation. https://www.sleepfoundation.org/delayed-sleep-wake-phase-syndrome

Meltzer, L. J., Phillips, C., & Mindell, J. A. (2009). Clinical psychology training in sleep and sleep disorders. *Journal of Clinical Psychology, 65*(3), 305-318. https://doi.org/10.1002/jclp.20545

Micic, G., Richardson, C., Cain, N., Reynolds, C., Bartel, K., Maddock, B., & Gradisar, M. (2019). Readiness to change and commitment as predictors of therapy compliance in adolescents with delayed sleep-wake phase disorder. *Sleep Medicine, 55*, 48-55. https://doi.org/10.1016/j.sleep.2018.12.002

Minges, K. E., & Redeker, N. S. (2016). Delayed school start times and adolescent sleep: A systematic review of the experimental evidence. *Sleep, 28*, 86-95. https://doi.org/10.1016/j.smrv.2015.06.002

Minkel, J. D., Banks, S., Htaik, O., Moreta, M. C., Jones, C. W., McGlinchey, E. L., Simpson, N. S., & Dinges, D. F. (2012). Sleep deprivation and stressors: Evidence for elevated negative affect in response to mild stressors when sleep deprived. *Emotion, 12*(5), 1015–1020. https://doi.org/10.1037/a0026871

Montie, K., Quaedackers, L., Perlitius, V., van der Horst, E., Vandenbussche, N., Overeem, S., & Pillen, S. (2019). The impact of delayed sleep phase disorder on adolescents and their family. *Sleep Medicine, 64*, 15-22. https://doi.org/10.1016/j.sleep.2019.05.022

Moore, M. & Meltzer, L. J., (2008). The sleepy adolescent: Causes and consequences of sleepiness in teens. *Paediatric Respiratory Review, 9*(2), 114-120. https://doi.org/10.1016/j.prrv.2008.01.001

Moreno-Galarraga, L., & Katz, E. S. (2019). Delayed sleep phase syndrome: A common sleep disorder in adolescents with important quality of life repercussions. *Atencion Primaria, 51*(6), 387-388. https://doi.org/10.1016/j.aprim.2019.01.009

Moturi, S., & Avis, K. (2010). Assessment and treatment of common pediatric sleep disorders. *Psychiatry (Edgmont), 7*(6), 24-37.

Nesbitt, A. D. (2018). Delayed sleep-wake phase disorder. *Journal of Thoracic Disorders, 10*(1), 103-111. https://doi.org/10.21037/jtd.2018.01.11

Pacheco, D., & Rehman, A. (2021). *Chronotypes.* The Sleep Foundation. https://www.sleepfoundation.org/how-sleep-works/chronotypes

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hrobjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S.,… Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *British Medical Journal, 372*(71), 1-9. http://doi.org/10.1136/bmj.n71

Pallesen, S., Nordhus, I. H., Omvik, S., Sivertsen, B., Tell, G. S., & Bjorvatn, B. (2007). Prevalence and risk factors of subjective sleepiness in the general adult population. *Sleep, 30*(5), 619-624. https://doi.org/10.1093/sleep/30.5.619

Perry, G. S., Patil, S. P., & Presley-Cantrell, L. R. (2013). Raising awareness of sleep as a healthy behaviour. *Preventing Chronic Disease: Public Health Research, 10,* 1-4. https://doi.org/10.5888/pcd10.130081

Preckel, F., Lipnevich, A. A., Schneider, S., & Roberts, R. D. (2011). Chronotype, cognitive abilities, and academic achievement: A meta-analytic investigation. *Learning and Individual Differences, 21*(5), 483–492. https://doiorg/10.1016/j.lindif.2011.07.003

Radloff, L. S. (1997). The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1*(3), 385-401. https://doi.org/10.1177/014662167700100306

Reutrakul, S., & Van Cauter, E. (2018). Sleep influences on obesity, insulin resistance, and risk of type 2 diabetes. *Metabolism, 84*, 56–86. https://doi.org/10.1016/j.metabol.2018.02.010

Richardson, C., & Gradisar, M. (2021). Depressed mood and repetitive negative thinking in delayed sleep–wake phase disorder: Treatment effects and a comparison with good sleepers. *Journal of Sleep Research, 31,* Article 13452. https://doi.org/10.1111/jsr.13452

Richardson, C., Micic, G., Cain, N., Bartel, K., Maddock, B., & Gradisar, M. (2018a). Cognitive performance in adolescents with delayed sleep-wake phase disorder: Treatment effects and a comparison with good sleepers. *Journal of Adolescence, 65*, 72-84. https://doi.org/10.1016/j.adolescence.2018.03.002

Richardson, C., Cain, N., Bartel, K., Micic, G., Maddock, B., & Gradisar, M. (2018b). A randomised controlled trial of bright light therapy and morning activity for adolescents and young adults with delayed sleep-wake phase disorder. *Sleep Medicine, 45,* 114-123. https://doi.org/10.1016/j.sleep.2018.02.001

Rosenzweig, S., & Rosenzweig, L. (1976). Guide to research on the Rosenzweig picture-frustration (P-F) study, 1934–1974. *Journal of Personality Assessment, 40*(6), 599–606. https://doi.org/10.1207/s15327752jpa4006_7

Roth, R. M., Isquith, P. K., & Gioia, G. A. (2005). *Behavior Rating Inventory of Executive Function-Adult Version (BRIEF-A)*. Psychological Assessment Resources.

Sawyer, S. M., Azzopardi, P. S., Wickremarathne, D., & Patton, G. C. (2018). The age of adolescence. *The Lancet Child and Adolescent Health, 2*(3), 223-228 http://doi.org/10.1016/S2352-4642(18)30022-1

Saxvig, I. W., Pallesen, S., Wilhelmsen-Langeland, A., Molde, H., & Bjorvatn, B., (2012). Prevalence and correlates of delayed sleep phase in high school students. *Sleep Medicine, 13*(2), 193-199. https://doi.org/10.1016/j.sleep.2011.10.024

Saxvig, I. W., Wilhelmsen-Langeland, A., Pallesen, S., Nordhus, I. H., Vedaa, Ø., & Bjorvatn, B. (2019) Habitual sleep, social jetlag, and reaction time in youths with delayed sleep–wake phase disorder. A case–control study. *Frontiers in Psychology, 10*, 1-10. https://doi.org/10.3389/fpsyg.2019.02569

Sheehan, D., Harnett-Sheehan, K., & Raj, B. (1996). The measurement of disability. *International Clinical Psychopharmacology, 11*(3), 89–95. https://doi.org/10.1097/00004850-199606003-00015

Short, M., Gradisar, M., Wright, H., Lack, L. C., Dohnt, H., & Carskadon, M. A. (2011). Time for bed: Parent-set bedtimes associated with improved sleep and daytime functioning in adolescents. *Sleep, 34*(6), 797-800. https://doi.org/10.5665/SLEEP.1052

Siegel, J. M. (2005). Clues to the function of mammalian sleep. *Nature, 437*(7063), 1264–1271. https://doi.org/10.1038/nature04285

Sivertsen, B., Pallesen, S., Stormark, K. M., Bøe, T., Lundervold, A. J., & Hysing, M. (2013). Delayed sleep phase syndrome in adolescents: Prevalence and correlates in a large

population based study. *BMC Public Health, 13,* Article 1163. https://doi.org/10.1186/1471-2458-13-1163

Smaldone, A., Honig, J. C., & Bryrne, M. W. (2007). Sleepless in America: Inadequate sleep and relationships to health and well-being of our nation's children. *Pediatrics, 119*(1), 29–37. https://doi.org/10.1542/peds.2006-2089F

Sprecher, K. E., Koscik, R. L., Carlsson, C. M., Zetterberg, H., Blennow, K., Okonkowo, O. C., Sager, M. A., Asthana, S., Johnson, S. C., Benca, R. M., & Bendlin, B. B. (2017). Poor sleep is associated with CSF biomarkers of amyloid pathology in cognitively normal adults. *Neurology, 89*(5), 445-453. https://doi.org/10.1212/WNL.0000000000004171

Stampi, C., Stone, P., & Michimori, A. (1995). A new quantitative method for assessing sleepiness: The alpha attenuation test. *Work Stress, 9*(2-3), 368-376. https://doi.org/10.1080/02678379508256574

Suni E., & Dimitriu, A. (2020). *Mental Health and Sleep.* The Sleep Foundation. https://www.sleepfoundation.org/mental-health

Suni E., & Dimitriu, A. (2022). *Teens and Sleep.* The Sleep Foundation. https://www.sleepfoundation.org/teens-and-sleep

The American Academy of Paediatrics. (2014). School start times for adolescents. *Pediatrics, 134*(3), 642-649. https://doi.org/10.1542/peds.2014-1697

Vaca, F. (2005). National Highway Traffic Safety Administration notes: Drowsy driving. *Annals of Emergency Medicine, 45*(4), 433–434. https://doi.org/10.1016/j.annemergmed.2005.01.015

Walker, M. (2018). *Why we sleep: The new science of sleep and dreams.* Penguin.

Wang, X., & Cheng, Z. (2020). Cross-sectional studies strengths, weaknesses, and recommendations. *Chest, 158*(1), 65-71. https://doi.org/10.1016/j.chest.2020.03.012

Weaver, M. D., Barger, L. K., Malone, S. K., Anderson, L. S., & Klerman, E. B. (2018). Dose-dependent associations between sleep duration and unsafe behaviours among US high school students. *JAMA Pediatrics, 172*(12), 1187-1189. https://doi.org/10.1001/jamapediatrics.2018.2777

Wechsler, D. (1997). *Wechsler Adult Intelligence Scale: Administration and Scoring Manual (3rd ed.).* The Psychological Corporation.

Weitzman, E. D., Czeisler, C. A., Coleman, R. M., Spielman, A. J., Zimmerman, J. C., Dement, W., Richardson, G., & Pollak, C. P. (1981). Delayed sleep phase syndrome: A chronobiological disorder with sleep-onset insomnia. *Archives of General Psychiatry 38*(7), 737-746. https://doi.org/10.1001/archpsyc.1981.01780320017001

Wheaton, A. G., O'Malley Olsen, E., Miller, G. F., & Croft, J. B. (2016). Sleep duration and injury-related risk behaviour among high school students – United States, 2007-2013. *Morbidity and Mortality Weekly Report, 65*(13), 337-341. https://doi.org/10.15585/mmwr.mm6513a1

Wilhelmsen-Langeland, A., Saxvig, I. W., Johnsen, E. H., Marszalek, M. A., Anderson, M. I. I., Sætre, V. K., Lundervold, A. J., Vedaa, Ø., Nordhus, I. H., Pallesen, S., & Bjorvatn, B. (2019). Patients with delayed sleep-wake phase disorder show poorer executive functions compared to good sleepers. *Sleep Medicine, 54*, 244-249. https://doi.org/10.1016/j.sleep.2018.10.035

Wilhelmsen-Langeland, A., Saxvig, I. W., Pallesen, S., Nordhus, I-H., Vedaa, Ø., Lundervold, A. J., & Bjorvatn, B. (2013). A randomized controlled trial with bright light and melatonin for the treatment of delayed sleep phase disorder: Effects on subjective and objective sleepiness and cognitive function. *Journal of Biological Rhythms, 28*(5), 306-321. https://doi.org/10.1177/0748730413500126

Wilhelmsen-Langeland, A., Dundas, I., Saxvig, I. W., Pallesen, S., Nordhus, I-H., Bjorvatn, B. (2012). Psychosocial challenges related to delayed sleep phase disorder. *The Open Sleep Journal, 5*(1), 51-58. https://doi.org/10.2174/1874620901205010051

Wilkinson, P. O., Croudace, T. J., & Goodyer, I. M. (2013). Rumination, anxiety, depressive symptoms and subsequent depression in adolescents at risk for psychopathology: A longitudinal cohort study. *BMC Psychiatry, 13,* Article 250. https://doi.org/10.1186/1471-244X-13-250

Wolfson, A. R., Carskadon, M. A., Acebo, C., Seifer, R., Fallone, G., Labyak, S. E., & Martin, J. L. (2003). Evidence for the validity of a sleep habits survey for adolescents. *Sleep, 26(*2), 213-6. https://doi.org/10.1093/sleep/26.2.213

World Health Organization. (2014). *Adolescence: A period needing special attention. Health for the World's adolescents report.* http://apps.who.int/adolescent/second-decade/section2/page1/recognizing -adolescence.html

Worley, S. L. (2018). The extraordinary importance of sleep: The detrimental effects of inadequate sleep on health and public safety drive an explosion of sleep research. *Pharmacy and Therapeutics, 43*(12), 758-763.

Zielinski, M. R., McKenna, J. T., & McCarley, R. W. (2016). Functions and mechanisms of sleep. *AIMS Neuroscience, 3*(1), 67-104. https://doi.org/10.3934/Neuroscience.2016.1.67

Zigmond, A. S., & Snaith, R. P. (1983). The hospital anxiety and depression scale. *Acta Psychiatrica Scandinavica, 67*(6), 361–370. https://doi.org/10.1111/j.1600-0447.1983.tb09716.x

EMILY PERRY BSc Hons MSc

MAJOR RESEARCH PROJECT

Section B: A grounded theory of how the covid-19 pandemic has affected, and continues to affect, the sleep of adolescents.

Word count: 7955 (270)

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Salomons Institute

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To protect anonymity all identifying information has been removed.

Abstract

In March 2020, the World Health Organisation declared the covid-19 virus a global pandemic. Research found that this unprecedented event impacted on the health and wellbeing of adolescents and caused significant sleep disturbance for many, with suggestions that these problems may continue to affect adolescents in the longer term. Due to the novelty of this situation, no theory had yet been developed to suggest how sleep problems may be maintained. A grounded theory analysis was utilised to explore the sleep experiences of adolescents at this time and to propose a theory of how sleep problems may continue to affect adolescents beyond the pandemic itself. The data consisted of eleven interviews with adolescents who had experienced a change in their sleep since the start of the pandemic, which had continued to persist. The resulting theory suggests that the coping strategies employed by adolescents during the pandemic, to manage the dramatic changes to their everyday lives, had a detrimental impact on their sleep. In turn, the processes by which sleep disturbance was managed in the longer term and the adolescent's ability and motivation to cope with continued stressors, affected recovery of their sleep. Limitations, and research and practice implications are discussed.

Keywords: Covid-19, pandemic, sleep, adolescents

Introduction

Sleep and sleep regulation

Sleep is a basic physiological need (Maslow, 1943) that recharges our body and mind (Pacheco & Singh, 2021) and is essential for our physical, intellectual, emotional and behavioural development. Our sleep cycle is regulated by two biological processes, described by the two process model of sleep regulation (Borbély, 1982); the sleep and wake homeostatic process (Process S) and the circadian pacemaker process (Process C). Process S reflects our need to sleep the longer we are awake (Hagell, 2012) and Process C acts as a 'gatekeeper' for sleep, based on signals from the environment, such as light (Hagell, 2012). These two processes are often disrupted in modern day life, due to work and lifestyle factors (Colten & Altevogt, 2006), such as shift work or drinking caffeine or alcohol, which can have a detrimental impact on our health and wellbeing (Pacheco & Singh, 2022; Pacheco & Rehman, 2020).

Sleep in the adolescent years

According to the National Sleep Foundation, adolescents need approximately eight to ten hours of sleep a night (Suni & Dimitriu, 2022). However, a 2013 survey found that nearly 69% of adolescents did not obtain this amount (Suni & Dimitriu 2022). This is often in relation to them tending to stay up late, whilst still having to meet societal demands, such as waking for school or work (Hagenauer et al., 2009). The impulse to stay up late is also considered to be a result of teens sleep drive (Process S) building more slowly, resulting in them not feeling tired until later in the evening, and the body waiting longer to produce melatonin, a hormone that promotes sleep (Suni & Dimitriu, 2022). As a result, adolescents often experience a shift in their circadian rhythm, leading to a preference for later sleep and wake times.

In addition to biological changes, adolescents experience an increase in academic demands and extracurricular activities, shifting peer and family relationships, and a pressure to join a social media world. They also reach a transition stage where they seek to establish independence (Erikson, 1968), which may come with less parental influence over their sleep (Carskadon, 1990). Insufficient sleep can have negative consequences on the adolescent's physical and emotional wellbeing as well as their behaviour and academic performance (Curcio et al., 2006; Fallone et al., 2002).

Cognitive behavioural theory

As previously stated, in response to changes in Process S, adolescents often choose to stay up late due to feeling less tired until later in the evening. This biological process can influence particular mental processes which can be viewed through the lens of cognitive behavioural theory, where it is understood that our thoughts, feelings, behaviours, and physiological states all play a role in one's sleep. Through this lens, ruminating on sleep loss and the implications of persistent sleep difficulties plays a role in maintaining these difficulties (Edinger et al., 2001; Morin et al., 2002). For example, worrying about sleep loss may lead to excessive time in bed trying to fall asleep, which leads to frustration, ultimately making it harder to fall asleep (Alfano et al., 2009). In addition, depression, anxiety and stress, along with concomitant cognitive thinking errors and control beliefs, have been found to be associated with sleep problems among adolescents (Alfano et al., 2009; Sadeh & Gruber, 2009). Sleep may also be determined by behavioural choices (Carskadon, 2009), with adolescents perhaps seeing sleep as something that is preventing them from doing the things they want to do. For example, adolescents may be less motivated to prioritise sleep, particularly if they feel less tired, due to the importance they place on other activities, such as socialising with friends (Carskadon, 2009).

The cognitive behavioural model is currently the gold-standard model for treating sleep disorders, particularly insomnia, and explores the link between one's thoughts, feelings and behaviours, and ability to sleep. To assist with this, the 3P model of insomnia (Spielman et al., 1987) provides a helpful framework to consider how predisposing, precipitating and perpetuating factors collectively contribute to the development and maintenance of chronic insomnia. Although this model focuses on insomnia, it is also applicable for understanding the interacting factors that play a role in sleep problems more generally.

Why should Clinical Psychologists worry about adolescent's sleep?

Sleep difficulties are a biopsychosocial problem. Not only are they associated with physical health problems (Bal et al., 2018), but they are also associated with psychological and social wellbeing. An increasing number of research studies have highlighted a bidirectional relationship between impaired behavioural and emotional functioning and poor sleep (Alfano & Gamble, 2009), with sleep restriction resulting in an increase in daytime sleepiness and poorer academic performance (Fuligni et al., 2018; Short et al., 2013; Wheaton et al., 2016), symptoms of panic, anxiety, low mood, low self-esteem, and a reduced quality of life (Dinges et al., 1997; Fredriksen et al. 2004; Lyall et al., 2018; Roy-Byrne et al., 1986). Young people who are sleep deprived have also been found to respond poorly to low stress (Minkel et al., 2012) and experience more problems in their peer relationships (Roberts, et al., 2002), often leading to a feeling of loneliness (Simon & Walker, 2018; Xu et al. 2012). At the more extreme end, sleep deprivation has been associated with motor vehicle accidents (Hansen et al., 2017), suicidal ideation and suicide attempts (Lee et al., 2012; Liu, 2004; Roane & Taylor, 2008).

Clearly, sleep problems in the adolescent years are a problem, and the interwoven nature of sleep problems and biopsychosocial challenges suggests that sleep problems are

likely to be prominent in mental health services (Higson-Sweeney et al., 2020). As sleep problems have been found to be associated with poorer outcomes after treatment and are likely to remain a residual symptom (McGlinchey et al., 2017), it is imperative to properly assess and treat sleep disturbances in adolescents when they present to mental health services.

In addition, the British Psychological Society note that promoting regular sleep patterns for children, among other factors, is likely to promote resilience (Evans et al., 2018). A study of 1503 French young adults assessed the long term impact of sleep problems, finding that those that experience sleep problems in early life are more likely to exhibit internalising symptoms in adulthood (Touchette et al., 2012). Evidently, supporting young people with sleep disturbance is vital in buffering against future mental health conditions.

One thing to consider, however, is the adolescent's motivation to change. As posited by the transtheoretical model of change (Prochaska & Velicer, 1997), an individual goes through six stages of change: precontemplation, contemplation, preparation, action, maintenance and termination. It is in the contemplation phase where motivation to change is likely to appear and, therefore, would be important to consider in an assessment.

Sleeping during a pandemic

In early 2020, the World Health Organisation declared a global pandemic. The coronavirus disease 2019 (covid-19) reached the UK around this time, which unbeknownst to many at the time, would alter daily life across the globe. The pandemic created a feeling of unsafe uncertainty (Mason, 2015) for everyone worldwide and to mitigate the spread of the virus, restrictions were brought into place, including restrictions on leaving the house and attending work and school. This affected our social interactions, our work and family lives and took both a physical and emotional toll. Considering that stress and stressful life events have been linked to sleep disturbance (Sadeh & Gruber, 2009; Voellmin et al., 2014), it was

unsurprising that the pandemic caused many to experience problems with their sleep; a global pooled estimate of 40% (Jahrami et al. 2021).

