

**Subjective Social Status and Social Comparisons with Peers at University and
Associations with Sleep and Mental Health**

Gamze Kocdemir

Medical School, Lancaster University

July 31, 2024

This thesis is submitted for the degree of Doctor of Philosophy

31st July 2024

Acknowledgements

I cannot thank enough my supervisors Dr. Judith Lunn and Dr. Guillermo Perez Algorta for their constant support and excellent leadership during the PhD process. This thesis would not be possible without their valuable feedback, organisational skills, suggestions, guidance and patience. I would additionally like to express my gratitude to the Turkish Ministry of National Education for sponsoring my PhD in the UK, and those who initiated the scholarship for the study abroad program nearly a century ago. Finally, I extend my appreciation to all examiners on the confirmation panel and the viva voce for their constructive feedback in enhancing my thesis; to all participants for their contributions; and to my family and friends for their ongoing support.

Declaration

I declare that this thesis is my own work and has not been submitted in any form for the award of a higher degree elsewhere.

Gamze Kocdemir

Contents

Chapter 1	Literature Review: Social Development, Sleep and Mental Health	
	in Adolescence	
	Definition of Terms	13-16
	Social Development in Adolescence	17-36
	Sleep and Circadian Rhythms in Adolescence	36-51
	Depression, Anxiety and Burnout in Adolescence	51-54
	Connections Between Social Factors, Sleep and Mental Health	54-78
	Covid Pandemic and Its Effects on the Programme of Work	79-80
	Overview of Main Issues in the Literature and Summary	80-82
Chapter 2	Aims, Objectives and Design of the PhD Thesis	
	Aims and Objectives	85-86
	Motivation and Reflection on Own Reasons for Undertaking	
	Research	86
	The Study Context	87
	Research Design	87-90

Ethical Approval and Funding	91
Research Timeline and Impact the Covid Pandemic had on the Research Design	91-94
Chapter 3	Subjective Social Status, Sleep Quality and Mental Health in the First Six Months of University: A Two-Wave Prospective Cohort Study of First Year University Students in 2020 and 2021
Abstract	96
Introduction	97-102
Methods	102-112
Results	113-119
Discussion	120-125
Chapter 4	The Role of Sleep Quality in the Relationship between Subjective Social Status and Mental Health Outcomes: An Exploratory Mediation Analysis
Introduction	127
Methods	128
Results	128-134
Discussion	135
Chapter 5	A Systematic Review of Sleep Interventions to Alleviate Depression and Anxiety Problems and Improve Sleep in University Students
Abstract	137-138

Introduction	139-142	
Methods	142-155	
Results	155-183	
Discussion	183-188	
Chapter 6	Evaluating an Academic Social Comparisons and Burnout Workshop Using the Kirkpatrick Evaluation Tool	
Abstract	190-191	
Introduction	192-198	
Methods	198-211	
Results	211-225	
Discussion	225-230	
Chapter 7	General Discussion and Conclusion	231-244
References	245-277	

List of Tables

Table 2.1	A Summary of the Aims, Design, Measures and Approach to Analysis in the Three Studies	88-89
Table 2.2	Chronology of PhD Research Activities	93-94
Table 3.1	Demographics of Participants in Cohort 1 and Cohort 2 with Reasons for Inclusion and Exclusion in the Main Analysis	104-108

Table 3.2 The Mean and Standard Deviations of the Study Variables on Social Status (SSS), Sleep Factors (MEQ, PSQI) and Mental Health Outcomes (GAD-7, PHQ-9)	114
Table 3.3 Cronbach Alpha Values of Subjective Social Status, Chronotype, Sleep Quality, Anxiety and Depression Measurements in Cohort 1 and Cohort 2	115
Table 3.4 Results of the Repeated Measures on Subjective Social Status, Sleep and Mental Health Outcomes	117
Table 3.5 Results of the General Linear Models with SSS, MEQ and PSQI as Predictors of Mental Health Outcomes after 6 Months at University	119
Table 4.1 Correlations of SSS, Sleep Quality and Mental Health in the Merged Dataset of Cohort 1 and Cohort 2 in Wave 1	129
Table 4.2 Correlations of SSS, Sleep Quality and Mental Health in the Merged Dataset of Cohort 1 and Cohort 2 in Wave 2	132
Table 5.1 PICO framework for Systematic Review of Sleep and Mental Health Interventions	143-144
Table 5.2 “Traffic light” Plots of the Domain-Level Judgements for Each Individual Result in Risk of Bias Assessment of Randomised Studies	152
Table 5.3 “Traffic light” Plots of the Domain-Level Judgements for Each Individual Result in Risk of Bias Assessment of Non-randomised Studies	153
Table 5.4 Studies Included in the Systematic Review	170-182
Table 6.1 Sociodemographic Characteristics of Participants	212