This period created a number of losses for adolescents too, including their social interactions, schooling, and extracurricular activities, as well as creating uncertainty about their futures (Office for National Statistics, 2020). Adolescents were also expected to remain in close proximity to their caregivers at a time when, developmentally, they are prioritising autonomy (Erikson, 1968). Challenges in family relationships and feelings of loneliness and disconnect would have been unsurprising consequences of this. These factors alongside reduced physical activity and napping behaviours had the potential to impact on adolescents sleep duration, sleep quality and choice of bedtimes and were likely to be directly or indirectly affecting their sleep (Sharma et al., 2021).

Recognising the significance of sleep difficulties, research into sleep during Covid-19 was fast growing. In the initial stages, Gruber et al. (2020), found that adolescent's sleep actually improved as they were able to sleep two hours later than their regular school times, resulting in an increase in sleep duration and less daytime sleepiness. They were spending more time on electronic devices and bedtimes became later. As habit formation theory highlights, the more we repeat a behaviour in a particular context, the more the association between the behaviour and context is reinforced, with this association becoming less of a conscious process (Gardner & Rebar, 2019). With this in mind, it is possible, for example, that later sleep times and use of technology before bed became habits.

It was clear that at some point, societal demands were likely to return, and questions were placed on how this would impact on young people's sleep, with a survey suggesting early warning signs for a long-term impact on sleep (The Sleep Council, 2020). Becker and Gregory (2020) highlighted the importance of assessing sleep problems and psychopathology

following the COVID-19 pandemic to disentangle the emergence, exacerbation, and interrelations among these difficulties. Questions that have arisen from this period include which domains of sleep are most clearly impacted on, are changes to sleep temporary and will changes in sleep persist when the initial threat of Covid-19 has diminished. Due to this project taking place during the aftermath of the initial threat of Covid-19, but still within the first 1-2 years following its arrival, we are in a unique position to investigate the longer-term impact on adolescent's sleep.

The current study

We have found ourselves in an unprecedented situation and there is not currently a model specific to understanding sleep problems during a pandemic. Additionally, the longer-term impact of COVID-19 is not yet known. For professionals working with adolescents in the aftermath of the pandemic, a framework for understanding this phenomenon is critical to provide the most effective and timely support in relation to adolescents' sleep. Such examination of this phenomenon may help to inform recommendations for supporting adolescents with their sleep. Given recent calls for both a behavioural and public health response (Kaslow et al., 2020), this research seems timely. The current study, therefore, aims to examine sleep difficulties during the pandemic, and propose a theoretical model to firstly understand how adolescents experience of the pandemic impacted negatively on their sleep, and secondly, to understand the factors that may be causing continued sleep disturbance.

Method

Research Design

Qualitative research understanding adolescents' experience of their sleep is scarce. However, it allows an individual's inner experience to be explored (Corbin & Strauss, 2015), privileging the individual's voice and adding richness to our understanding of sleep. Also,

this methodology is suitable when researching areas about which knowledge is in its infancy (Stern, 1980).

A qualitative grounded theory analysis was considered the most appropriate research design to address the study aims and allowed for the construction of a theory grounded in the data. Taking a critical realist epistemological position, Corbin and Strauss's (2015) method to grounded theory was adopted. This epistemological approach aligned with mine and my supervisor's view that even though real events occur, individuals have their own experiences that influence the meaning they attribute to the event. With this in mind, from the realist perspective, I accept that participants are telling their subjective reality at the time as they know it. Additionally, this position understands that some constructs exist independently from the researcher but can be observed and that both social structures and agency are real (Fryer, 2020). It also aims to produce a theory that is relevant to the situation and able to guide action and practice.

Service-user consultation

Prior to data collection, two adolescents were approached to consult on the accessibility of the information sheets, website and advert, and were asked for feedback on the interview guide. This resulted in some minor amendments.

Recruitment

Although grounded theory adopts a theoretical sampling approach, due to the potentially sparse pool from which to recruit and, therefore, the challenges of this form of sampling, this study recruited participants using partly purposive and partly opportunistic sampling. Due to this, the study is considered to adopt a 'modified' grounded theory approach. However, theoretical sampling occurred in terms of modifying the interview questions based on the emerging theory.

Participants were recruited via social media and schools and were provided with accessible information via the study website (https://ep4093.wixsite.com/teensleepstudy). The study advert (Appendix F) was posted to the researchers own Facebook profile and on specific groups that would reach the target population. Several local schools were contacted by email (Appendix G) to ask for their support in circulating the project advert.

If a young person expressed their interest, they were provided with a more detailed information sheet (Appendix H) and asked to complete a screening form to confirm they met the eligibility criteria (see Table 1). Sampling continued until enough meaningful information had been collected to achieve a sufficient depth of understanding for a theory to emerge, what Dey (1993) called 'theoretical sufficiency'. To reach theoretical sufficiency, recruitment continued until the researcher felt confident that the information obtained provided a 'good enough' understanding of the young people's experiences and when new information was beginning to slow.

Table 1

Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
- Participants must be between 11 and 18 years old, as these young people were typically experiencing disruption to their school routine	- Participants that were under 11 years or older than 18 years
- Residing in the UK	- Residing outside the UK
- Participants to have recognised a change in their sleep (quality and/or quantity) since the introduction of the first UK lockdown (March 2020).	- A physical health condition that may account for the change in their sleep.
- Persisting problems with sleep	

Participants

Eleven participants were included in the study and were given pseudonyms to protect anonymity. Participant demographics can be viewed in Table 2.

Table 2

Participant demographics

Pseudonym	Gender	Ethnicity	Age	School Year
Lucy	Female	White British	16	12
Katie	Female	White British	13	8
Melissa	Female	White/Chinese	14	9
Charlie	Male	British Indian	18	13
Faye	Female	White Other	15	9
Sarah	Female	Black African	13	8
Gemma	Female	Mixed	17	13
Nathan	Male	British Indian	17	13
Jess	Female	White British	13	9
Annie	Female	White British	14	10
George	Male	White British	16	12 (not currently attending school)

Data collection procedure

Semi-structured interviews, lasting 30-60 minutes, were conducted via Zoom (a GDPR compliant video call platform). An interview guide (Appendix I) was adopted to provide talking points and prompts to the participants and to help them to discuss experiences relevant to the research aims (Urquhart, 2013). Minor adaptations were made to the interview guide during the course of the research based on emerging themes, in line with the grounded theory approach. Interviews were audio recorded and transcribed verbatim.

Data analysis

Data collection and data analysis occurred simultaneously, as considered best practice (Urquhart, 2013). Table 3 outlines the process of analysis, taking an inductive bottom-up approach (concepts arise from the data). Rather than this being a step wise analysis, the method of constant comparison (Glaser & Strauss, 1967) was utilised.

Table 3

Stages of analysis based on Corbin & Strauss (2015) grounded theory approach

Stage of analysis	Explanation
Familiarisation	Transcripts were read a few times to encourage familiarisation
Open coding (see Appendix J for an example)	Line-by-line coding of the transcripts to minimise the possibility of missing important categories and gaining new insights (Urquhart, 2013).
Axial coding	The process of relating codes to each other
Selective coding (see Appendix K for an example)	Choosing a core category and relating other categories to it

Throughout the analysis, memos (Appendix L) and diagrams (Appendix M) were used to help with the development of codes and categories that were grounded in the data.

Ethical Considerations

Ethical approval was received from the Salomon's ethics committee (Appendix N) and a summary of the findings were provided to the ethics committee and participants (Appendix O) on completion of the study.

Informed consent

Following guidance from the NHS Health Research Authority (2021), adolescents over the age of 16 were presumed capable of providing consent for their participation. For adolescents under the age of 16, parental consent was sought in addition to child assent (see Appendix P for consent forms). At the start of the interviews, participants understanding of the study was reviewed and any outstanding questions were answered. The participant was made aware that they were able to stop the interview at any point should they wish, and that they had the right to withdraw at any stage, up until their recording had been transcribed and analysed.

Confidentiality and anonymity

All data was anonymised, with each participant being allocated a unique ID throughout the process of data collection and a pseudonym in the write up of the research. Demographic information was kept separately from interview transcripts and recordings were stored on a password encrypted USB and deleted once transcribed.

Potential harm

Participants were made aware prior to participation that should the researcher become concerned about their safety or the safety of another, the researcher would need to escalate this to their supervisor and to the participants' parent. All participants, including any consenting parents, received a debrief email (Appendix Q) signposting them to local services should they need further support.

Quality assurance

At each stage of the research, continuous reflexivity was encouraged by utilising particular processes to assure the quality of the research (Corbin & Strauss, 2015; Yardley, 2000). A research diary documented the research process and kept track of any emotional

responses and thoughts along the way (Appendix R). A bracketing interview was conducted with a peer ahead of data collection to bring awareness to any preconceptions or biases I was bringing, particularly as I was coming with some knowledge of the current research, which Corbin and Strauss (2015) recognised as unavoidable. Additionally, having my own experience of living through the pandemic meant I held my own assumptions which may have altered my understanding of others' experience. Recognising this helped me to be more aware of, and put aside, these biases (Tufford & Newman, 2012, Creswell & Miller, 2000) by asking open-ended questions and avoiding trying to confirm my hypotheses.

During the analysis phase a peer was consulted to code a section of an interview transcript to attend to any disparities in coding (Elliott et al., 1999). I also made use of memos to document the coding process and to start making connections, highlighting areas for further exploration. Finally, supervision provided the opportunity to review coding, discuss developing ideas and review the overall process.

Results

During the course of the analysis, four main categories emerged, and the results present a grounded theory of how adolescents sleep disturbances precipitated and have been perpetuated in the context of the pandemic. These were: "initial response to an unprecedented event", "dramatic changes to everyday life", "lost control over sleep" and "getting back on track". Together these categories encompassed fifteen subcategories (Table 4). Figure 1 illustrates the model, highlighting the interactions between categories and the multifaceted nature of the participants experiences. Each category is explained in more detail below, including interview quotations for illustrative purposes.

Table 4

List of categories and subcategories

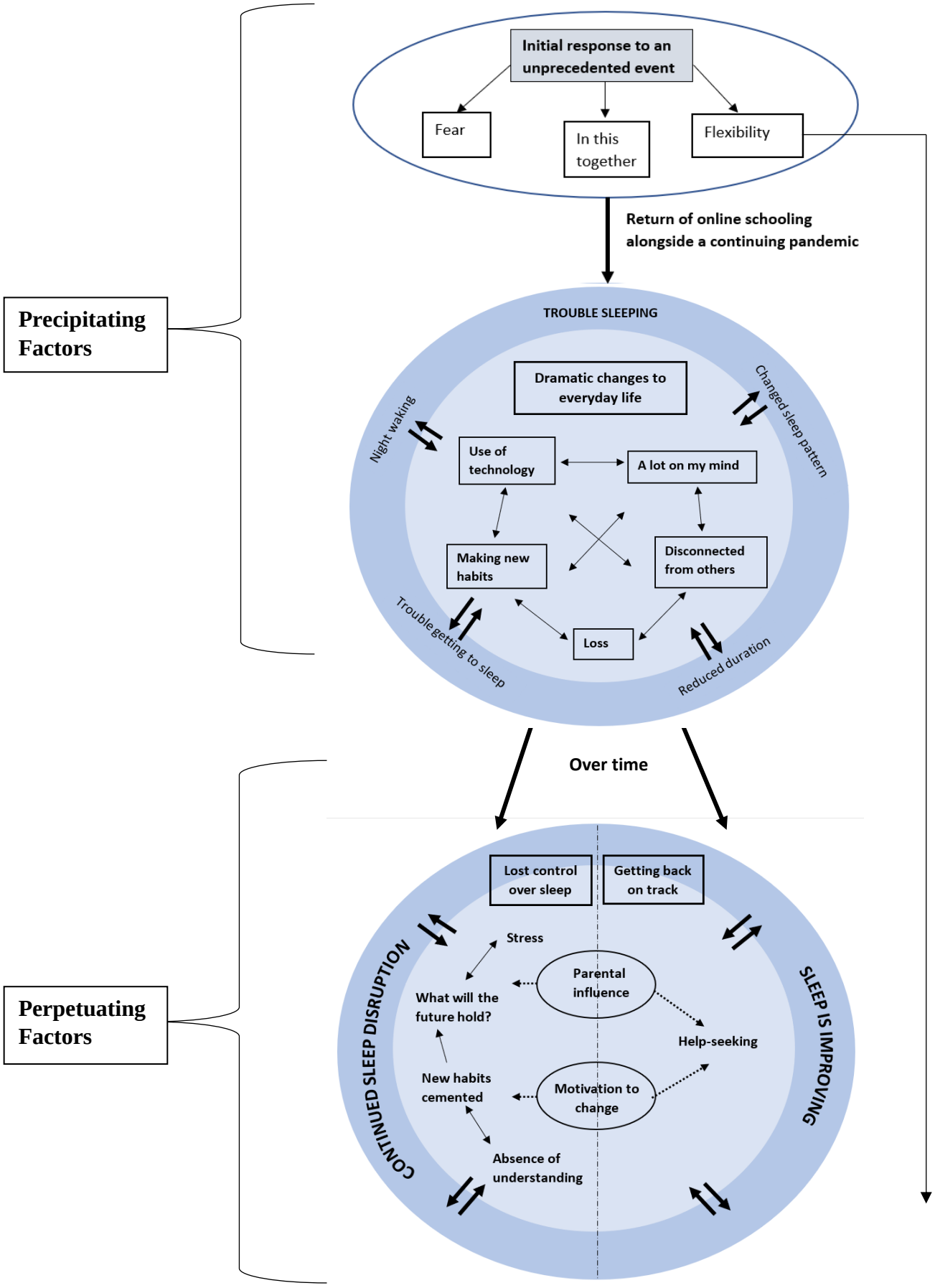
Categories	**Subcategories**
1. Initial response to an unprecedented event	We are in this together Fear Flexibility
2. Dramatic changes to everyday life	Loss A lot on my mind Disconnected from others Use of technology Making new habits
3. Lost control over sleep	Absence of understanding What will the future hold? New habits cemented Stress ***Mediating subcategories*** Motivation to change Parental influence
4. Getting back on track	Help-seeking

The model depicts the participants experience of sleep during the pandemic. In the initial stage, normal life changed suddenly, bringing fear and uncertainty, but also allowed for considerable flexibility in sleep routines. However, when school returned this initial flexibility became problematic. Continued feeling of disconnect meant adolescents turned to social media and other forms of technology to maintain friendships. This increase in technology use delayed sleep times and new sleep habits were created. Additionally adolescents had a lot on their minds which affected their ability to sleep. As time went on, some adolescents found that their sleep troubles perpetuated, and some found their sleep was improving. The model depicts how uncertainty about what the future may hold and an increase in stress led to extended bedtimes. Also, the extended length of time appeared to cement problematic sleep habits. Motivation to change and parental influence were mediating factors, with the importance that was placed on school and parental responses to their child's

sleep appearing to influence whether sleep problems continued or improved. The more motivated to change the adolescent was, the more likely they were to want to seek help with their sleep.

Figure 1

Grounded theory model of how the covid-19 pandemic has affected, and continues to affect, the sleep of adolescents



Category 1: Initial response to an unprecedented event

This category describes participants' initial responses to the pandemic. This was in early spring 2020, when the UK went in to its first lockdown and schools were closed. This category gives some context which sets up how the participants responded and adapted to the pandemic as time went on.

Subcategory 1: We are in this together

Several participants spoke about the positives of the pandemic being a collective experience, understanding that we were navigating a complex situation together. This created a "community sense with everyone clapping for the NHS and everything" (Faye). Participants felt that "the good thing was that we all went through it together… it was a learning thing" (Charlie). For many participants, however, this did not negate the fear and uncertainty that came with such a novel situation.

Subcategory 2: Fear

Some participants said they "would never have expected something like this to happen" (Melissa) and were "quite worried and anxious about it" (Jess). They found the loss of freedom hard and were uncertain about what might happen, particularly if loved ones became unwell:

> I remember when schools first closed, I think that was the first hit for me when I went, 'god this is serious'… when we were alone just with families and stuff, I think it just… I felt a weight on my shoulders…I have lots of elderly grandparents that might be affected from this (Lucy).

Subcategory 3: Flexibility

Many participants suited the flexibility of not attending school online or in person (Melissa, Annie, George, Nathan, Jess). They felt that it gave them more time to relax and allowed them to sleep when the wanted to, perhaps slipping into their natural sleep patterns:

> I definitely slept in a lot later, because for my school we didn't have to wake up for Zoom meetings, so we could just do the work in our own time... I'd sometimes find myself sleeping from, like 1am-12pm, or maybe even 2pm sometimes, but I also found that I was a lot happier and less stressed (Melissa).

The increased flexibility appeared to be somewhat of a novelty at the beginning of the pandemic, however, as time went on and flexibility of schedules fluctuated in line with restrictions, this flexibility appeared to get in the way of re-establishing a sleep routine.

Category 2: Dramatic changes to everyday life

This category describes the period from when schooling resumed but was delivered online. Participants were expected to meet the demands of attending school alongside a continuing pandemic, which resulted in variations in personal freedoms and contact with others. Sleep problems described by participants included night-time waking, having trouble getting to sleep and a shorter sleep duration. For one participant in particular, things got so bad that he had to take a year out of school (George).

As Corbin and Strauss highlighted, "there are no simple explanations that can be given for why events occur. Rather, events are the result of multiple factors coming together and interacting in complex and often unanticipated ways" (Corbin & Strauss, 2015; p. 28). This is true for the factors leading to sleep troubles during the pandemic, with interlinking subcategories. The disconnect from others and loss of activities and freedom meant that a lot of adolescents turned to social media and other forms of technology to stay connected and to keep themselves entertained. Although helpful in some ways, it meant that adolescents stayed up using technology until later into the night, which led to the development of new habits, which in turn, were enabled due to the loss of activities and socialising opportunities. The feeling of loss and increased use of technology contributed to adolescents having a lot on

their mind, worrying about a lot of things in relation to the impact of the pandemic, meaning that they found it harder to get to sleep.

Subcategory 1: Loss

All participants spoke about loss. This included loss of activities, loss of freedom and a loss of motivation for schoolwork. Some even expressed feeling 'robbed' of the 'fun years' (Melissa, Sarah, Katie). Some participants felt they were "generally less happier than before" (Nathan) and felt there was nowhere to go to avoid household tension (Lucy, Gemma, Nathan). Not having anything to do in the day also meant for some participants that they had "all this energy that [they hadn't] used by the time it's night-time, which is why [they] stay up for so long" (Melissa).

This left many of the participants feeling low in mood, in turn impacting on their sleep. Lucy particularly seemed to struggle with this, saying: "I think that I've become more anxious during the pandemic… I've been a lot more down in myself, and I haven't always been feeling 100%, I've cried a lot. That definitely reflects in my sleep."

Subcategory 2: A lot on my mind

For some participants, the uncertainty of the pandemic had created a lot of worries, which made it difficult for them to sleep. The expectations of completing schoolwork on top of this compounded the problem, as did the constant use of screens: "I was on my phone a lot more, and I was obviously on my computer all day to do school meetings and then I think that kept my mind active a lot longer" (Melissa). Faye and Annie felt that the uncertainty in particular was hard: "there's still of course that edge to it… we might go into our third wave, and everything might go back again" (Faye); "the second one was just like hard enough and I feel like if it went to another one… yeah, it's not good" (Annie).

Some participants worried a lot about loved ones (Melissa, Annie, Jess), which could impact on their sleep. For example:

> I'm especially worried about my family getting sick… I get worried a lot about financial stuff because my dad became unemployed at the start of the pandemic… because I experience a lot more negative thoughts during the day then it might impact my dreams at night… the worries wake me up at night a lot, or they just keep me up (Melissa).

Subcategory 3: Disconnected from others

Something that was particularly difficult for most participants, was the feeling of being disconnected from loved ones. The following quotes provide some examples of this: "I haven't been able to go back to Germany for three years now… that's what I'm concerned about… losing contact with my friends in Germany completely" (George).

> I usually just stayed in my room all the time, then I felt a lot further away from my family and friends… I was very isolated at that time, because if I wasn't on a zoom meeting, I'd be sleeping through my zoom meetings, or after school I would be sleeping, or doing work (Melissa).

Subcategory 4: Use of technology

It appeared that for most participants, feeling disconnected from others and the loss of other things to do led to an increase in technology use, particularly social media. Although this was a positive use of technology, for some, it started to have a negative impact on their sleep, as they were using social media until later in the evening. Some participants spoke about being able to endlessly scroll videos on social media platforms such as Instagram and Tik Tok (Katie, Melissa, Nathan, Annie). One participant wondered whether her phone use was "a coping mechanism… to just get away from things" (Annie).

> I used to get like 3 or 4 hours of sleep everyday… just because all my friends were at home, so we used to, you know, face time or go on 'Houseparty'… we'd talk through the night, um, even when we had lessons the next day… it became really addictive… I think that's 100% definitely the main reason why I used to sleep late… earliest, 2am, latest… I think there was one time I slept at 7am (Nathan).

Subcategory 5: Making new habits

As previously mentioned, increased use of technology and the loss of other things to do facilitated the development of habits of sleeping later, as if their bodies had got used to it: "I guess I developed a bad habit of just… cause I was just used to "oh it's only 12" (Gemma).

> Once I was fired back into a regular routine, I was more… I think my body was naturally inclined to sleep throughout the night like I was doing throughout lockdown… and then I'd end up not sleeping at all, 'cause I was attuned to sleeping throughout the day as opposed to the night (George).

Category 3: Lost control over sleep

This category describes what the participants perceive to be the reasons why they were still experiencing disruption with their sleep.

Subcategory 1: Absence of understanding

Some participants simply did not know why they were still experiencing troubles with their sleep. Most were able to make some hypotheses, but for some this felt a little harder: "I've tried thinking about it and I just don't seem to understand why… I haven't figured it out yet" (Charlie). For these adolescents it seemed that they lacked an understanding as to how habits are formed and where new sleep habits that have created were being sustained over time. It also seemed that they lacked control over their sleep problems and the skills to change them.

Subcategory 2: What will the future hold?

For a few participants, they still held anxieties about the future, including how they would perform in exams given the amount of work they had missed out on (Charlie) and whether something like this may happen again (Faye, Melissa). These worries were on their mind a lot, creating stress, in turn affecting their ability to sleep, with stress and sleep disturbances being a bidirectional relationship. For example:

> I'm quite worried about the future… I'm scared that something like covid might happen again, so it's made me a lot more wary of… especially of jobs that are like easily replaceable or easily cut off when pandemics happen... I worry quite a lot about that (Melissa).

Subcategory 3: New habits cemented

The length of time in which the pandemic was lasting appeared to elicit some of the worries about the future and appeared to be a big reason for continued sleep troubles. More time was allowed for new sleep habits to develop, and they had, therefore, become cemented. This was also in relation to participants feeling that their body clocks had been affected and their bodies were finding it hard to adapt to a normal routine that fit with societal demands, again adding to concerns about the future:

> Basically, we had a massive, long holiday… that definitely messed up my sleep schedule... I found it easier after the summer holidays because it was six weeks of like nothing... there was no work they gave us, and it felt like I had time to get myself back together… but then we had the pandemic and then the work (Katie).

> I start getting very miniscule amounts of sleep and then I think I start needing less of it… I think your body always tries to adapt to its surroundings… or the conditions it's under, and as a result I think I'm now used to getting very little sleep (George).

Subcategory 4: Stress

Several participants felt an increase in stress, again adding to concerns about what the future would hold. Increased stress levels were particularly in relation to school, continued uncertainty and also ruminating thoughts about not sleeping enough:

> When I go to bed, I know that I'm probably not gonna sleep the whole night… I'm always really shattered before I go to school… trying to go back to sleep thinking if I don't get enough sleep then I'll be tired in the mornings (Jess).

Due to having missed a lot of school, a loss of motivation and the challenges of working from home, many participants did not feel they had learnt as much as was expected. Now with the return of face-to-face school and exams, this pressure was building up and they felt they had a lot to catch up on. Again, this was another layer of added stress that impacted on sleep, as well as meant they worked till later at night, delaying their sleep: "I sometimes extend the time I went to sleep by catching up on work… I just pull an all-nighter doing as much work as I possibly can" (George).

> We had so much information crammed in that I became very overwhelmed… I don't work well at home…I didn't do what I was meant to do… it's always there in my mind and I've never had a chance to catch up (Lucy).

Mediating subcategories

Two subcategories appeared to be mediating factors as to whether the participant would lose control of their sleep, and hence continue to experience sleep disruption, or would get 'back on track'.

Subcategory 1: Motivation to change

For some participants, their view on school seemed to impact on their motivation to change their sleep habits, which was perhaps why their difficulties were continuing. For

example, Katie said that “once or twice a week [she will] miss the bus as [she] can’t get up in the morning and [her] parents have to drive [her]”. Melissa and Gemma also spoke about their relationship with school, saying:

> The way my school managed the lockdown, it wasn’t very good for my mental health, and it made me see them in a more negative light… I think my mindsets also changed as now I don’t really care that much about my grades... it’s just not as important to me anymore… I prioritise quite a lot spending time with my family (Melissa).

> I think my attitudes towards schools changed a bit, so I feel like I just probably got annoyed, and I was like if you’re not going to work for me then I’m not going to work for you (Gemma).

Additionally it appeared that prioritising other things, such as socialising or completing school work appeared to reduce motivation to sleep. When school was the priority, this seemed to give some participants the motivation to seek help and work on improving their sleep and allowed them to feel more able to cope with tiredness. For example:

> I was making sure that I went to bed at a specific time, especially for assessment week… I was strict with myself waking up in the morning, because I’d have to wake up earlier than I would when we were actually at home... I just can’t afford to be getting little sleep, but also I can’t afford to spend all my time sleeping (Sarah).

This is maybe why these participants did not feel that their sleep problems were too bad anymore, but perhaps not being back to pre-pandemic sleep routines explains why they volunteered for a study that was recruiting people with continued difficulties.

Subcategory 2: Parental influence

Parental influence seemed beneficial for some participants, who valued the role their parents played in improving their sleep, including enforcing a sleep time, waking them in the morning or helping them to seek support. Parental influence appeared to motivate the young person to want to seek some form of help, either from the parent themselves or from self-help resources or professionals; "She (mother) does try and wake me up a lot of the time, but yeah, she mainly helps organising appointments for me to, you know, meet doctors and stuff" (George).

> Sometimes I sleep in their room so they can make sure I don't get up and get distracted, so that I'm just relaxing and go to sleep…recently my parents have been taking my phone away before bed so that they can keep it in a separate room (Melissa).

On the other hand, it appeared that when parents recognised their child was struggling with sleep, they did not push too much and allowed them to sleep in, perhaps later than required to fit in with societal demands: "…because I wasn't getting the full amount of sleep… I just try and sleep in as much as possible… it made me almost late a few times" (Melissa).

Category 4: Getting back on track

This category describes how some participants actually noticed an improvement in their sleep and why this might be. For Sarah and Faye, their sleep seemed to almost have returned to how it was pre-pandemic. For others, they still experienced significant sleep disturbance but this had improved slightly with support (Melissa, George).

Subcategory 1: Help-seeking

For some that had experienced an improvement in their sleep, it was through help-seeking that they achieved this. This was through a variety of means, including the use of technology such as audiobooks and relaxation (Faye, Jess) or professionals (Melissa,

George). For these participants, it was parental influence that encouraged them to seek support and motivation to improve their sleep. In addition, participants were more likely to seek help the worse their sleep problems were or due to having a positive relationship with school, therefore having the motivation and wish to change habits to allow them to be more alert at school.

Discussion

This study aimed to develop a grounded theory of adolescents sleep during the covid-19 pandemic. What emerged through the development of the model was that there were clear precipitating and perpetuating factors for sleep troubles, as well as protective factors that enabled some participant's sleep problems to reduce. The resulting model, presented above, describes the unique experiences for adolescents at this time and the impact on their sleep.

Precipitating factors

When the UK went in to its first national lockdown, adolescents had to adapt to school closures and a loss of freedom. With this, brought a huge amount of stress and uncertainty. However, many adolescents found the sense of community to be comforting. Also, without the expectation of waking early for school, adolescents were able to slip in to a more natural sleep routine, sleeping later and waking later, in line with age-related changes to Process S and C (Borbély, 1982). In normal circumstances, this delay would result in insufficient sleep during the school week due to having to wake early for school. However, with the increased flexibility at the start of the pandemic, adolescents sleep became longer in duration and perhaps more in line with their recommended hours of sleep (Gruber et al., 2020). Shortly after, schools adopted an online learning approach, with the expectation that adolescents would attend their lessons virtually. It appeared that it was at this point that most of the adolescent's sleep problems started.

The theory described how one of the major challenges was the continued feeling of disconnect from others. This was upsetting for many of the adolescents and so they turned to social media and other forms of technology to maintain connections with friends. This was important, particularly due to loneliness being a prominent feeling, however, meant that the adolescents use of technology during the pandemic increased significantly, in line with previous research (Fore, 2020; Tyack et al., 2021). Many were using social media later into the evening to connect with friends or subside boredom. This delayed their sleep time, with some adolescents not sleeping until the early hours, leading to tiredness during lessons.

Another aspect that impacted on adolescent's sleep was having a lot on their minds, which was maintained by the feeling of loss and use of technology. These factors were impacting on adolescents' mental health and affecting their ability to get to sleep at night, again causing them to feel tired and less able to concentrate during the day. Together, these precipitating factors created a 'perfect storm' for sleep difficulties (Carskadon, 2011). These results are in line with results from a content analysis of an open-ended survey conducted in Sweden (Jakobsson et al., 2019), that found that adolescents perceived sleep difficulties to be caused by an increase in stress, technology use, existential thoughts, low mood and anxiety and poor sleep habits, adding weight to this part of the theory.

Perpetuating factors

There were a number of factors that adolescents perceived to be continuing their sleep problems, in terms of thoughts and behaviours, in line with the CBT model. Results added support to the 3P model of insomnia (Spielman et al., 1987), which describes how after suffering a period of bad sleep due to a particular stressor, individuals can develop ways of coping with fatigue, such as napping or sleeping in later on weekends. However, this tends to perpetuate sleeplessness and over time they develop negative expectations about their sleep,

such as predicting further sleepless nights, and worry about the impact this will have. These ruminating factors are likely to keep them awake.

Although adolescents were not always sure of these perpetuating factors, perhaps lacking awareness of habit formation and reinforcing behaviours, many were able to make hypotheses. Continued uncertainty about what the future may hold and an increase in stress were reasons why adolescents continued to have trouble getting to sleep or extended their bedtime. Ruminating thoughts on not being able to sleep were prevalent, which have been found to increase anxieties around sleeping, increasing stress, and in turn, exacerbating the sleep difficulties (Suni & Dimitriu, 2022). Additionally, the adolescents felt that the extended length of time that their bodies had been allowed to adapt to a more preferred routine, was a key factor in their continued sleep problems; they felt their bodies had adapted to a new schedule and had got used to less sleep, cementing new habits. This is in line with research that suggests that it is possible to develop a 'tolerance' to sleep loss, where an individual may perceive a shorter sleep duration to feel normal to them (Pacheco & Singh, 2021).

Another factor that stood out from the interviews was motivation to sleep, which influenced their wishes to seek help. The less importance they placed on needing to be refreshed for school, or the priority of other things over sleep, were reasons for delayed bedtimes. It is possible that a lack of motivation to sleep earlier may come from a belief that more sleep means less time for communicating with friends or for leisure activities (Cassoff et al., 2013), in keeping with research that sleep may in part be determined by behavioural choices (Carskadon, 2009). Perhaps these adolescents were in the 'precontemplation' stage of the transtheoretical model of change (Prochaska & Velicer, 1997).

Those that saw school as a priority, and perhaps were in the 'contemplation' stage of change, appeared to have more motivation to get their sleep back to a healthier routine. Help-

seeking, from professionals, parents, or technology (audiobooks and relaxation apps) was a key factor for helping the adolescent to improve their sleep and was encouraged by the attitudes of parents towards their child's sleep. Parental supervision of sleep schedules as well as assistance with accessing support when sleep is affecting day to day life, may be a way of helping adolescents to improve their sleep. It appeared that young people who were more motivated to improve their sleep and whose parents had increased awareness of, and influence over their sleep patterns, were more likely to seek help. Research has found that help-seeking among adolescents is facilitated by having a trusting relationship with an adult such as a parent (Van den Toren et al., 2020; Velasco et al., 2020). Therefore, it is possible that the more influence the parent had, the more the young person felt able to open up to them, with parents in turn seeking help on behalf of the adolescent. However, research in adolescent help-seeking behaviours is limited, particularly when related to sleep, and so without further research, it is not possible to validate this. It would be helpful for future research to explore this model from the perspective of parents.

Limitations

The study had several limitations. Firstly, participants were interviewed over an eight month period. Over this time, some participants were interviewed during a national lockdown, some were on school holidays, some were learning online, and others had returned to face-to-face schooling. The context in which the adolescent was in was likely to have impacted on the way they responded to interview questions. For example, those that were on holiday may have perceived their sleep difficulties to not be as bad due to the option of sleeping later without the pressure of attending school.

Another limitation was the method of recruitment, which required participants to volunteer for the study. It was not possible to say whether there would be differences in

responses from those that volunteered and those that did not. Also, adolescents that were struggling more may have been less likely to volunteer. However, one participant was not attending school due to their sleep difficulties and their responses appeared to fit with the model.

The gender split between participants was unequal, with the opportunity to interview only three boys. It is possible that girls and boys may have experienced the pandemic differently, but it is difficult to interpret this from the data. Due to time constraints, it was not possible to validate the final model with the participants, limiting the ability to see if participants interviewed earlier on felt it resonated with them. Finally, the participants were predominantly from white middle-class backgrounds, which reduces the generalisability to a more diverse population of young people. For example, it may be that differing cultural beliefs about sleep or even the pandemic, may have influenced the way in which young people experienced this time.

Implications for research

To the author's knowledge, this is the first study to attempt to understand why sleep problems that are precipitated by pandemic-related factors, are continuing to be problematic, from the adolescent's perspective. Further research to test the applicability of the theory would be beneficial, as recommended by Strauss and Corbin (1994), particularly in years to come considering we do not yet know the longer term implications for adolescent's wellbeing and sleep health.

Another interesting area of research would be into the effects of long covid (continued symptoms following the virus infection), considering sleep disturbance was the most commonly reported long covid symptoms in 19,426 children aged 3-17 years, across 14 different studies (Zimmermann et al., 2021). One participant had experienced sleep problems since they tested positive for the infection, but it was difficult to decipher whether continued

problems were the result of concurrent ruminating thoughts or the infection itself. It was beyond the scope of the current research to investigate this further.

Further research would also benefit from taking a more systemic approach and interviewing parents or carers to further understand the influence that they may have on their child's sleep. For example, it would be interesting to know whether parents' perception of their child's sleep impacts on the influence they have, for example, do those that see their child struggling as a result of poor sleep place sleep as a priority and allow them to sleep in later, perhaps even facilitating late attendance to school.

Implications for practice

Considering the significant impact that even just a small reduction in sleep duration can have on adolescents biopsychosocial functioning (Sadeh et al. 2003), the importance of assessing for sleep problems in child and adolescent mental health services is clear. The model provides a framework that is useful for professionals working with young people in the aftermath of the pandemic, particularly as we are likely to experience its' impact for some time to come. Understanding from the adolescent's perspective what they perceive to be critical in maintaining problems provides a platform on which to provide effective and timely support in relation to their sleep.

The model highlights the integral role of stress and uncertainty in the maintenance of sleep problems, with this relationship being bidirectional. Therapies such as CBT and mindfulness are well placed to help the young person to cope with these challenges which, in turn, is likely to benefit their sleep. Additionally, clinicians are in a key position to support adolescents to not only maintain regular sleep hygiene but also to support them to develop new sleep habits. Support with sleep is likely to help to allay stress, anxiety, and depression (Sharma et al., 2021), which is what young people are more likely to present to services with. Given results from a randomised controlled trial that found that treatment of sleep problems

can help to improve depression, anxiety, and prodromal symptoms (Freeman et al., 2017), it is clear that sleep treatments are key in promoting psychological wellbeing and should be considered when developing formulations.

It would, however, be important for clinicians to consider the adolescent's motivation to change, given that the model found this to be a mediating factor between improved sleep and continued sleep disruption. Clinicians should understand at what stage of change the young person is at, given that this may be a barrier for engaging in interventions, and that the best predictor of behavioural change is one's ability and desire to change (Micic et al., 2019).

Considering the influence that parents may have over their child's sleep, particularly for younger adolescents, taking a systemic approach within interventions is likely to be beneficial. Clinical psychologists are well placed to deliver interventions in this way. Finally, the theory adds to the evidence that school initiatives, such as later school start times would be beneficial for adolescents to prevent daytime tiredness and concentration difficulties (see Minges & Redeker, 2016 for a review), which could in turn increase stress and affect sleep.

Conclusion

Following interviews with adolescents experiencing disturbed sleep, and using grounded theory analysis, themes emerged in relation to precipitating and perpetuating factors for adolescent's sleep disturbances during the COVID-19 pandemic. The theory described how the pandemic created an increased amount of pressure on young people in terms of loss, stress, and uncertainty, with ways of coping having a detrimental impact on their sleep. In turn, the processes by which sleep disturbance was managed in the longer term and the adolescent's ability and motivation to cope with continued stressors, affected recovery of their sleep. The findings contribute to an emerging body of literature on the longer-term effects of the pandemic on the sleep of adolescents and provides a useful

framework for clinicians working in the wake of the pandemic to guide interventions for disturbed sleep within young people's services.

References

Alfano, C. A., & Gamble, A. L. (2009). The Role of Sleep in Childhood Psychiatric Disorders. *Child Youth Care Forum, 38*(6), 327–340. https://doi.org/10.1007/s10566-009-9081-y

Alfano, C. A., Zakem, A. H., Costa, N. M., Taylor, L. K., & Weems, C. F. (2009). Sleep problems and their relation to cognitive factors, anxiety, and depressive symptoms in children and adolescents. *Depression and Anxiety, 26*(6), 503–512. https://doi.org/1002/da.20443

Bal, C., Öztürk, A., Çiçek, B., Özdemir, A., Zararsız, G., Ünalan, D., Zararsız, G. E., Korkmaz, S., Göksülük, D., Eldem, V., İsmailoğulları, S., Erdem, E., Mazıcıoğlu, M. M., & Kurtoğlu, S. (2018). The relationship between blood pressure and sleep duration in turkish children: A cross-sectional study. *Journal of Clinical Research in Pediatric Endocrinology, 10*(1), 51-58. https://doi.org/10.4274/jcrpe.4557

Becker, S. P., & Gregory, A. M. (2020). Editorial perspective: Perils and promise for child and adolescent sleep and associated psychopathology during the COVID-19 pandemic. *Journal of Child Psychology and Psychiatry, 61*(7), 757-759. https://doi.org/10.1111/JCPP.13278

Borbély, A. A. (1982). A two-process model of sleep regulation. *Human Neurobiology, 1*(3), 195–204.

Carskadon, M. A. (1990). Patterns of sleep and sleepiness in adolescents. *Pediatrician, 17*(1), 5-12.

Carskadon, M. (2009). Factors influencing sleep patterns of adolescents. In M. A. Carskadon (Ed.), *Adolescent sleep patterns: Biological, social, and psychological influences* (pp. 236-253). Cambridge University Press. https://doi.org/10.1017/CBO9780511499999

Carskadon, M. A. (2011). Sleep in adolescents: The perfect storm. *Pediatric Clinics of North America, 58*(3), 637-647. https://doi.org/10.1016/j.pcl.2011.03.003

Cassoff, J., Knäuper, B., Michaelsen, S., & Gruber, R. (2013). School-based sleep promotion programs: Effectiveness, feasibility and insights for future research. *Sleep Medicine Reviews, 17*(3), 207–214. https://doi.org/10.1016/j.smrv.2012.07.001

Colten, H. R., & Altevogt, B. M. (2006). Extent and health consequences of chronic sleep loss and sleep disorders. In H. R. Colten & B. M. Altevogt (Eds.), *Sleep disorders and sleep deprivation: An unmet public health problem* (pp. 55-136). The National Academies Press.

Corbin, J., & Strauss, A. (2015). *Basics of qualitative research: Techniques and procedures for developing grounded theory* (4th ed.). Sage

Creswell, J. W., & Miller, D. L. (2000). Determining validity in qualitative inquiry. *Theory into practice, 39*(3), 124-130. https://doi.org/10.1207/s15430421tip3903_2

Curcio, G., Ferrara, M., & De Gennaro, L. (2006). Sleep loss, learning capacity and academic performance. *Sleep Medicine Reviews, 10*(5), 323-337. https://doi.org/10.1016/j.smrv.2005.11.001

Dey, I. (1993). *Qualitative data analysis: A user friendly guide for social scientists*. Routledge.