List of Figures

Figure 1.1 Thesis Roadmap	83
Figure 2.1 Research Design	90
Figure 4.1 The Mediator Effect of Sleep Quality Between SSS and Anxiety in Merged Data of Cohort 1 and 2 in Wave 1	130
Figure 4.2 The Mediator Effect of Sleep Quality Between SSS and Depression in Merged Data of Cohort 1 and 2 in Wave 1	131
Figure 4.3 The Mediator Effect of Sleep Quality Between SSS and Anxiety in Merged Data of Cohort 1 and 2 in Wave 2	133
Figure 4.4 The Mediator Effect of Sleep Quality Between SSS and Depression in Merged Data of Cohort 1 and 2 in Wave 2	134
Figure 5.1 Search Process for the Systematic Review	149
Figure 6.1 The Workshop Programme	204-209
Figure 6.2 The Four Levels of Kirkpatrick Evaluation Tool	213
Figure 6.3 A Graph to Show the Frequency of Responses as to What Part of the Workshop Participants Found Valuable	217
Figure 6.4 A Graph to Show the Frequency of Responses as to What Specific Knowledge or Skills Participants Acquired during the Workshop	219
Figure 6.5 A Graph to Show the Frequency of Responses as to How the Workshop Will Influence Participants' Future Behaviours	223

Appendices

Appendix A Ethical Documents	278-429
Appendix B Demographics of Participants	430-431
Appendix C Drop-Out Analyses	432-433
Appendix D Detailed Table for Risk of Bias in Included Studies	434-446
Appendix E Results Section: Academic Social Comparisons and Mental Health	447-452
Appendix F Workshop Script	453-460
Appendix G Workshop Toolkit	461-476

Abstract

University is frequently the first experience of living together with peers. Living with others might increase interactions but can impact subjective social status, sleep and mental health. At present, there is an absence of studies looking at changes in subjective social status and sleep-related characteristics during the first year of university, and how they could predict poor mental health outcomes in transition to university. This thesis aimed to understand the connections between subjective perceptions of social status compared to peers in the transition to university and sleep factors in predicting mental health. The thesis contains three studies that have used mixed methods to understand the connection between subjective social status with sleep and mental health. The data at two-time points were collected in the first study. At the beginning of university and again after six months and was conducted with the 2020 and 2021 entry cohorts. The results showed that a change towards a lower subjective social status from high school to university, poorer sleep quality, and a greater eveningness profile were all associated with poorer mental health outcomes in the first six months of university. The second study was a systematic review to see whether sleep and mental health interventions designed for university students addressed social factors such as social comparisons and perceived social status. The systematic review revealed that sleep and mental health interventions for university students did not specifically address factors such as social comparisons or subjective social status. The third study was developed from an additional exploratory analysis of data from the first study and the results of the systematic review. The third and final study involved the development and delivery of a pilot workshop about academic social comparisons and burnout to understand the experiences of university

students and the necessity of increasing awareness on this topic. The workshop was further evaluated with thirteen small groups of students who reported it was highly relevant and that they valued learning different strategies on how to decrease adverse social comparisons. The workshop findings have also been developed into a toolkit to share with staff teams responsible for supporting student well-being in higher education settings. Overall, this work contributes to our understanding of how perceptions of social status and comparisons with our peers on academic performance are predictive of lower sleep quality and poorer mental health outcomes frequently reported in higher education student populations.

Keywords: subjective social status, sleep, depression, anxiety

CHAPTER 1**LITERATURE REVIEW: SOCIAL DEVELOPMENT, SLEEP AND MENTAL HEALTH IN
ADOLESCENCE**

Definition of Terms

This opening section provides definitions of the key terms that underlie the research described in this thesis. The following definitions, therefore, establish a basis of understanding for the succeeding chapters.

Subjective Social Status (SSS): This construct refers to an individual's perception of their social standing in comparison to others within their community or society (Davis, 1956). Individuals engage in social comparisons to ascertain their social rank. In adolescence, gaining status amongst peers becomes increasingly significant, accompanied by a heightened tendency to make social comparisons with others (Koski et al., 2015). SSS differs from objective social status, which refers to an individual's social standing based on factors like income, education, and employment (Adler et al., 2000). One dimension of SSS commonly examined in adolescent studies is popularity. SSS is measured as Familial Subjective Social Status and Subjective Social Status in Society and among Peers in school. School-based SSS may serve as a better predictor of sleep and mental health in adolescents. It is measured in this thesis as the score obtained from the School-Based Subjective Social Status Scale.

Social Comparisons: This concept describes the process of evaluating or enhancing certain characteristics of oneself by comparing themselves with others (Suls et al., 2002), which in turn, impacts subjective social status. The form and type of social comparisons will differ depending on the environment or context, and vary along different individual trait dimensions. They are linked to different emotional responses that will have differing effects on well-being (Vidal & Wissow, 2023). Social Comparisons are measured in this thesis as the score in the Iowa-Netherlands Comparison Orientation Scale and the Social Comparison and Interest Scale.