Dinges, D. F., Pack, F., Williams, K., Gillen, K. A., Powell, J. W., Ott, G. E., Aptowicz, C., & Pack, A. (1997). Society cumulative sleepiness, mood disturbance, and psychomotor vigilance performance decrements during a week of sleep restricted to 4-5 hours per night. *American Sleep Disorders Association and Sleep Research, 20*(4), 267-277. https://doi.org/10.1093/SLEEP/20.4.267

Einger, J. D., Wohlgemuth, W. K., Radtke, R. A., Marsh, G. R., & Quillian, R. E. (2001). Does cognitive-behavioral insomnia therapy alter dysfunctional beliefs about sleep? *Sleep, 24*(5), 591–599. https://doi.org/10.1093/sleep/24.5.591

Elliot, R., Fischer, C. T., & Rennie, D. L. (1999). Evolving guidelines for publication of qualitative research studies in psychology and related fields. *British Journal of Clinical Psychology*, *38*(3), 215-229. https://doi.org/10.1348/014466599162782

Erikson, E. H. (1968). *Identity, youth, and crisis*. Norton

Evans, G., Cowley, L., Fox, S., McMonagle, L., Peake, A., & Rouf, K. (2018). *Safeguarding children and young people: Every psychologist's responsibility.* The British Psychological Society. https://www.bps.org.uk/sites/www.bps.org.uk/files/Policy/Policy%20-%20Files/Safeguarding%20Children%20and%20Young%20People%20%28June%202018%29.pdf

Fallone, G., Owens, J. A., & Deane, J. (2002). Sleepiness in children and adolescents: Clinical implications. *Sleep Medicine Reviews, 6*(4), 287–306. https://doi.org/10.1053/smrv.2001.0192

Fore, H. (2020). *Don't let children be the hidden victims of COVID-19 pandemic*. UNICEF. https://www.unicef.org/press-releases/dont-let-children-be-hidden-victims-covid-19-pandemic

Fredriksen, K., Rhodes, J., Reddy, R., & Way, N. (2004). Sleepless in Chicago: Tracking the effects of adolescent sleep loss during the middle school years. *Child Development, 75*(1), 84–95. https://doi.org/10. 1111/j.1467-8624.2004.00655.x

Freeman, D., Sheaves, B., Goodwin, G. M., Yu, L-M., Nickless, A., Harrison, P. J., Emsley, R., Luik, A. I., Foster, R., Wadekar, V., Hinds, C., Gumley, A., Jones, R., Lightman, S., Jones, S., Bentall, R., Kinderman, P., Rowse, G., Brugha, T., …Espie, C. A. (2017). The effects of improving sleep on mental health (OASIS): A randomised controlled trial with mediation analysis. *The Lancet Psychiatry, 4*(10), 749-758. https://doi.org/10.1016/S2215-0366(17)30328-0

Fryer, T. (2020). *A short guide to ontology and epistemology: Why everyone should be a critical realist.* https://tfryercom.files.wordpress.com/2020/10/cr_shortguide_201029.pdf

Fuligni, A. J., Arruda, E. H., Krull, J. L., & Gonzales, N. A. (2018). Adolescent sleep duration, variability, and peak levels of achievement and mental health. *Child Development, 89*(2), 18-28. https://doi.org/10.1111/cdev.12729

Gardner, B., & Rebar, A. L. (2019). Habit formation and behaviour change. In D. Dunn (Ed.), *Oxford research encyclopaedia: Psychology* (pp. 1-31). Oxford University Press. https://doi.org/10.1093/OBO/9780199828340-0232

Glaser, B., & Strauss, A. (1967). *The discovery of grounded theory: Strategies for qualitative research*. Sociology Press.

Gruber, R., Saha, S., Somerville, G., Boursier, J., & Wise, M. S. (2020). The impact of COVID-19 related school shutdown on sleep in adolescents: A natural experiment. *Sleep Medicine, 76*, 33-35. https://doi.org/10.1016/j.sleep.2020.09.015

Hagell, A. (2012). *Adolescent sleep: AYPH research update no.10*. Association for Young People's Mental Health. https://www.youngpeopleshealth.org.uk/wp-content/uploads/2015/07/Sleep.pdf

Hagenauer, M. H., Perryman, J. I., Lee, T. M., & Carskadon, M. A. (2009). Adolescent changes in the homeostatic and circadian regulation of sleep. *Developmental Neuroscience, 31*(4), 276–284. https://doi.org/10.1159/000216538

Hansen, S. L., Capener, D., & Daly, C. (2017). Adolescent sleepiness: Causes and consequences. *Pediatric Annals, 46*(9), 340–344. https://doi.org/10.3928/19382359-20170816-01

Higson-Sweeney, N., Loades, M. E., Hiller, R., & Read, R. (2020). Addressing sleep problems and fatigue within child and adolescent mental health services: A qualitative study. *Clinical Child Psychology and Psychiatry, 25*(1), 200–212. https://doi.org/10.1177/1359104519838573

Jahrami, H., BaHammam, A. S., Bragazzi, N. L., Saif, Z., Farris, M., & Vitiello, M. V. (2021). Sleep problems during the Covid-19 pandemic by population: A systematic review and meta-analysis. *Journal of Clinical Sleep Medicine*, *17*(2), 299-313. https://doi.org/10.5664/jcsm.8930

Jakobsson, M. Josefsson, K., & Hogberg, K. (2019). Reasons for sleeping difficulties as perceived by adolescents: A content analysis. *Scandinavian Journal of Caring Sciences, 34*(2), 464-473. https://doi.org/10.1111/scs.12750

Kaslow, N. J., Friis-Healy, E. A., Cattie, J. E., Cook, S. C., Crowell, A. L., Cullum, K. A., Del Rio, C., Marshall-Lee, E. D., LoPilato, A. M., VanderBroek-Stice, L., Ward, M. C., White, D. T., & Farber, E. W. (2020). Flattening the emotional distress curve: A behavioral health pandemic response strategy for COVID-19. *American Psychologist, 75*(7), 875–886. http://doi.org/10.1037/amp0000694

Lee, Y. J., Cho, S-J., Cho, I. H., & Kim, S. J. (2012). Insufficient Sleep and Suicidality in Adolescents. *Sleep*, *35*(4), 455-460. https://doi.org/10.5665/sleep.1722

Liu, X. (2004). Sleep and adolescent suicidal behavior. *Sleep, 27*(7), 1351–1358. https://doi.org/10.1093/sleep/27.7.1351

Lyall, L. M., Wyse, C. A., Graham, N., Ferguson, A., Lyall, D. M., Cullen, B., Morales, C. A. C., Biello, S. M., Mackay, D., Ward, J., Strawbridge, R. J., Gill, J. M. R., Bailey, M. E. S., Pell, J. P., & Smith, D. J. (2018). Association of disrupted circadian rhythmicity with mood disorders subjective wellbeing, and cognitive function: A cross-sectional study of 91 105 participants from the UK Biobank. *The Lancet Psychiatry, 5*(6), 507-514. https://doi.org/10.1016/S2215-0366(18)30139-1

Maslow, A. H. (1943). A theory of human motivation. *Psychological Review, 50*(4), 370–396. https://doi.org/10.1037/h0054346

Mason, B. (2015). Towards positions of safe uncertainty. *InterAction-The Journal of Solution Focus in Organisations, 7*(1), 28-43. https://doi.org/10.1177/26344041211063125

McGlinchey, E. L., Reyes-Portillo, J. A., Turner, J. B., & Mufson, L. (2017). Innovations in practice: The relationship between sleep disturbances, depression, and interpersonal functioning in treatment for adolescent depression. *Child and Adolescent Mental Health, 22*(2), 96–99. https://doi.org/10.1111/camh.12176

Micic, G., Richardson, C., Cain, N., Reynolds, C., Bartel, K., Maddock, B., & Gradisar, M. (2019). Readiness to change and commitment as predictors of therapy compliance in adolescents with delayed sleep-wake phase disorder. *Sleep Medicine, 55*, 48-55. https://doi.org/10.1016/j.sleep.2018.12.002

Minges, K. E., & Redeker, N. S. (2016). Delayed school start times and adolescent sleep: A systematic review of the experimental evidence. *Sleep, 28*, 86-95. https://doi.org/10.1016/j.smrv.2015.06.002

Minkel, J. D., Banks, S., Htaik, O., Moreta, M. C., Jones, C. W., McGlinchey, E. L., Simpson, N. S., & Dinges, D. F. (2012). Sleep deprivation and stressors: Evidence for elevated negative affect in response to mild stressors when sleep deprived. *Emotion, 12*(5), 1015–1020. https://doi.org/10.1037/a0026871

Morin, C. M., Blais, F., & Savard, J. (2002). Are changes in beliefs and attitudes about sleep related to sleep improvements in the treatment of insomnia? *Behaviour Research and Therapy, 40*(7), 741–752. https://doi.org/10.1016/S0005-7967(01)00055-9

NHS Digital. (2020). *Mental health of children and young people in England*. https://files.digital.nhs.uk/AF/AECD6B/mhcyp_2020_rep_v2.pdf

NHS Health Research Authority. (2021). *Research involving children.* https://www.hra.nhs.uk/planning-and-improving-research/policies-standards-legislation/research-involving-children/

Office for National Statistics. (2020). *Coronavirus and the social impacts on young people in Great Britain: 3 April to 10 May 2020.* UK Government. https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/ageing/articles/coronavirusandthesocialimpactsonolderpeopleingreatbritain/3aprilto10may2020

Pacheco, D., & Rehman, A. (2020). *Shift work disorder.* The Sleep Foundation. https://www.sleepfoundation.org/shift-work-disorder

Pacheco, D., & Singh, A. (2021). *Why do we need sleep?* The Sleep Foundation. https://www.sleepfoundation.org/how-sleep-works/why-do-we-need-sleep

Pacheco, D., & Singh, A. (2022). *Alcohol and sleep*. The Sleep Foundation. https://www.sleepfoundation.org/articles/alcohol-and-

sleep#:~:text=Since%20alcohol%20can%20reduce%20REM,excessively%20sleepy%20the%20following%20day.

Prochaska, J. O., & Velicer, W. F. (1997). Transtheoretical model of health behaviour change. *American Journal of Health Promotion, 12*(1), 38-48. https://doi.org/10.4278/0890-1171-12.1.38

Roane, B. M., & Taylor, D. J. (2008). Adolescent insomnia as a risk factor for early adult depression and substance abuse. *Sleep, 31*(10), 1351–1356. https://doi.org/10.5665/sleep/31.10.1351

Roberts, R. E., Roberts, C. R., & Chen, I. G. (2002). Impact of insomnia on future functioning of adolescents. *Journal of Psychosomatic Research, 53*(1), 561–569. https://doi.org/10.1016/S0022-3999(02)00446-4

Roy-Byrne, P. P., Uhde, T. W., & Post, R. M. (1986). Effects of one night's sleep deprivation on mood and behaviour in panic disorder: Patients with panic disorder compared with depressed patients and normal controls. *Archives of General Psychiatry*, *43*(9), 895-899. https://doi.org/10.1001/archpsyc.1986.01800090085011

Sadeh, A., & Gruber, R. (2009). Stress and sleep in adolescence: A clinical-developmental perspective. In M. A. Carskadon (Ed.), *Adolescent sleep patterns: Biological, social, and psychological influences* (pp. 4-26). Cambridge University Press. https://doi.org/10.1017/CBO9780511499999

Sadeh, A., Gruber, R., & Raviv, A. (2003). The effects of sleep restriction and extension on school-age children: What a difference an hour makes. *Child Development, 74*(2), 444–455. https://doi.org/10.1111/1467-8624.7402008

Sharma, M., Aggarwal, S., Madaan, P., Saini, L., & Bhutani, M. (2021). Impact of COVID-19 pandemic on sleep in children and adolescents: A systematic review and meta-analysis. *Sleep Medicine, 84,* 259-267. https://doi.org/10.1016/j.sleep.2021.06.002

Short, M. A., Gradisar, M., Lack, L. C., & Wright, H. R. (2013). The impact of sleep on adolescent depressed mood, alertness and academic performance. *Journal of Adolescence*, *36*(6), 1025–1033. https://doi.org/10.1016/j.adolescence.2013.08.007.

Simon, E. B., & Walker, M. P. (2018). Sleep loss causes social withdrawal and loneliness. *Nature Communications*, *9*(1), 3146. https://doi.org/10.1038/s41467-018-05377-0

Spielman, A. J., Caruso, L. S., & Glovinsky, P. B. (1987). A behavioural perspective on insomnia treatment. *The Psychiatric Clinics of North America, 10*(4), 541-553. https://doi.org/10.1016/S0193-953X(18)30532-X

Stern, P. N. (1980). Grounded theory methodology: Its uses and processes. *Journal of Nursing Scholarship, 12*(1), 20-23. https://doi.org/10.1111/j.1547-5069.1980.tb01455.x

Strauss, A., & Corbin, J. (1994). Grounded theory methodology: An overview. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 273–285). Sage Publications, Inc.

Strauss, A. L., & Corbin, J. M. (1998). *Basics of qualitative research: Techniques and procedures for developing grounded theory* (2nd ed.). SAGE Publications.

Suni E., & Dimitriu, A. (2022). *Teens and Sleep.* The Sleep Foundation. https://www.sleepfoundation.org/teens-and-sleep

The Sleep Council. (2020). *Survey reveals COVID-19 having severe impact on sleep*. https://sleepcouncil.org.uk/survey-reveals-covid-19-having-severe-impact-on-sleep/

Touchette, E., Chollet, A., Galera, C., Frombonne, E., Falissard, B., Boivin, M., & Melchior, M. (2012). Prior sleep problems predict internalising problems later in life. *Journal of Affective Disorders, 143*(1-3), 166-171. https://doi.org/10.1016/j.jad.2012.05.049

Tufford, L., & Newman, P. (2012). Bracketing in qualitative research. *Qualitative Social Work, 11*(1), 80-96. https://doi.org/10.1177/1473325010368316

Tyack, C., Unadkat, S., & Voisnyte, J. (2021). Adolescent sleep – lessons from COVID-19. *Clinical Child Psychology and Psychiatry*, *27*(1), 6-17. https://doi.org/10.1177/13591045211065937

Urquhart, C. (2013). *Grounded theory for qualitative research: A practical guide*. Sage.

Van den Toren, S. J., van Grieken, A., Lugtenberg, M., Boelens, M., & Raat, H. (2020). Adolescents' views on seeking help for emotional and behavioural problems: A focus group study. *International Journal of Environmental Research and Public Health, 17*(1), 1-11. https://doi.org/10.3390/ijerph17010191

Velasco, A. A., Santa Cruz, I. S., Billings, J., Jimenez, M., & Rowe, S. (2020). What are the barriers, facilitators and interventions targeting help-seeking behaviours for common mental health problems in adolescents? A systematic review. *BMC Psychiatry, 20*(293), 1-22. https://doi.org/10.1186/s12888-020-02659-0

Voellmin, A., Schäfer, V., Cajochen, C., Meyer, A. H., Bader, K., Winzeler, K., & Wilhelm, F. H. (2014). Daily stress, presleep arousal, and sleep in healthy young women: A daily life computerized sleep diary and actigraphy study. *Sleep Medicine, 15*(3), 359–366. https://doi.org/10.1016/j.sleep.2013.09.027

Wheaton, A. G., Chapman, D. P., & Croft, J. B. (2016). School start times, sleep, behavioral, health, and academic outcomes: A review of the literature. *Journal of School Health, 86*(5), 363–381. https://doi.org/10.1111/josh.12388

Xu, Z., Su, H., Zou, Y., Chen, J., Wu, J., & Chang, W. (2012). Sleep quality of Chinese adolescents: Distribution and its associated factors. *Journal of Paediatrics and Child Health, 48*(2), 138–145. https://doi.org/10.1111/j.1440-1754.2011.02065.x

Yardley, L. (2000). Dilemmas in qualitative health research. *Psychology and Health, 15*(2), 215-228. https://doi.org10.1080/08870440008400302

Zimmermann, P., Pittet, L. F., & Curtis, N. (2021). How common is long COVID in children and adolescents? *The Pediatric Infectious Disease Journal*, *40*(12), 482–487. https://doi.org/10.1097/INF.0000000000003328

Section C: Appendices of supporting material

Appendix A: CASP qualitative checklist (CASP, 2018a)

Study authors	**Montie et al. (2019)**	**Wilhelmsen-Langeland et al. (2012)**
Was there a clear statement of the aims of the research?	Yes – lack of research in this area is indicated. Clear aims identified and initial possible implications considered	Yes – clear aim and reason for importance
Is a qualitative methodology appropriate?	Yes – to gain a subjective understanding	Yes – researchers want patients subjective experiences
Was the research design appropriate to address the aims of the research?	Yes – based on aims but researcher does not justify why qualitative over quantitative	Yes
Was the recruitment strategy appropriate to the aims of the research?	Yes – purposive sample with considered inclusion and exclusion criteria. No information on why some may not have taken part	Unable to tell – recruitment discussed but not much consideration
Was the data collected in a way that addressed the research issue?	Yes – semi-structured interviews with the use of a topic guide. Data saturation discussed	Yes – semi-structured interviews with the use of a guide. Data saturation discussed
Has the relationship between researcher and participants been adequately considered?	Yes – ways to minimise bias is discussed	Unable to tell – says it is but no information on how it is managed
Have ethical issues been taken into consideration?	Yes – approved by the Medical Ethics Review Committee, but no information on confidentiality, consent, or withdrawal	Yes - approved by the Regional Committee for Medical Research. Consent and withdrawal discussed
Was the data analysis sufficiently rigorous?	Yes – informational on the analysis and how themes were derived. Sufficient data presented	Unable to tell – Presenting themes not part of researcher's preconception – unclear if all results are presented

Is there a clear statement of findings?	Yes	Unable to tell – findings not summarised but results do relate to aims
How valuable is the research	Consideration of research and clinical implications	Consideration of research and clinical implications

Appendix B: Appraisal tool for cross sectional studies (Downes et al., 2016)

Study authors	**Wilhelmsen-Langeland et al. (2019)**	**Sivertsen et al. (2013)**	**Lovato et al. (2013)**
Were the aims/objectives of the study clear?	Yes	Yes	Yes
Was the study design appropriate for the stated aim(s)?	Yes	Yes	Yes
Was the sample size justified?	No	No	No
Was the target/reference population clearly defined? (Is it clear who the research was about?	Yes	Yes	Yes
Was the sample frame taken from an appropriate population base so that it closely represented the target/reference population under investigation?	Yes	Yes	No
Was the selection process likely to select subjects/participants that were representative of the target/reference population under investigation?	Don't know – advertisements at school, a college and a university – people with DSPD may not attend school	Yes	Do not know – recruited from schools – people with DSPD may not attend school
Were measures undertaken to address and categorise non-responders?	No	Yes	Yes
Were the risk factor and outcome variables measured appropriate to the aims of the study?	No – self-report measure of EF only	No	Yes
Were the risk factor and outcome variables measured correctly using instruments/measurements that had been trialled, piloted or published previously?	Yes	No	Do not know – no information on reliability and validity of the measures

Is it clear what was used to determined statistical significance and/or precision estimates? (e.g. p-values, confidence intervals)	Yes	Yes	Yes
Were the methods (including statistical methods) sufficiently described to enable them to be repeated?	Yes	Yes	Yes
Were the basic data adequately described?	Yes	Yes	Yes
Does the response rate raise concerns about non-response bias?	Yes	Yes	Yes
If appropriate, was information about non-responders described?	No	No	Yes
Were the results internally consistent?	Yes	Yes	Yes
Were the results presented for all the analyses described in the methods?	Yes	Yes	No – no information on the depression scale
Were the authors' discussions and conclusions justified by the results?	Yes	Yes	No – very small number with DSPD so cannot make firm conclusions
Were the limitations of the study discussed?	Yes	Yes	Yes
Were there any funding sources or conflicts of interest that may affect the authors' interpretation of the results?	No	No	No
Was ethical approval or consent of participants attained?	Yes	Yes	Yes

Study authors	***Richardson et al. (2018a)**	***Richardson & Gradisar (2021)**	**Danielsson et al. (2016)**
Were the aims/objectives of the study clear?	Yes	Yes	Yes
Was the study design appropriate for the stated aim(s)?	Yes	Yes	Yes
Was the sample size justified?	No	No	No

Was the target/reference population clearly defined? (Is it clear who the research was about?	Yes	Yes	Yes
Was the sample frame taken from an appropriate population base so that it closely represented the target/reference population under investigation?	Yes	Yes	Yes
Was the selection process likely to select subjects/participants that were representative of the target/reference population under investigation?	Yes	Yes	Yes
Were measures undertaken to address and categorise non-responders?	No	No	Yes
Were the risk factor and outcome variables measured appropriate to the aims of the study?	Yes	Yes	Yes
Were the risk factor and outcome variables measured correctly using instruments/measurements that had been trialled, piloted or published previously?	Yes	Yes	Yes
Is it clear what was used to determined statistical significance and/or precision estimates? (e.g. p-values, confidence intervals)	Yes	Yes	Yes
Were the methods (including statistical methods) sufficiently described to enable them to be repeated?	Yes	Yes	Yes
Were the basic data adequately described?	Yes	Yes	Yes
Does the response rate raise concerns about non-response bias?	No	No	No
If appropriate, was information about non-responders described?	No	No	Yes
Were the results internally consistent?	Yes	Yes	Yes

Were the results presented for all the analyses described in the methods?	Yes	Yes	Yes
Were the authors' discussions and conclusions justified by the results?	Yes	Yes	Yes
Were the limitations of the study discussed?	Yes	Yes	Yes
Were there any funding sources or conflicts of interest that may affect the authors' interpretation of the results?	Unable to tell – information not provided	No	No
Was ethical approval or consent of participants attained?	Yes	Yes	Do not know – only mention of an 'advisory statement' from the Regional Ethical Vetting Board

Note. *although these studies were part of an RCT, the cross-sectional part of the study was what the review was most interested in

Appendix C: CASP case control checklist (CASP, 2018b)

Study authors	**Saxvig et al. (2019)**
Did the study address a clearly focused issue?	Yes
Did the authors use an appropriate method to answer their question?	Yes
Were the cases recruited in an acceptable way?	Unable to tell – Little information about recruitment procedure. No power calculation
Were the controls selected in an acceptable way?	Can't tell – as above
Was the exposure accurately measured to minimise bias?	Yes
Aside from the experimental intervention, were the groups treated equally?	Yes
Have the authors taken account of the potential confounding factors in the design and/or in their analysis?	Yes
How large was the treatment effect?	Large effect sizes defined and reported; no adjustment for confounders
How precise was the estimate of the treatment effect?	P-values, standard deviation and effect sizes provided; no confidence intervals; interaction effects; all variables considered
Do you believe the results?	Yes
Can the results be applied to the local population?	Yes
Do the results of this study fit with other available evidence?	Yes

Appendix D: CASP cohort study checklist (CASP, 2018c)

Study authors	**Iwamitsu et al. (2007)**
Did the study address a clearly focused issue?	Yes
Was the cohort recruited in an acceptable way?	Unable to tell - minimal information is available
Was the exposure accurately measured to minimise bias?	Unable to tell – States that conversations were analysed but no information on validity of coding scheme
Have the authors identified all important confounding factors?	Unable to tell
Have the authors taken account of the potential confounding factors in the design and/or analysis?	No
Was the follow up of subjects complete enough?	Yes
Was the follow up of subjects long enough?	Yes
What are the results of the study?	Participants showed an improvement in their sleep-wake schedules and school refusal decreased.
How precise are the results	Only standard deviations are provided
Do you believe the results?	No - group therapy could be a confounding factor and there is no information on what group therapy consisted of. No control group
Can the results be applied to the local population?	Unable to tell - little information on recruitment and participants.
Do the results fit with other available evidence	Yes, although minimal comparison to previous studies is made.
What are the implications of the study for practice?	Unable to tell - some discussion of implications but this is minimal.

Appendix E: CASP randomised controlled trial checklist (CASP, 2020)

Study authors	Gradisar et al. (2011)	Richardson et al. (2018b)	Wilhelmsen-Langeland et al. (2013)	Langevin et al. (2014)
Did the study address a clearly focused research question?	Yes	Yes	Yes	Yes
Was the assignment of participants to interventions randomised?	Yes	Yes	Yes	Yes
Were all participants who entered the study accounted for at its conclusion?	Yes	Yes	Yes	No
Were the participants and investigators 'blind' to intervention they were given/giving? Were the people assessing/analysing outcome/s 'blinded'	No – the control group did not receive the intervention. The researchers analysing the outcomes were not 'blind' to group	Unable to tell	Yes	Yes
Were the study groups similar at the start of the RCT?	Unable to tell	Yes	Yes	Unable to tell
Apart from the experimental intervention, did each study group receive the same level of care?	Yes	Yes	Yes	Unable to tell

Were the effects of intervention reported comprehensively?	No – no power calculation and no consideration of possible bias	No – no power calculation and no consideration of possible bias	Yes	No – no power calculation and no consideration of possible bias
Was the precision of the estimate of the intervention or treatment effect reported?	Yes	Yes	Yes	Yes
Do the benefits of the experimental intervention outweigh the harms and costs?	Yes	Yes	Yes	Unable to tell

Appendix F: Advert

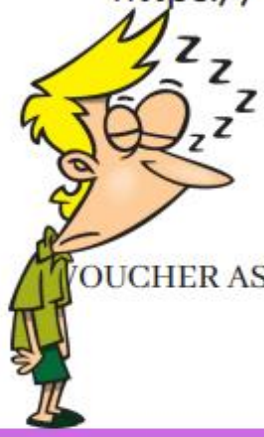
Canterbury Christ Church University

ARE YOU 11-18 YEARS OLD?

HAVE YOU NOTICED A CHANGE IN YOUR SLEEP SINCE THE START OF COVID-19?

IF YES, WE NEED YOU!

To find out more, visit
https://ep4093.wixsite.com/teensleepstudy



OR email Emily Perry at
ep409@canterbury.ac.uk

YOU WILL RECEIVE A £10 AMAZON VOUCHER AS A THANK YOU FOR YOUR PARTICIPATION

Appendix G: Email to schools

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Appendix H: Information sheets

Information about the research (11-15 years)

How has the Covid-19 global pandemic impacted on young peoples' sleep?

Hello. My name is Emily Perry and I am a trainee clinical psychologist at Canterbury Christ Church University. I would like to invite you to take part in a research study. Before you decide whether to take part, it is important that you understand why the research is being done and what it would involve for you.

Talk to others about the study if you wish. You can also contact me if you have any queries. Email: e.perry409@canterbury.ac.uk; Phone: 01227 927070 (please leave a voicemail stating my name, your name and a contact number and I will get back to you).

Study Supervisors
Principal Supervisor: Dr Maja Schaedel, Principal Clinical Psychologist, Great Ormond Street Children's Hospital
Second Supervisor: Dr Holly Milling, Clinical and Academic Tutor, Salomons Institute for Applied Psychology

You might like to look through this information with a parent or carer.

What is the study for?
We would like to speak to young people who have experienced a change in their sleep since the start of the Covid-19 pandemic. We are interested in finding out what factors are continuing to affect young people's sleep.

Why have I been invited?
You have been invited to participate because you have experienced changes in your sleep since the start of the Covid-19 pandemic.

Do I have to take part?
It is up to you to decide whether to join the study. If you agree to take part, I will ask you **and** your parent or carer to sign a consent form. You are free to leave the study at any time prior to taking part, or two weeks after taking part, without giving a reason.

What will happen to me if I take part?
If you are interested in taking part you will be asked to complete a short screening questionnaire to make sure that you meet the criteria to participate. You will also be asked for an email address of a parent or carer so we can tell them about the study too. They will need to provide their consent for you to take part. Please talk to them about the study too.

If you meet criteria and decide you would like to take part, you will be asked to complete a consent form and a 5-minute questionnaire asking for some information about your gender, ethnicity, health, alcohol and caffeine intake and social media use. Once these have been completed, I will arrange a time with you to meet via the video call platform 'zoom'. You can have a parent or carer with you during the interview if you like. The interview will last for up to 60 minutes. You will be asked questions about the impact the pandemic has had on you,

particularly on your sleep. *Please note that this interview will be audio-recorded, but recordings will only be available to myself and the lead supervisor.*

What are the possible disadvantages and risks of taking part?
As we will be thinking about your mental health, it is possible that you may find some questions upsetting. If this happens, then we can think about this further and decide if we should continue the interview or not. We encourage you to answer as freely and honestly as possible, but it is up to you how much you chose to tell me.

If you have any concerns about your mental health then you might like to speak with your parents or carers. You can also contact your GP or speak to someone at Child Line on 0800 1111 who offer children and young people a space to talk.

What are the possible benefits of taking part?
It is hoped that this research will help us to understand how young people's sleep has been affected by the pandemic, how any difficulties are continuing, and what might help. *We cannot promise the study will help you directly but the information we get from this study will help to improve the treatment of other young people with sleep difficulties*.

What if there is a problem?
If any problems arise during the study or you need to rearrange the interview, then you can contact me by email at e.perry409@canterbury.ac.uk

Expenses and payments

As a thank you for taking part, you will be given a £10 Amazon voucher.
Your e-mail address will be securely given to the University finance department who will issue the voucher. Your details will not be used for any other purpose.

If you are still interested in taking part, then please read Part 2

Part 2

What will happen if I don't want to carry on with the study?
If you decide you don't want to take part anymore before the interview has happened, then all previously collected information (personal questions about you and the consent form) will be destroyed.

If you would like to withdraw during the interview, then you can stop the interview at any point without giving a reason.

If the interview has already been conducted, you can ask for the data to be removed up to two weeks after taking part. This is because, after this time, I will have analysed the interview. If you have any worries about this then let me know.

Will information from or about me collected in the study be kept private?
All information which is collected from or about you during the course of the research will be kept private. **The only time when I would need to pass on information from you to a parent/carer, the project's lead supervisor and/or other relevant services, would be if, as a result of something you told me, I were to become worried about your safety or the safety of someone else.** If this happens, then I will speak to you about this first.

You will be assigned a unique number when you join the study so that your data cannot be traced back to you. All data that we collect will be stored in accordance with the Data Protection Act 1998.

Audio-recordings of the interviews will be taken so that the interviews can be written up word for word. All recordings will be stored on a password protected memory stick and will be deleted once written up. Interview write ups will be stored securely on a password protected memory stick and will only be accessible to myself and the lead supervisor. Canterbury Christ Church University will keep this information for 10 years after the study has finished, after which all data will be destroyed securely.

What will happen to the results of the research study?
It is intended that the results from this study will be published. You will not be identified in any publication. You will be provided with a summary of the results.

It is possible that the data from this study may be available for use in other studies. Again, you will not be able to be identified.

Worries and complaints
If you are worried about this study, you can speak to me via phone or email (details below).

Further information and contact details
If you would like to speak to me and find out more about the study or have questions about it answered, you can email me at e.perry409@canterbury.ac.uk

Alternatively, you can leave a message for me on a 24-hour voicemail phone line at 01227 927070. Please say that the message is for me [Emily Perry] and leave a contact number so that I can get back to you.

Information about the research (16-18 years)

How has the Covid-19 global pandemic impacted on young peoples' sleep?

Hello. My name is Emily Perry and I am a trainee clinical psychologist at Canterbury Christ Church University. I would like to invite you to take part in a research study. Before you decide whether to take part, it is important that you understand why the research is being done and what it would involve for you.

Talk to others about the study if you wish. You can also contact me if you have any queries. Email: e.perry409@canterbury.ac.uk; Phone: 01227 927070 (please leave a voicemail stating my name, your name and a contact number and I will get back to you).

Study Supervisors
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What is the study for?
We would like to speak to young people who have experienced a change in their sleep since the start of the Covid-19 pandemic. We are interested in finding out what factors are continuing to affect young people's sleep.

Why have I been chosen to take part?
You have been invited to participate because you have experienced changes in your sleep since the start of the Covid-19 pandemic.

Do I have to take part?
It is up to you to decide whether to join the study. If you agree to take part, I will then ask you to sign a consent form. You are free to withdraw at any time, without giving a reason.

What will happen to me if I take part?
If you are interested in taking part you will be asked to complete a short screening questionnaire to make sure that you meet the criteria to participate.

If you meet criteria and decide you would like to take part, you will be asked to complete a consent form and a 5-minute questionnaire asking for some information about your gender, ethnicity, health, alcohol and caffeine intake and social media use. Once these have been completed, I will contact you to arrange a time to meet via the video call platform 'zoom'. The interview will last for up to 60 minutes. You will be asked questions about the impact the pandemic has had on you, particularly on your sleep. *Please note that this interview will be audio-recorded, but recordings will only be available to myself and the lead supervisor.*

What are the possible disadvantages and risks of taking part?
As we will be thinking about your mental health, it is possible that you may find some lines of questioning distressing. If this happens, then we can discuss this further and decide if it is appropriate to continue the interview. We encourage you to answer as freely and honestly as possible, but it is up to you how much you chose to disclose.

If you have any concerns about your mental health then you can contact your GP or speak to someone at Child Line on 0800 1111 who offer a free counselling to children and young people up until their 19th birthday.

What are the possible benefits of taking part?
It is hoped that this research will help us to understand how young people's sleep has been affected by the pandemic, how any difficulties are continuing, and what kind of interventions might help. *We cannot promise the study will help you directly but the information we get from this study will help to improve the treatment of other young people with sleep difficulties*.

What if there is a problem?
If you have any worries or concerns about the study then you can contact me on my email address: e.perry409@canterbury.ac.uk

What will happen to my data?
The information you give to us will be confidential and will be matched with a unique ID number. Your name will be stored separately. There are some rare situations in which information would have to be shared with others. The details are included in Part 2.

Expenses and payments

As a thank you for taking part, you will be given a £10 Amazon voucher.
Your e-mail address will be securely given to the University finance department who will issue the voucher. Your details will not be used for any other purpose.

If you are still interested in taking part, then please read Part 2

Part 2

What will happen if I don't want to carry on with the study?
If you withdraw prior to the interview, then all previously collected information (demographics and consent form) will be destroyed.

If you would like to withdraw during the interview, then you can stop the interview at any point without giving a reason.

If the interview has already been conducted, you can ask for the data to be removed up to two weeks after participation. This is because, after this time, the interview would have been written up and analysed. If you have any concerns about this then let me know.

Concerns and Complaints
If you have any concerns about any part of the study, you should ask to speak to me and I will do my best to help you.

If you remain concerned and wish to complain, you can do this by contacting Dr Fergal Jones, Clinical Psychology Programme Research Director, Salomons Institute for Applied Psychology –fergal.jones@canterbury.ac.uk

Will information from or about me collected during the study be kept confidential?

All information which is collected from or about you during the course of the research will be kept strictly confidential. ***The only time when I would be obliged to pass on information from you to a third party (a parent/guardian, the project's lead supervisor or other relevant services) would be if, as a result of something you told me, I were to become concerned about your safety or the safety of someone else.*** I will speak to you about this first.

You will be assigned a unique participant number so that your data will not be personally identifiable. All data that we collect will be stored securely in accordance with the Data Protection Act 1998.

As previously mentioned, audio-recordings of the interviews will be taken so that the interviews can be transcribed (written up word for word). All recordings will be stored anonymously on an encrypted and password-protected memory stick and will be deleted once transcribed. Transcriptions will be stored securely on an encrypted and password-protected memory stick and will only be accessible to myself and the lead supervisor. Canterbury Christ Church University will keep identifiable this information for 10 years after the study has finished, after which all data will be destroyed securely.

What will happen to the results of the research study?
It is intended that the results from this study will be published. You will not be identified in any publication. You will also be provided with a summary of the results.

It is possible that the data from this study may be available for use in other studies. Again, this data will be anonymised, and you will not be able to be identified.

Who is sponsoring and funding the research?
Canterbury Christ Church University is the sponsor and will be funding and supporting the organisation of the research.

Who has reviewed the study?
This study has been reviewed and approved by The Salomons Ethics Panel, Salomons Institute for Applied Psychology, Canterbury Christ Church University.

Further information and contact details
If you would like to speak to me and find out more about the study or have questions about it answered, you can email me at e.perry409@canterbury.ac.uk

Alternatively, you can leave a message for me on a 24-hour voicemail phone line at 01227 927070. Please say that the message is for me [Emily Perry] and leave a contact number so that I can get back to you.

Information about the research (parent)

How has the Covid-19 global pandemic impacted on young peoples' sleep?

Hello. My name is Emily Perry and I am a trainee clinical psychologist at Canterbury Christ Church University. I would like to invite your child to take part in a research study. Before you decide whether you are happy for your child to take part, it is important that you understand why the research is being done and what it would involve for your child.

Talk to others about the study if you wish. You can also contact me if you have any queries. Email: e.perry409@canterbury.ac.uk; Phone: 01227 927070

Study Supervisors
Principal Supervisor: Dr Maja Schaedel, Principal Clinical Psychologist, Great Ormond Street Children's Hospital
Second Supervisor: Dr Holly Milling, Clinical and Academic Tutor, Salomons Institute for Applied Psychology

What is the purpose of the study?
We would like to speak to young people who have experienced a change in their sleep since the start of the Covid-19 pandemic. We are interested in finding out what factors are continuing to affect young people's sleep.

Why has my child been chosen to take part?
Your child has been invited to participate because they are between 11 and 18 years old and have experienced changes in their sleep since the start of the Covid-19 pandemic.

Does my child have to take part?
It is up to you to decide whether your child can join the study. If you agree for your child to take part, I will then ask you to sign a consent form. You are free to withdraw your child at any time, without giving a reason.

What will happen to my child if they take part?
If you consent for your child to take part, your child will be asked to complete a consent form themselves and a 5-minute questionnaire asking for some information about their gender, ethnicity, health, alcohol and caffeine intake and social media use. Once these have been completed, I will contact you to arrange a time to meet with your child via the video call platform 'zoom'. The interview will last for up to 60 minutes and you will be asked to join for the first 5-minutes so that I can introduce myself to you. You are welcome to stay for the full 60 minutes if your child would like you there.

The interview with your child will ask questions about the impact the pandemic has had on them, particularly around their sleep. If you would like a copy of the broad questions your child will be asked, then please let me know. *Please note that this interview will be audio-recorded, but recordings will only be available to myself and the lead supervisor.*

If, during the course of the interview, your child shares information with me that raises concerns about their safety or the safety of another individual, then I will contact you as soon as possible following the interview to discuss this further.

What are the possible disadvantages and risks of taking part?
As we will be thinking about your child's mental health, it is possible that your child may find some lines of questioning distressing. If this happens, then we will discuss this further with your child and decide if it is appropriate to continue the interview. If we have any concerns about your child's mental health then we will contact you to let you know. Your child will be aware that this will happen and will have consented to this.

If you have your own concerns about your child's mental health then please contact your child's GP.

What are the possible benefits of taking part?
It is hoped that this research will help us to understand how young people's sleep has been affected by the pandemic, how any difficulties are continuing, and what kind of interventions might help. *We cannot promise the study will help you directly but the information we get from this study will help to improve the treatment of other young people with sleep difficulties*.

What if there is a problem?
If you have any worries or concerns about the study then you can contact me on my email address: e.perry409@canterbury.ac.uk. Alternatively, you can leave a message for me on a 24-hour voicemail phone line at 01227 927070. Please say that the message is for me [Emily Perry] and leave a contact number so that I can get back to you.

What will happen to my child's data?
The information your child gives to us will be confidential and will be matched with a unique ID number. Your child's name will be stored separately to this. There are some rare situations in which information your child provides will be passed on to you, for example, if we were concerned about your child's safety or the safety of others.

Expenses and payments

As a thank you for taking part, your child will be given a £10 Amazon voucher.
Your e-mail address will be securely given to the University finance department who will issue the voucher. Your details will not be used for any other purpose.

If you are still interested in your child being part of this research, then please read Part 2.

Part 2

What will happen if I don't want my child to carry on with the study?
If you withdraw your child prior to the interview, then all previously collected information about your child (demographics and consent form) will be destroyed. However, if the interview has already been conducted, you can ask for the data to be removed up to two weeks after your child's participation. This is because, after this time, the interview would have been written up and analysed. If you have any concerns about this then let me know.

Concerns and Complaints
If you have any concerns about any part of the study, you should speak to me and I will do my best to help you.

If you remain concerned and wish to complain, you can do this by contacting Dr Fergal

Jones, Clinical Psychology Programme Research Director, Salomons Institute for Applied Psychology –fergal.jones@canterbury.ac.uk

Will information from or about my child be kept confidential?
All information which is collected from or about your child during the course of the research will be kept strictly confidential. ***The only time when I would be obliged to pass on information to you directly and/or to the relevant authorities, would be if, as a result of something your child told me, I were to become concerned about their safety or the safety of someone else.*** If this happens then I will email you straight after your child's interview. Your child will be made aware of this process.

Your child will be assigned a unique participant number so that their data will not be personally identifiable. All data that we collect will be stored securely in accordance with the Data Protection Act 1998.

As previously mentioned, audio-recordings of the interviews will be taken so that the interviews can be transcribed (written up word for word). All recordings will be stored anonymously on an encrypted and password-protected memory stick and will be deleted once transcribed. Transcriptions will be stored securely on an encrypted and password-protected memory stick and will only be accessible to myself and the lead supervisor.

Canterbury Christ Church University will keep this information for 10 years after the study has finished, after which all data will be destroyed securely.

What will happen to the results of the research study?
It is intended that the results from this study will be published. Your child will not be identified in any publication. You will also be provided with a summary of the results.

It is possible that the data from this study may be available for use in other studies. Again, this data will be anonymised, and your child will not be able to be identified.

Who is sponsoring and funding the research?
Canterbury Christ Church University is the sponsor and will be funding and supporting the organisation of the research.

Who has reviewed the study?
This study has been reviewed and approved by The Salomons Ethics Panel, Salomons Institute for Applied Psychology, Canterbury Christ Church University.

Further information and contact details
If you would like to speak to me and find out more about the study or have questions about it answered, you can leave a message for me on a 24-hour voicemail phone line at 01227 927070. Please say that the message is for me [Emily Perry] and leave a contact number so that I can get back to you. Alternatively, you can email me at e.perry409@canterbury.ac.uk

Appendix I: Draft interview guide

Preamble

Thanks for logging in to speak with me today. We are going to talk about your experiences of the pandemic and how it has impacted on your sleep. It should take up to one hour. If you want to take a break during our discussion or would like to stop the discussion, then this is okay – just let me know. If you become upset following the interview, who might you be able to speak to about this? Is there someone that you live with that you can talk to?

Everything that we speak about today will be kept private, unless anything comes up that makes me feel concerned about your safety or the safety of someone else. If this happens, then I will talk this through with you first before speaking to a parent or carer. Do you have any questions? Are you still happy to continue?

Proposed Questions

1) To start with, I would like to find out about how the pandemic has impacted on you. In what way do you feel it has impacted on you? Possible prompts:
    a. What were your concerns when the pandemic first started?
    b. What are your concerns now?
    c. Have you been feeling very worried or low since it started? (If yes, can you tell me a bit more about this? How has this impacted on your sleep?)
    d. Can you tell me about your relationship with your family and friends? Have these relationships changed since the start of the pandemic?

2) I would now like to find out a bit about how you are sleeping at the moment. Possible prompts:
    a. Can you describe what your sleep routine is like?
    b. How would your parents describe your sleep?
        i. Prompts: do you think they would have noticed a change in your sleep and if so, how do you know?
    c. How do you feel about your sleep patterns?
    d. What help have you previously sought for your sleep, if any? (If they have sought help, this can be explored further)
    e. How likely is it that you would access support for your sleep difficulties?

3) Can you tell me how your sleep has changed since the start of the covid-19 pandemic? Possible prompts:
    a. What changes to your sleep have you noticed since the start of the pandemic?
    b. Why do you think these sleep difficulties started?
    c. Have these changes persisted?
        i. *If yes,* what do you think is making these difficulties continue?
        ii. *If no,* what has changed?

4) Why do you think these sleep problems are continuing? Possible prompts:
    a. Is there anything you have been doing differently with regards to your sleep since the start of the pandemic?
    b. Are you doing anything before bed that extends your bedtime?

5) What makes it easier for you to get to sleep? Possible prompts:
    a. Have you been doing anything to help you sleep, either before bed or when in bed? If yes, what have you been doing? Has this been helping?

6) Is there anything else you'd like me to know about your experience of sleep since the start of the pandemic? Possible prompts:
    a. Is there anything you think it's important for me to understand?
    b. Is there anything you thought I would ask about that I haven't?

Thank you so much for your time. Would you be interested in finding out the results of this study?

Appendix J: Open coding from Annie's interview

This has been removed from the electronic copy

Appendix K: Selective Coding from Annie's interview

INITIAL RESPONSE TO AN UNPRECEDENTED EVENT	**DRAMATIC CHANGES TO EVERYDAY LIFE**	**LOST CONTROL OVER SLEEP**	**GETTING BACK ON TRACK**
Flexibility At the start, work was less monitored and more flexible School hours reduced at the start giving more time to relax Initially feeling happy about being off school Felt like a holiday – more flexibility **In this together** Initially kept socially active Novelty of the situation – in this together	Sleep problems started when realised that everyday life had changed **Use of technology** Transition to an online world Increased use of technology Phone use as a way of escaping reality Increased use of screen time when online school resumed Increased use of screens was draining Use of phone as an alternative to lying awake Getting swept away with addictive technology Losing track of time Stimulation from the phone made it hard to sleep Use of technology exacerbating sleep problem **A lot on my mind** Feeling frustrated Becoming preoccupied by the progress of the pandemic Further lockdowns would feel worse – aware of the pandemics fluctuating nature	**Stress** School work creating additional stress Increased stress due to importance of school year Missing out on having tests as a normal school experience Feeling overwhelmed with the flurry of tests Increased anxiety Increased stress Anxiety around schoolwork Missed out on prep work for GCSEs Anxiety around school performance Constantly having work on the mind Having an active mind Suspecting the sleep problems are due to an increase in stress Preoccupied mind leads to night waking Continued stress causing continuation of problems Concerns about continued pressure from school Build-up of pressures Missing out on schoolwork means having a lot to catch up on School making up for lost time Feeling like there is no rest Sleep problems are the new normal	**Motivation to change** Separation from friends has reduced motivation to get to school Not feeling supported by school in lockdown Feeling unsupported Going into school face-to-face feels unnecessary Feel the school did not take on board the challenges **Parental influence** Parents able to support late waking Parents are having to accommodate lying in Parents having to prompt to wake up Parental support to wake up Importance of having things outside of school Pandemic has helped me to see what's important

	Fear about spreading the virus to more vulnerable people An overshadowing worry Fearing that others will become unwell Worries were consuming Increase in school pressures Ruminating could make it harder to sleep Expressing concern for what may come – what the future may hold Ruminating on not being able to sleep **Disconnected from others** Reduced contact with friends Effort to see friends reduced as time went on Feeling guilty that didn't make more effort with friends Feeling lonelier as time went on Missing out on seeing family - disconnect Missing out on the physical contact was hard **Making new habits** Development of pre-sleep habits **Loss** Feeling trapped – no escape Loss of freedom Expectation that would attend lessons even though motivation was low	Having more worries than should at this life stage Lost out on chance to make new friendships Lost out on new experiences Normal expectations of life stage were shattered **What will the future hold?** Worried about loved ones becoming unwell Feeling sad about continued uncertainty Uncertainty of the pandemic remains **New habits cemented** Continued sleep problems due to extended period of change Creation of new habits **Absence of understanding** Absence of understanding for night time waking	Family is more important than grades

Appendix L: Example Summary Memos

Initial ideas of categories are represented in bold

Lucy

What initially stood out for me in Lucy's interview was the importance for her of **connectedness**. She spoke a number of times throughout the interview about **feeling alone** and cut off socially. This was impacting on her mood and perhaps her ability to offload, which is something she did not feel as able to do with her family. Having a lot of time alone was causing her to overthink things with regard to her friendships and how she was perceived by others, but also on her growing to do list. She appeared to be in a cycle of **feeling demotivated** to do any of her schoolwork, but then having so much to do that she was having to rush and could become self-critical. Her demotivation made using social media a more attractive option and so this felt like a better way (or maybe just a more enjoyable way) to spend her time. Feeling inadequately supported, at least initially, by the school was an important thing for Lucy and she was concerned about falling behind with her schoolwork and letting her family down. Unsurprisingly, there seemed to be a link between her increase in stress and worry (in relation to friendships and school work) and her experience of nightmares. She was having **nightmares that reflected her worries** which I wonder whether made her feel like she could not get away from her worries and had no real relaxation time. The increase in nightmares, worries about friendships and boredom was understandably impacting on Lucy's mood. Additionally the **lack of activity** during the day, appeared to prevent her from burning off energy and so when it came to sleep time, she was not tired. She would sleep late as she found it difficult to get to sleep, which meant she got up later in the morning – it seemed as if her sleep pattern shifted. On top of all of this, Lucy seemed to have some personal difficulties which perhaps made her more vulnerable to low mood and anxiety. As Lucy's interview took place during a local lockdown, it was unclear whether getting back to 'normal life' would improve all of this. Given the fluctuating nature of the pandemic (in terms of changing restrictions), there was still a huge amount of uncertainty around the pandemic, and I wondered if this was something that was playing on Lucy's mind. It is something to explore with other participants.

Melissa

Melissa's interview felt really rich and really showed the different areas where poor sleep had impacted on her life. Melissa was someone whose sleep had always been a little disrupted, but she noticed a significant change in her sleep during the pandemic. She was able to think about reasons why her sleep had gotten worse. What struck me was her honesty about her priorities in life. These seem to have shifted during the pandemic from being about academia and achieving to spending time with loved ones. It appeared that the pandemic had really made Melissa think about her future, sometimes with concern, which in itself was full of uncertainty (**uncertainty about the future?**).

Motivation was a huge thing for Melissa. Like Lucy, the onset of the pandemic made Melissa **lose all her motivation** for school (and therefore her want to sleep on time), which unfortunately even now she had not gained back. I wondered whether it was something about being **less motivated to sleep** that maintained her sleep problems. Interestingly, Melissa seemed to take the opportunity of the first lockdown to slip into her **natural sleep cycle**. All

the while she was able to be in this natural cycle, she was doing well and was happy. However, when the demands of everyday life began again, mainly attending online lessons, getting back into a sleep pattern proved difficult. Melissa felt that her **body had got used to the late sleeping** and this late sleeping continued. However, because she had to now get up early she was getting much less sleep and was very tired in the day which prevented her from functioning well day to day. It had an impact on her schooling and social relationships. Although Melissa's sleep is slowly improving, this is through the help she sought (**help seeking?**) from her parents and therapist.

What seems to be coming out from Melissa's interview is that there had been three distinct phases in the pandemic in relation to sleep; when it first began and we went into lockdown, at the point of the second lockdown, and where we are now. I'm wondering about the significance of these 'phases'. Perhaps there is something about fluctuating nature of pandemic restrictions that increased anxiety (something that I had considered following Lucy's interview too). For Melissa, the start was okay as this was when she could slip into her natural sleep pattern, however, in the second lockdown things became a bit more difficult for her as she was expected to wake up for school. She was feeling very **disconnected from others**, isolated and finding it hard to get back into any kind of sleep schedule. This massively affected her mental health and her anxiety increased, in turn affecting her ability to sleep. Although her sleep remained a significant problem, at the time of the interview she was in a better place than a few months previously, primarily through the support from her parents and therapist. It appeared that one of the reasons Melissa felt her sleep schedule remained poor was due to the **extended period** that she has had to be in her natural sleep routine (more so than the school holidays).

Katie

What was key for Katie was her **loss of motivation** and **increased use of social media.** Katie had felt her sleep routine was healthy prior to the pandemic, but that the pandemic had brought later sleep times and a **sleep routine that became inconsistent and stuck**. This seemed to also be what Melissa said – perhaps a **new habit was created?** The impact of the lockdowns on Katie seemed to be what affected her the most. She was very active prior to the pandemic, participating in lots of sporting activities but the lockdown meant that these activities had to stop, and she became bored as she did not have anything to do. It also meant she was not burning off energy so was feeling less tired in the evenings. I'm wondering about the impact of **loss** and how this came in many forms, as seen in interviews so far – thinking this is a key theme. This boredom meant that she lost a lot of motivation to do any set schoolwork and she often procrastinated with this during the day. However, she would get to a point towards her bedtime that she would start to worry about the lack of work she had done and felt that she had to use that time to catch up. She was finding this difficult, but it was as routine she could not seem to get out of. This pattern remained even when she went back to her sporting activities. Katie spoke about often having late nights as a lack of tiredness, or perhaps just wanting to put off sleep due to having **lots on her mind**, meant that she spent a lot of time scrolling videos on social media (**unhelpful use of technology**). I wondered whether this had become quite habitual for Katie. Habits seems like a key theme – the development of **new sleep habits** and the increased use of social media. Another thing that Katie mentioned was that late nights meant that she would want to sleep later in to the morning, and since returning to school had meant she missed the bus to school quite often. I

heard how Katie had placed less importance on school due to the school year which is perhaps why she felt unmotivated to get up and was unphased by being late. Perhaps, like Melissa, there is something about seeing less importance of needing to sleep meant motivation to change habits reduced. Her parents appeared to allow her to sleep in resulting in her missing the bus and them having to take her to school. I wondered if there was more to this in relation to parental influence, although Katie said there was not.

Charlie

Charlie did not seem to be worried about his sleep and did not feel it impacted on him day to day. He interestingly spoke about periods of sleep difficulties, rather than continuous problems. These did not appear to be in relation to things such as exams but perhaps has something to do with the process of coming to terms with the pandemic. Lots of changes happening, particularly in terms of how we communicate with friends and having to adapt to a new way of life, I wondered whether all of these created **uncertainty** at the time, leading to **increased stress,** and therefore impacting on sleep. Charlie did not seem to have much understanding of why he continued to experience sleep problems. It feels difficult to make firm conclusions with Charlie's account of his sleep problems due to the fluctuating nature of his difficulties, however, **social media use** may have had something to do with it as like the others, he noted that this had increased quite a lot during the pandemic.

Faye

Going against previous interviewees, Faye felt that her sleep had improved massively since returning to school. I wondered if this could be due to **help-seeking** behaviours – not from others but from the use of sleep techniques (e.g. relaxation and sleep stories). She said that she was sleeping two hours later than normal during the pandemic, which appeared to be in line with her natural rhythm, as she did not have to get up for school. However, the return to school brought a scheduled wake-up time, which Faye felt able to stick to (motivated by school). However, as she was talking, and from re reading her interview, it seemed as though her sleep had returned to normal due to school imposed wake-times but that she was feeling more tired during the day. This was perhaps due to her having to get up earlier than what her natural body clock would like. I wondered whether this had an impact on how she viewed her sleep (i.e., perception that there were still some minor problems), even though her description of her sleep pattern seemed 'normal' for her age. There seemed to be something about the fluctuating nature of the pandemic that had been hard for Faye – from hope and the easing of restrictions to back into another lockdown, to easing again to **uncertainty** about new variants. In line with this, Faye was able to see that uncertainty, and its **impact on mood**, was one of the biggest reasons for her sleep difficulties.

Sarah

It was a little tricky to get to grips with Sarah's interview as there seemed to be some contradiction within the interview. I worried this was due to not understanding the question, me being leading or her feeling she had to answer a certain way based on what the project was about. This was unclear. It helped to summarise and clarify with her. I got the sense that Sarah was sleeping later and waking later in the pandemic and then on return to school, she still was sleeping later but was waking up earlier for school. She didn't appear to be affected by tiredness. Her account does not appear to be in line with previous interviewees. However,

I wonder if there is something about the relationship she has with school and her level of motivation to get back to academia that may be the reason for this. Sarah clearly said that school was her priority so I wondered if this may feed in to her perception of tiredness or her motivation to get back to a good sleep routine. This relationship between motivation to attend school and sleep was similar to what appeared to come from Faye's interview and I'm wondering about the difference between those whose sleep improved and those who didn't. **Motivation to change** seems important.

Gemma

Gemma's interview was really interesting in that it clearly demonstrated that she had entered a delayed sleep phase. Before the pandemic, she did not experience any problems with her sleep and minimal tiredness in the day, however, it appeared that the pandemic allowed her to 'slip' in to perhaps a more natural sleeping rhythm. When societal demands returned and she had to return to school, the change in her sleep pattern started to have a significant impact on her ability to function at school and motivation. Her sleep pattern seemed to remain the same even with school going back and so I wonder whether the extended nature of the lockdown period, meant that late sleeping become more of a norm for Gemma. Again, the idea of **making new habits** seems to be key in sleep problems starting and continuing. Gemma herself felt that her body itself had just 'got used to it'**.** At the present time, even though structures of daily life are back, she continues to get to sleep later than she had previously (11pm before the pandemic). Unfortunately, late sleeping and early rising meant that she had extreme tiredness in the day which was leading to her falling asleep in lessons and on one occasion missing her morning lesson. Gemma seems to put less importance on school, perhaps in relation to a general low motivation. It seems like relationship with school is important, perhaps to do with how motivated they are to improve sleep. Makes me think of Sarah's interview.

Another thing that Gemma noted was an increase in use of social media. Before the pandemic, she would prefer face to face contact with friends, however, with the lockdown, she had to rely more heavily on virtual communication. This developed a pattern of using her phone late into the night (**use of technology**) to communicate with friends perhaps through a fear of missing out?

Annie

Sleep quality was more of a problem for Annie now. Even though she initially had trouble getting to sleep, this was no longer a problem. What remained was night-time waking. Annie would wake a couple of times a night for unknown reasons, and it would take her a long time to get back to sleep. Although Annie struggled to say why this was, she did acknowledge an increase in worries/anxieties about schoolwork (**increased stress**) and also people becoming unwell with the virus. This seems to be a common thread between all the interviews so far and I'm wondering if all the worries, increased technology use and feeling of loss was contributing to having **a lot on their minds**, which can impact on one's ability to sleep.

At the start, Annie used her phone as a way to escape pandemic news, however, this use became problematic when using social media, resulting in endless scrolling which kept her awake. When societal demands returned though, her phone use reduced and anxieties about schoolwork took over (were more important). It would seem that technology use could be

both positive and a negative – positive in the sense that it allowed an escape and a way to communicate with friends but it also led to the pushing back of bed times. Overall **use of technology** seems key in the model. Things were getting worse about a month in – the uncertainty of how long it would last - **when is it going to end**? Things started to feel more effortful. Annie also felt **disconnected** from family which was hard. In terms of why sleep problems were continuing, the main reason for Annie appeared to be concerns about **having to catch up** with schoolwork, in relation to the time she had lost (the lost years?) – she felt unsupported by the school in her learning during the pandemic so felt quite behind now, which was on her mind.

Jess

What was interesting about Jess's interview was that her main sleep problems started following her infection with coronavirus. Although she had trouble getting to sleep at the start, this seemed to be short lived and related to **uncertainty** about what the virus was and **fear** of the unknown. She did, however, enjoy the **flexibility** of being at home and enjoyed spending quality time with her family. In relation to recent virus symptoms, she experienced fatigue which was impacting on daytime functioning. But also, the impact on her sleep seemed to be separate from this. Jess was unclear why she was waking up in the night but said that it felt like her body got in to perhaps a 'habit' of waking up, in line with previous interviewees. Also, something that felt important from my point of view was her **rumination on not sleeping**. Jess initially didn't highlight this to be an issue but later in the interview she did admit that she worries in the evening about getting enough sleep, perhaps anticipating a disrupted night's sleep. It does sound like her sleep pattern is changing slightly but the sleep disruption remains. Jess's lack of sleep was exacerbating the feeling of tiredness and impacting on her ability to function at school. She also spoke about feeling a little stressed regarding schoolwork as there was a lot to catch up on which could be another reason for the sleep problems continuing. Jess did not have major concerns about her sleep as felt hopeful for improvement but did make use of audiobooks to help with sleep (help-seeking).

George

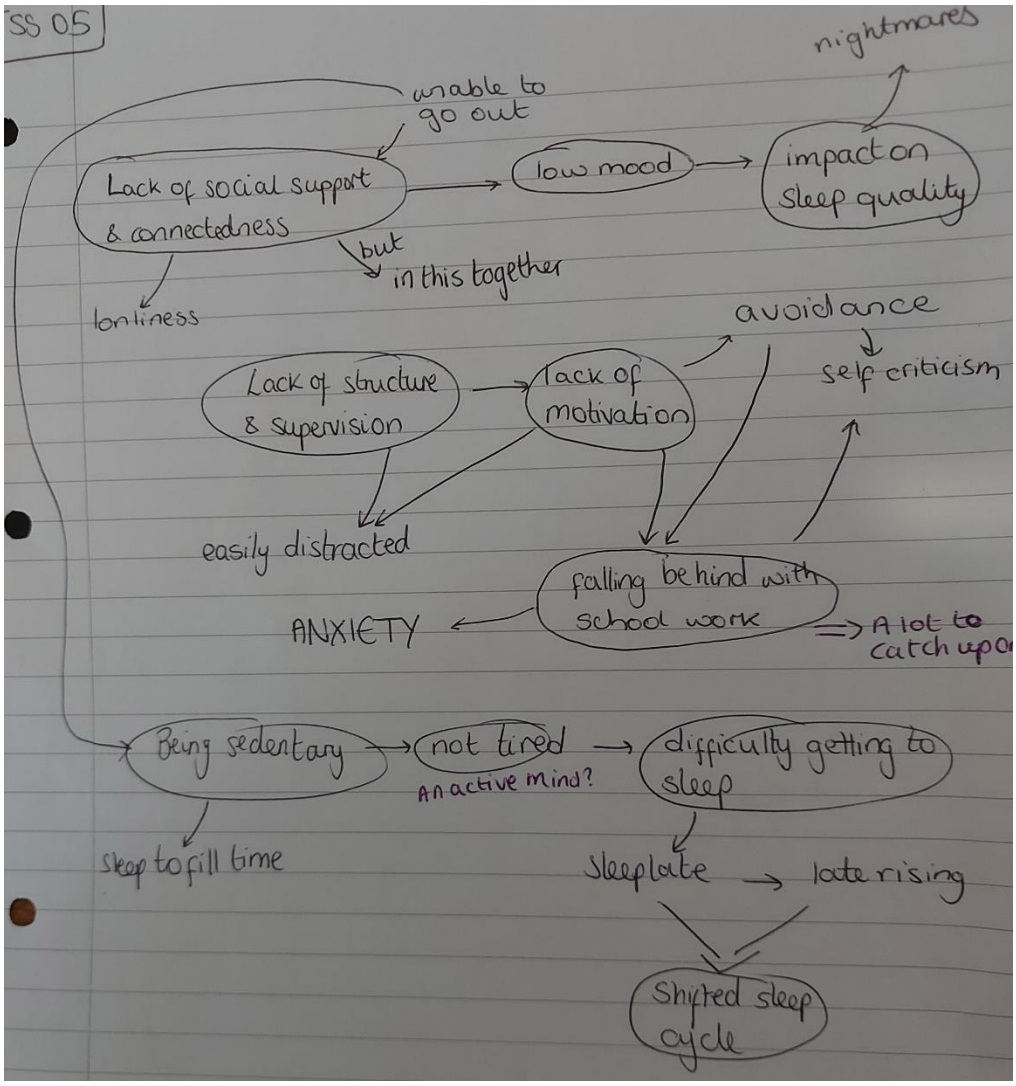
George had the most affected sleep pattern out of all the participants as his was so disrupted that he had to take time out from school. George spoke of having a history of sleep problems, however, he said that these became significantly worse during the pandemic. What was interesting about George was that he did not mention at any stage any feelings if anxiety and uncertainty, which came up in all other interviews. Although George recognised the experience of feeling **disconnected from others**, the loss of face-to-face contact appeared to suit George's personality style, although he admitted that he did become a bit of a recluse. The pandemic appeared to allow George to enter a natural pattern of sleep and he said that at the start his sleep was good, similarly to all of the other participants. For George, his preferred sleep pattern was sleeping in the day and being awake during the night. However, given the fluctuating nature of the pandemic (lockdowns and restrictions to this easing to going back into lockdown) made it hard to find a sleep pattern. His nocturnal patterns understandably did not work when online school started and led to him missing lessons and catching up on work in the evening. George spoke about going days without sleep, which at its worse resulted in experiencing hallucinations. Following a conscious seizure after 4-5 days of no sleep, George's mother was understandably very worried about George. I

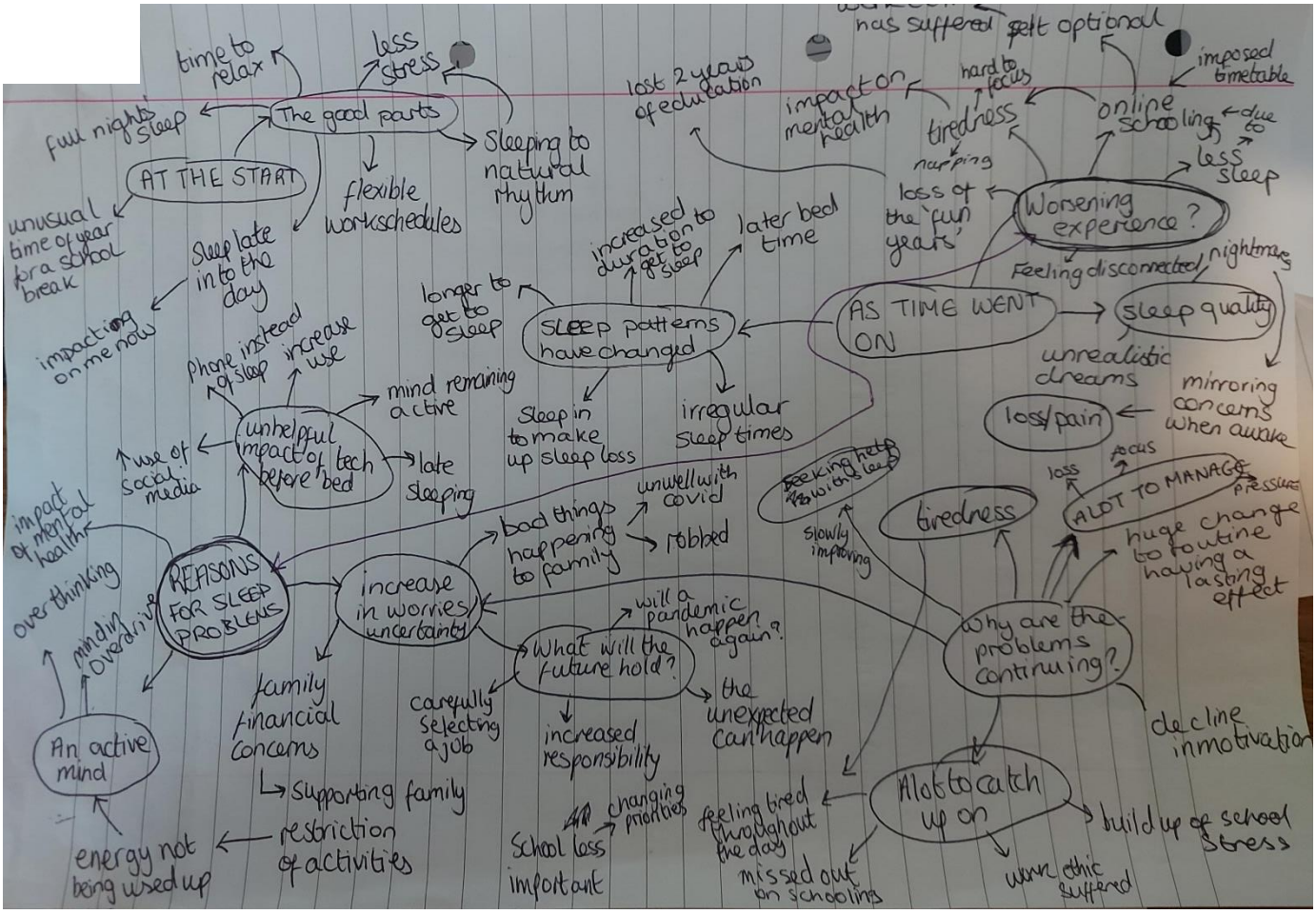
wondered whether this was perhaps why she allowed George to sleep as and when he needed (something about **parental influence** over sleep here?). Given the extreme nature of George's sleep difficulties, at the time of our interview George was no longer attending school and he was seeking professional support (**help seeking**) to support him to develop a healthier sleep routine so that he could return to school. George's perception of his continued sleep problems was that his body had got used to having little sleep (**new habits cemented**) so no longer needed it. I wondered whether this were true given the challenges he was having because of his sleep pattern.

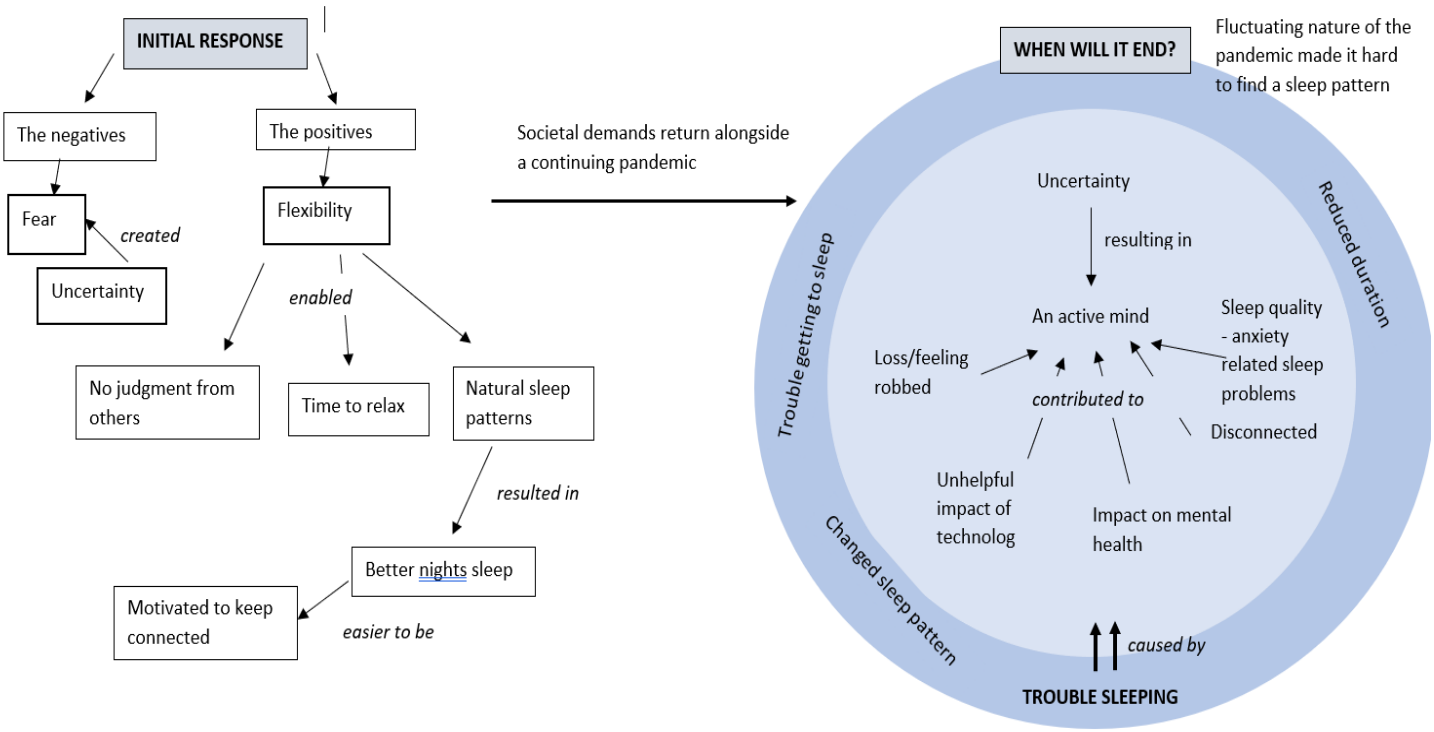
Nathan

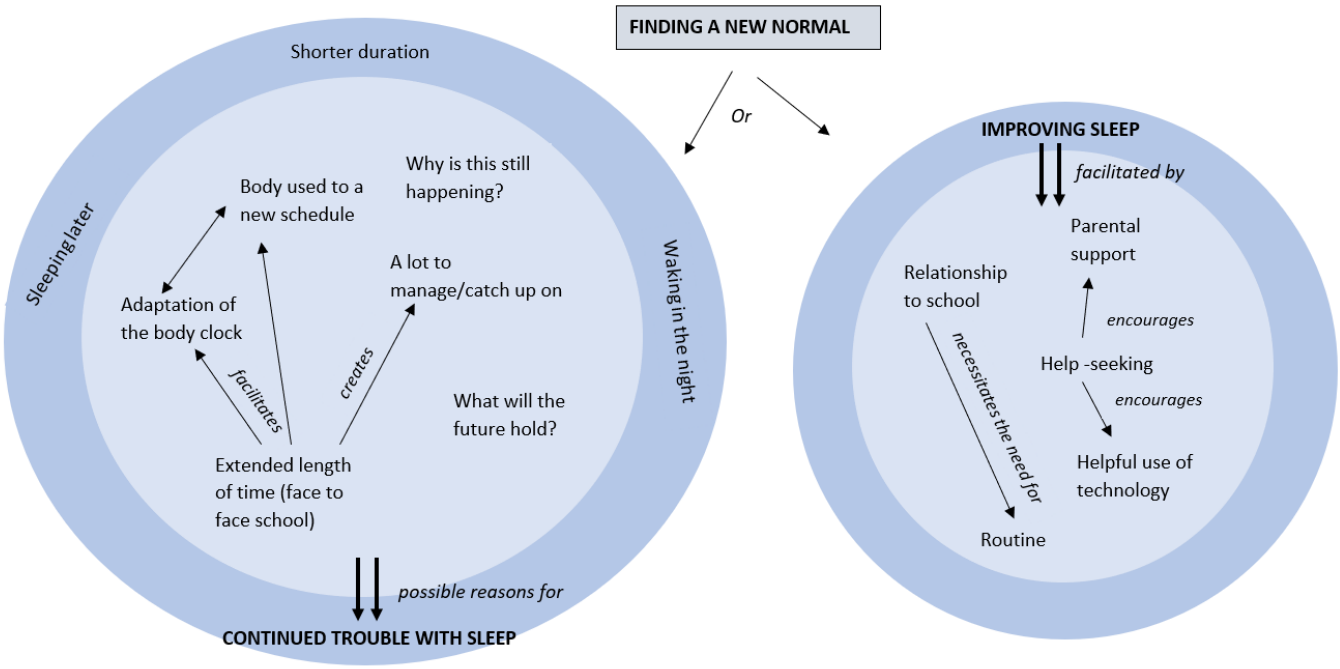
For Nathan, the most striking difficulty in relation to his sleep was the major decrease in duration during lockdown due to increased technology use to stay connected with friends. It appeared that maintaining these connections were prioritised over his sleep. Also, the addictive nature of social media added to this. Having to attend lessons virtually, and then spending free time on his phone or watching the TV, meant that he never had a break from screens. This was quite draining for Nathan, but still screen use remained high. Nathan was the first participant to recognise that sleeping later is a normal pattern of ageing, which is interesting, and I wondered something about the possibility of the "lost years" for other participants making it difficult to recognise this. In terms of continued sleep patterns, Nathan was able to recognise that it was better than in the pandemic but felt he still got too little sleep. He put this down to the increase in workload since returning to school face to face – perhaps due to there being more to catch up on (**increased stress**) due to the troubles he had concentrating on work during lockdown, which affected his grades. He recognised the compromise between working and sleeping and having time to relax.

Appendix M: Example diagrams used in the development of the model




time to relax
less stress
full nights sleep
The good parts
AT THE START
Sleeping to natural rhythm
flexible work schedules
unusual time of year for a school break
Sleep late in to the day
impacting on me now
has suffered
felt optional
imposed timetable
lost 2 years of education
impact on mental health
hard to focus
tiredness
online schooling
due to
napping
less sleep
loss of the 'fun years'
Worsening experience?
Feeling disconnected
nightmares
increased to duration to get to sleep
later bed time
longer to get to sleep
SLEEP patterns have changed
AS TIME WENT ON
sleep quality
unrealistic dreams
mirroring concerns when awake
loss/pain
Phone instead of sleep
increase use
mind remaining active
unhelpful impact of tech before bed
use of social media
late sleeping
Sleep in to make up sleep loss
irregular sleep times
Seeking help with loss
slowly improving
loss
focus
ALOT TO MANAGE
pressure
tiredness
huge change to routine having a lasting effect
impact of mental health
over thinking
REASONS FOR SLEEP PROBLEMS
bad things happening to family
unwell with covid
robbed
increase in worries/uncertainty
will a pandemic happen again?
What will the future hold?
the unexpected can happen
Why are the problems continuing?
decline in motivation
mind/body overdrive
An active mind
family financial concerns
supporting family
carefully selecting a job
increased responsibility
energy not being used up
restriction of activities
School less important
changing priorities
feeling tired throughout the day
A lot to catch up on
build up of school stress
missed out on schooling
work ethic suffered


INITIAL RESPONSE
The negatives
The positives
Fear
created
Uncertainty
Flexibility
enabled
No judgment from others
Time to relax
Natural sleep patterns
resulted in
Better nights sleep
Motivated to keep connected
easier to be
Societal demands return alongside a continuing pandemic
WHEN WILL IT END?
Fluctuating nature of the pandemic made it hard to find a sleep pattern
Uncertainty
resulting in
An active mind
Loss/feeling robbed
contributed to
Sleep quality - anxiety related sleep problems
Disconnected
Unhelpful impact of technolog
Impact on mental health
Trouble getting to sleep
Reduced duration
Changed sleep pattern
caused by
TROUBLE SLEEPING


FINDING A NEW NORMAL
Or
Shorter duration
Sleeping later
Waking in the night
Body used to a new schedule
Why is this still happening?
A lot to manage/catch up on
Adaptation of the body clock
facilitates
creates
What will the future hold?
Extended length of time (face to face school)
possible reasons for
CONTINUED TROUBLE WITH SLEEP
IMPROVING SLEEP
facilitated by
Parental support
Relationship to school
encourages
necessitates the need for
Help -seeking
encourages
Helpful use of technology
Routine

Appendix N: Ethics approval letter

This has been removed from the electronic copy

Appendix O: End of study report for ethics panel and participants

A grounded theory of how the covid-19 pandemic has affected, and continues to affect, the sleep of adolescents.

I am writing to inform you that the above research study has come to an end and I write now with a summary of the findings. I would like to thank all of the participants for giving up their time to take part in this research and for sharing their personal experiences of sleep during the pandemic, a difficult time for all.

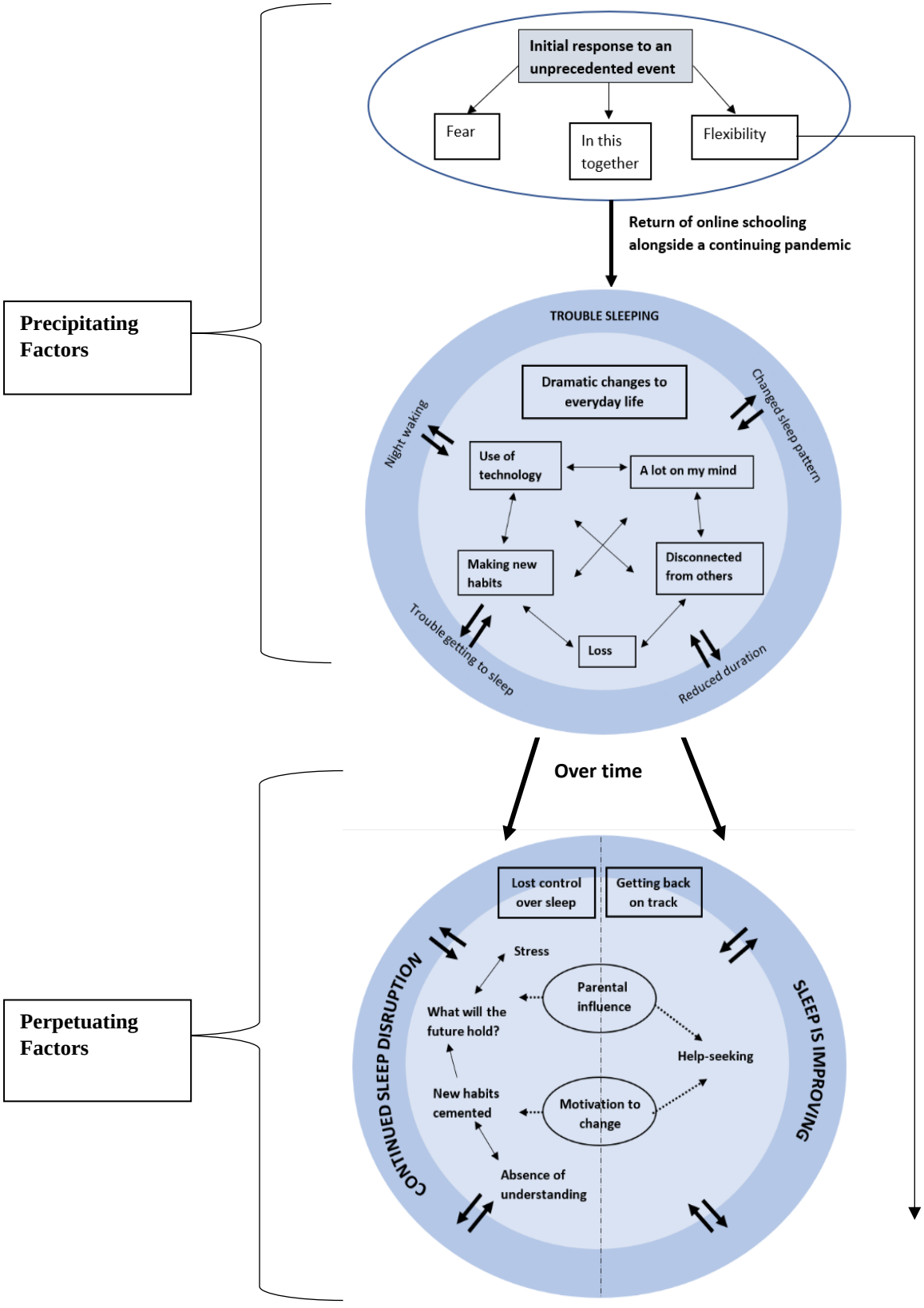
Background: In March 2020, the World Health Organisation declared the covid-19 virus a global pandemic. Research found that this unprecedented event impacted on the health and wellbeing of adolescents and caused significant sleep disturbance for many, with suggestions that sleep problems may continue to affect adolescents in the longer term.

Method: A grounded theory analysis was used to explore the sleep experiences of adolescents during the pandemic and to propose a theory to understand why sleep problems may have started, and what may be causing them to continue. Eleven adolescents aged 13-18 years who had noticed a change in their sleep since the pandemic were interviewed.

Findings: A theoretical model was developed, which suggested that when school returned online alongside a continuing pandemic, the initial flexibility in sleep schedules, allowed by the lockdown, became problematic. The continued feeling of disconnect and loss of activities meant adolescents turned to social media and other forms of technology to maintain friendships and reduce boredom. This increase in technology use delayed sleep times and new sleep habits were created. Additionally adolescents had a lot on their minds which affected their ability to sleep.

As time went on, some adolescents found that their sleep troubles perpetuated, and some had noticed improvements. The model suggests that uncertainty about what the future may hold and an increase in stress led to extended bedtimes. Also the extended length of time of significant disruption appeared to cement problematic sleep habits. Motivation to change was a mediating factor, with the importance that was placed on school appearing to influence whether sleep problems continued or improved. The more motivated to change the adolescent was, the more likely they were to want to seek help with their sleep. Parental influence was also another mediating factor, with parents that encouraged regular sleep schedules or

promoted boundaries around bed times, appearing to help their child's sleep improve. Those that sought help with their sleep, whether that be self-help or professional support, noticed improvements with their sleep.



Implications for research: Further research to test the applicability of the theory would be beneficial, particularly in years to come considering we do not yet know the longer term implications of Covid-19 for adolescent's wellbeing and sleep health. Further research would also benefit from taking a more systemic approach and interviewing parents or carers to further understand the influence that they may have on their child's sleep.

Implications for practice: The model provides a framework that is useful for professionals working with young people in the aftermath of the pandemic. Understanding from the adolescent's perspective what they perceive to be critical in maintaining problems provides a platform on which to provide effective and timely support in relation to their sleep. The model highlights the integral role of stress and uncertainty in the maintenance of sleep problems. Therapies such as CBT and mindfulness are well placed to help young people to cope with these challenges which, in turn, is likely to benefit their sleep also.

If you have any questions about these results or would like to discuss anything further then please do not hesitate to get in touch.

Kind Regards,

Emily Perry
Trainee Clinical Psychologist
Canterbury Christ Church University
ep409@canterbury.ac.uk

Supervised by Dr Maja Schaedel and Dr Holly Milling

Appendix P: Consent forms

Young person consent form, displayed via Qualtrics.

CONSENT FORM

Title of Project: How has the Covid-19 global pandemic impacted on young peoples' sleep?

Name of Researcher: Emily Perry, Trainee Clinical Psychologist

If you would like to participate in this study, please read each of the following statements and select yes or no. If you do not wish to participate, simply close this window.

I confirm that I have read and understand the above information sheet. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.

- Yes
- No

I understand that my participation is voluntary and that I am free to withdraw up until two weeks after my interview, without giving a reason.

- Yes
- No

Should I choose to withdraw from the study, I understand that I can ask for my data to be destroyed up until two weeks after my interview.

- Yes
- No

I agree for my interview to be audio-recorded.

- Yes
- No

I understand that data collected during the study may be looked at by the lead supervisor [Dr Maja Schaedel]. I give permission for this individual to have access to my data.

- Yes
- No

I agree for my parent/guardian to be contacted should the researcher, based on something I say, become concerned about my safety or the safety of others.

- Yes
- No

I agree that anonymous quotes from my interview and other anonymous data (e.g, age, gender, ethnicity) may be used in published reports of the study findings.

- Yes
- No

[Optional] I agree for my anonymous data to be used in further ethically approved research studies.

- Yes
- No

I agree to take part in the above study.

- Yes
- No

Parental consent form, displayed via Qualtrics.

CONSENT FORM

Title of Project: How has the Covid-19 global pandemic impacted on young peoples' sleep?

Name of Researcher: Emily Perry, Trainee Clinical Psychologist

If you would like your child to participate in this study, please read each of the following statements and select yes or no. If you do not wish to participate, simply close this window.

I confirm that I have read and understand the above information sheet. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.

- Yes
- No

I understand that my child's participation is voluntary and that I am free to withdraw them up until two weeks after their interview, without giving a reason.

- Yes
- No

Should I choose to withdraw my child from the study, I understand that I can ask for my child's data to be destroyed up until two weeks after their interview.

- Yes
- No

I agree for my child's interview to be audio-recorded.

Yes

No

I understand that data collected during the study may be looked at by the lead supervisor [Dr Maja Schaedel]. I give permission for this individual to have access to my child's data.

Yes

No

I agree that anonymous quotes from my child's interview and other anonymous data (e.g, age, gender, ethnicity) may be used in published reports of the study findings.

Yes

No

[Optional] I agree for my child's anonymous data to be used in further ethically approved research studies.

Yes

No

I agree for my child to take part in the above study.

Yes

No

Appendix Q: Debrief email to participants

Hi [name of young person]

Thank you so much for meeting with me and for taking the time to be part of the project.

If anything we have spoken about has upset you, or you are worried about your mental health then you can:

- Speak to a parent, carer or another trusted adult
- Speak to your GP
- Contact NHS 111 – call 111 or got to www.111.nhs.uk
- Contact Childline on 0800 1111. Childline offer a free counselling service for young people up until their 19th birthday.

If you have any worries about the information you have provided in your interview or have any further questions, then please reply to this email and I would be happy to answer any questions you have.

When the project is finished, I will send you a summary of the findings.

Attached to this email is a document with some tips that may help to improve your sleep. I hope that you find some of these suggestions helpful.

Thank you again for all your help.

Emily Perry
Trainee Clinical Psychologist

Appendix R: Abridged research diary

29.11.2019: Following the research fair, I found I was drawn to project in the area of sleep as I understand it is a growing field within psychology. Also due to my own experience of having a medical condition that requires me to get 'enough' sleep, I am particularly interested in what can go wrong when people experience disrupted sleep. However, this isn't a 'set' project like some of the others and so I will have to do some of my own research to think of a question to research.

10.01.2020: Looking at the literature, I am finding it hard to come up with ideas with enough literature in the area to support the project or a question that excites me. I want to stay away from NHS recruitment also as I've heard how tricky this can be. I will keep looking

16.04.2020: We have been hit by a pandemic! I spoke with my supervisor, and we thought that the pandemic could actually open up a possible research area as it is an obvious gap in the research due to this being a completely novel situation. My supervisor pointed me to an already growing body of research on sleep during covid.

19.07.2020: I've been doing a lot of research recently and have seen queries about a possible longer-term impact of disrupted sleep at this time. This is interesting as research suggests sleep disturbance is more prominent in times of acute stress – is there something about the pandemic that is keeping this stress going. I thought this likely due to no one really knowing when it is going to end! Thinking about this in terms of the younger age group in particular.

18.08.2020: After speaking with both my lead and second supervisor, I'm thinking that grounded theory would fit with my research topic. As covid is a new phenomenon, little is known about the long-term impact it will have on young people. Reading up a little on grounded theory (Corbin & Strauss, 2015) helped me to see that this would work well and helped me to establish the research questions. It does, however, feel very scary as I'm used to taking a quantitative approach to research and grounded theory looks a little complicated.

07.10.20: Finally completed the MRP proposal and sent this off to my reviewers.

31.12.20: The proposal has now been approved – hurrah!

12.02.21: Full approval of the project from the ethics committee has been received. Now to begin the research…

18.03.21: I have had no responses to my research advert and now feeling quite nervous about recruitment. Thinking about the impact of the research and considering my own position with regard to my research idea in terms of assumptions and biases I may bring. I'm going through the pandemic too so obviously have my own emotional responses to it but I am trying to hold in mind that others may experience the pandemic differently than me or may be affected in a different way.

18.03.21: Met with my supervisor who said she would share the advert on her Facebook page and a psychology page she is part of. Also created a rough timeline to stick to for hand-ins. Discussed whether it is okay to start Part A before my analysis – agreed it was as would never really be a 'blank slate'.

06.04.21: Interview 1 - Lucy: I felt really anxious initially, but Lucy was really chatty and easy to talk to. However, it made me see the challenges of a research interview! Lucy bought

spoke about some difficult feelings and I found it hard not to jump into a therapist type role. I found it difficult at times to know where to go and felt I was flitting back and forth a little. I think I expected social media to be spoken about and I had to really pull back from being leading – to my surprise, it did not come up for Lucy at all. I was surprised to hear how lonely and isolated she felt and how she had actually stated to feel completely demotivated to even reply to friends. Her self-critical thoughts about friendships made me feel quite sad and it made me think about the pressure to 'fit in' at this life stage in particular. It made me remember how difficult this period of life can be and I'm wondering how my own experience may impact on what I hear in the interviews. I was really struck about how open Lucy was with her personal experiences and I felt privileged that she felt about to share this with me.

08.04.21: Transcribing of first interview – was actually really nice to listen back. Although I realised I was a little clunky, I was able to pick up on more than I had during the interview itself. Seeing the importance of reading and re-reading.

23.04.21: Interview 2: As we spoke, it became clear that this participant was not actually eligible. They had no problems with sleep now and had only minor ones at the very beginning. Was also hard to get information from this participant.

29.04.21: Meeting with supervisor – told her about my concerns about recruitment and she said she was not concerned at this stage. This made me feel much calmer and I realised that recruitment is sometimes the hardest part. Feeling more hopeful after further suggestions of places to recruit from. I think sitting with uncertainty might just be something I have to learn to be okay with!

04.06.21: Interview 3 - Katie: wondering about Katie's motivation to attend school. Whether a loss of importance on school meant she was less motivated to get up, making her late. Remembering back to being an adolescent myself and how I viewed school as important so made sure I was up on time every morning so as not to be late.

10.06.21: Spoke to the deputy head at my old secondary school today. She was really interested in the project and really keen on helping out. She suggested that I recorded a PowerPoint presentation that she could show to all students in their form times. She also said that she could follow up this with an email to all students asking them to fill in a form if they were eligible and interested. This really felt fantastic that she was so keen to help out and I was feeling really hopeful about being able to recruit here.

16.07.21: Interview 4 – Melissa: What struck me about Melissa's interview was the sense of responsibility she had taken on, which felt like a lot to be thinking about at her age. She seemed to have picked up on family anxieties and taken these on herself, feeling worried about family finances, but also feeling concerned about her future in terms of coping with her own family. She was concerned a pandemic could happen again so was already thinking about jobs she could do where she was more indispensable. This seemed to be a lot of worries to have as a young teenager. I was really aware of just how difficult some of the young people's experiences was of the pandemic in areas I had not thought would be so troublesome for them. I was pleased to hear she was seeking support for her anxiety and sleep troubles.

17.07.21: Open coding

I started to open code the first three interviews. This was quite a long process, and I was unsure if I had done this correctly. I wanted to get this right as I knew that with this, I could focus the coding of future interviews. Also started to draw a couple of diagrams to help me to pull the data together a little better. This helped me to see where my codes could be more focused into categories. Plan to use these ideas when thinking about data from further interviews.

23.07.21: I've been thinking about how my data so far seems to fit with cognitive behavioural theory. Thoughts such as ruminating on having sleep problems and having worries and concerns in relation to school work, the continued uncertainty, and the safety of loved ones, all seem to feed in to the sleep problems. As well as this, there are behavioural choices that the young people seem to be making that extend sleep times, particularly in relation to an increased use of technology. The need for human connection seems to be of paramount importance in the data so far and technology is a way of gaining this but means that sleep duration is reduced due to later sleep times. Thinking about how young people are continuing in these cycles rather than being able to break them. Something to hold in mind for future interviews.

02.08.21: Met with my supervisor today. I had attempted to code my first couple of interviews and start some mapping of codes. I had sent some of the ideas prior to supervision and we reviewed this in supervision. My supervisor said that I was definitely on the right track which was so great to hear and gave me a little confidence boost. I had wondered about coding lines that weren't saying much and my supervisor reminded me about the importance of flexibility. This is something that Strauss and Corbin (1998) emphasise also.

We spoke about getting back in contact with my second interview to clarify a couple of points in the hope that this may open up another avenue of questioning. I started to see the value of carefully reflecting on the data and making interpretations which I could then review. From this meeting, I made some adaptations to my interview questions, adding queries around how young people's views of school may have changed since the pandemic and why things were different going back after just a normal school holiday than after the pandemic. This meeting really put my mind at ease but also made me realise how much else I had to do! The meeting helped me to see how the ambiguity of the analysis was what was making me anxious, as I tend to prefer structure. I still feel unsure about how I will end up with a theory at the end of this - I think I just need to continue and trust that the GT process works!

06.08.21: Interview 5 – Charlie: Interested about the 'chunks' of sleep problems that Charlie had. I wondered if this was related to particular stressful periods across the year, but Charlie did not seem to think there was a pattern. It was interesting that his friends had had similar experiences and I was unsure what this was about. I found it hard to think about how to code Charlie's interview as it felt uncertain. I wonder if this reflected the uncertainty he felt too about the pandemic and his future.

16.08.21: Interview 6 – Faye: The interview went well, however, I am querying her eligibility. She said she still has difficulties with sleep, but these appear to be very minor and improving with being back at school. Similar themes were, however, coming up in terms of concerns about schoolwork. Help-seeking through technology seemed to be key for Faye in improving her sleep but also perhaps her motivation to return to school and the impact this

had on her sleep. I spoke to my supervisor after this interview to discuss eligibility and was helped to see that actually having alternative perspectives were also an important part of the model – this is the young people's experience which is what I was trying to understand.

19.08.21: Feeling a little lost in the coding. I really can't see at this stage how I'm going to end up with a 'theory' with what I have. Spoke with another trainee who is also conducting grounded theory and found that they felt the same. We agreed to ask a couple of the staffing team if they may be able to arrange a time to speak with us for a Q&A session (it did, and it helped!).

20.08.21: Interview 7 – Sarah: At first I felt a little unsure why Sarah had volunteered to take part in the study as her sleep seemed like it was getting back to normal now, considering the advert says the sleep problems should be continuing. However, when I thought about this, and based on previous conversations I had had with my supervisors, I thought that this in itself was important to think about. Even minor changes to routine, perhaps even changes related to the natural change in patterns as one gets older did not seem to be recognised by Sarah, but she saw these minor changes as problematic. Perhaps this highlights a lack of awareness and understanding? It also interested me that she put the main reason for improving sleep down to the importance she places on school – needing to be well rested for school. I wondered whether there was something about the perception she took about her sleep being coloured by her motivation for achieving well at school. Perhaps she refused to see any issues because she did not want there to be?

30.09.21: I have been feeling quite pessimistic about my research study recently as still feel like I have a long way to go. I had supervision with both of my supervisors this morning and my mindset completely changed. I was helped to see that in grounded theory, the hypotheses are only held loosely in mind, and actually it is important that I am not trying to find what I want to find. This seems obvious now thinking about it but I got caught up in only finding sleep problems and the reasons for these continuing. Actually there is a lot more to the question. I needed to get what I thought I wanted out of mind and actually be led by what the young people were expressing. Because of this, we spoke about loosening the criteria a little in my mind and reflecting this in the advert, to recruit young people that have noticed a change in their sleep, not necessarily problems. This is because perhaps young people do not see the change as a problem. However, in getting a fuller understanding of what has been happening for these young people, developing the theory will fall out more naturally. I have decided to slightly amend my recruitment documents to reflect these changes and will be having another recruitment drive. I need to begin to think more flexibly in order to be less biased and not just finding what I want to find.

07.10.21: Interview 8 – Gemma: Feeling like there is a lot of pressure on adolescents to get up earlier than they would naturally want, which seems unfair. Wondered if this was making me quite annoyed and I wondered how my feelings were impacting on the interviews. I also had a sense that Gemma held some resentment about school which made me think about how a young person's perception of school may affect the way they respond, for example how truly motivated they are to improve their sleep. I was struck by the significant impact that a lack of sleep was having on her daytime functioning (falling asleep in class) and wondered why this in itself wasn't motivation to sleep earlier. Maybe this isn't fair - making me think

of how people view situations from different lenses and wondering if it is more something about being a teenager is hard due to competing demands. What's more important to them?

14.10.21: Interview 9 – Nathan: this interview really highlighted the addictive nature and unhelpful impact of social media

03.11.21: Now I am getting stuck into the analysis phase, having some queries around where to go and how the next stage of coding will work. Met with my supervisor to discuss the process and went through what I had so far. This gave me a little more confidence and my supervisor said I was definitely along the right track. She gave me some advice on how the theory develops, and how diagrams are really helpful to bring it all together. Will continue the diagrams in the hope that overarching categories may come to light.

07.11.21: Interview 10 – Jess: Rumination of not getting a good night's sleep was something that stood out for me in Jess's interview. Although she said that the sleep problems were triggered by the virus it seemed that anticipating a disrupted night's sleep may have been playing a major role in the continuation of these problems. Another thing that interested me was how un-phased Jess was by her sleep. She did not see it as particularly problematic so I wondered if my expectation of poor sleep being viewed as a problem could have impacted on the interview at all. Something to discuss with my supervisor.

07.11.21: Interview 11 – Annie: Annie seemed much more anxious about her sleep problems than Jess had been. Unhelpful use of technology came up again so I could see the significance of this in the developing model. I thought about how this was used as a way of escapism and also to maintain connections. Fears about having to catch up was also prominent in Annie's interview and I thought back to how this was related to a lot of other things that previous interviewees had disclosed.

09.12.21: Interview 12 – George: I was really struck by how significant George's sleep problems were, to the point where he could not attend school. I had not considered this level of disruption and it really made me think about the wider impact of the pandemic. His sleep became completely nocturnal so going back to school had created real issues. He was napping, missing lessons but also then not sleeping at night. When I spoke with him, he hadn't slept for 3 days so I was amazed at how alert he was. What stood out in George's interview, and came up a few times, was that he felt his body had been enabled to make new sleep habits, which were now cemented. This seemed aligned to habit formation theory. I also wondered about the influence that George's mum had and how she was the one that sought help for him, but perhaps equally didn't want to push him to be awake during the day too much as she was worried for her son's health (due to experiences George had of hallucinating and seizure-type activity following long periods of no sleep). This made me think about the vital role that parents play in their child's sleep.

27/01/2022 – Was feeling really unsure at the beginning of the day. Had no idea how my data was going to end up as a theory and feeling worried I wouldn't get there. Spent time going through one of the richer interviews again and actually found when I integrated this with later diagrams I could see some links within the open coding. This felt really positive. I started to regroup open codes of my first interview to see how they related and found that actually, very similar points were coming up with later interviews. Started looking at responses for the next two interviews to see if they fit similarly, which they did. Some contradictions so am

wondering if this is okay but felt much more positive by the end of the day. I could see that it will come together (hopefully!)

28/01/2022 – finalised the grouping of codes for 4 interviews. Starting to think more about the relationship between codes and what this means. Realising that not all the data can fit into the model – feels strange disregarding some codes but trying hard to think about what fits to my research question. Worry I am excluding too much. Hypothesising what core categories could be

03/02/2022: Continuing axial coding and thinking about selective codes. Open coding final interviews thinking about how they fit in with selective codes so far. Had an interview which didn't seem to fit with the model at all – an anomaly and unlike the other interviews – unsure how these fit and how to work this into my theory.

06/02/2022: Thought more about the interview I felt didn't fit in and taking a break from it and re-reading I was able to see that although it wasn't exactly the same, there were definitely key ideas that fit, particularly around ruminating on sleep troubles.

10/02/2022: Met with my supervisor who felt I was on the right tracks. It really felt like things were coming together and the model was taking shape. Feeling excited to see the final model.

Appendix S: Publication Guidelines of Journal Chosen for Publication

About this journal

Founded in 1945, the *Journal of Clinical Psychology* is a peer-reviewed forum devoted to research, assessment, and practice. *In Session*, a branch of the *Journal of Clinical Psychology*, focuses on the clinical challenges confronting psychotherapists, in the form of either a distinct patient population or a therapeutic dilemma. *Journal of Clinical Psychology* is a monthly, peer-reviewed publication that consists of eight issues of the *Journal* proper and four issues of its branch, *Journal of Clinical Psychology: In Session*. *In Session* maintains separate editorial operations, reviewers, and policies.

1. Submission and Peer Review Process

New submissions should be made via the **Research Exchange submission portal**. Should your manuscript proceed to the revision stage, you will be directed to make your revisions via the same submission portal. You may check the status of your submission at anytime by logging on to submission.wiley.com and clicking the "My Submissions" button. For technical help with the submission system, please review our **FAQs** or contact **submissionhelp@wiley.com**.

For help with article preparation **Wiley Editing Services** offers expert help with English Language Editing, as well as translation, manuscript formatting, and figure preparation.

Free format submission

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