Social and Non-Social Rewards: Rewards are essential for encouraging behaviour and reinforcing actions and can be classified into social rewards and non-social rewards (Schwartz et al., 2019). Social rewards include social signals such as smiling faces, gestures, and compliments (Matyjek et al., 2020) as well as relational factors including friendship, prosocial behaviours, social interactions, and communal activities that foster group cohesion, collaboration (Schultz, 2015). Gaining approval and status amongst peers can also be considered a form of social reward. Adolescents have heightened brain activity in response to social rewards, indicating that adolescence may represent a phase of heightened sensitivity to all social cues (Foulkes & Blakemore, 2016). Non-social rewards are considered to include financial rewards, meals, drinks, and other material or visual stimuli (Matyjek et al., 2020). Monetary tasks have frequently been used as non-social rewards in several research studies on reward processing (Mori et al., 2016; Schwartz et al., 2019; Straub et al., 2015). Social Rewards are measured in this thesis as the score in the Social Reward Needs Questionnaire.

Circadian Rhythm: The circadian system regulates the timing and length of sleep by maintaining an approximately 24-hour internal rhythm that synchronises with environmental cues. The circadian rhythm is essential for controlling biological activities such as the sleep-wake cycle, body temperature, hormone secretion, eating behaviour, and mental and physical functioning (Montaruli et al., 2021). In the human population, there is a normal distribution observed in the alignment of the circadian system with the regular day-night cycle, and therefore a diverse set of circadian preferences known as chronotypes (Ashbrook et al., 2020).

Chronotype (Morningness-Eveningness): During a 24-hour cycle, an individual's inclination for increased activity or sleep can be defined through the concept of morningness-eveningness. Three chronotypes have been identified: Morning, Neither (Intermediate), and

Evening types. An individual's chronotype exists on a spectrum ranging from morning to evening types. Individuals lacking a distinct circadian preference are classified as N-types because of their intermediate traits (Montaruli et al., 2021). Approximately 40% of the adult population is categorised under one of the two extreme morningness-eveningness categories, whilst 60% are categorised as neither type (Adan et al., 2012). Morning types will go to sleep and awaken early, attaining optimal mental and physical performance in the morning. In contrast, evening types rise and sleep later, achieving peak performance in the later part of the day (Adan et al., 2012; Montaruli et al., 2017). A certain percentage of the population's variance in sleep-wake chronotypes is determined by genetics and is evidenced by single-gene mutations that result in noticeable early or late chronotypes (Ashbrook et al., 2020). Chronotype is measured in this thesis as the score in the Morningness-Eveningness Questionnaire.

Sleep Quality: It refers to the subjective and objective assessment of how well individuals sleep. It is a multifaceted concept that includes numerous dimensions of sleep, such as sleep latency (how long it takes one to get to sleep), sleep duration, sleep efficiency, and sleep disturbances (Buysse et al., 1989). Sleep Quality is measured in this thesis as the score in the Pittsburgh Sleep Quality Index.

Mental Health: Mental health is not mental illness; however, inadequate mental health may result in psychological disorders (Government of Canada, 2020; Manwell et al., 2015). In the context of this thesis, the focus is on depression and anxiety, which are common and frequently examined mental health issues in the university context.

Depression: Depression is a common disorder characterised by diminished interest or pleasure in activities, pervasive hopelessness, sleeplessness or excessive sleepiness, fatigue, impaired concentration, cognitive impairment or anxiety, and thoughts of suicide (Kroenke

et al., 2001). Depression is marked by cognitive distortions, ineffective emotional control and unfavourable biases in attention and memory (LeMoult & Gotlib, 2019). It may result in significant interruptions to everyday activities. Depression is measured in this thesis as the score in the Patient Health Questionnaire.

Anxiety: Generalised Anxiety Disorder is also one of the most common mental health problems and is characterized by feeling nervous, anxious or on edge, and being restless for more than two weeks (Spitzer et al., 2006). Anxiety disorders are conditions that significantly impair quality of life and psychosocial functioning (Mendlowicz et al., 2000). Anxiety is measured in this thesis as the score in the Generalised Anxiety Disorder Questionnaire.

Burnout: Burnout and depression have shared characteristics; nevertheless, burnout is linked to one's professional life and job role (Maslach et al., 2001; Schonfeld et al., 2016), in contrast to depression, which is contextually independent (Bakker et al., 2000). Though burnout is typically linked to occupational settings, university students can also report symptoms associated with the Burnout phenomenon. Burnout scores are not measured in this thesis. However, the relationship between academic social comparisons and burnout, as well as the relevance of these concepts for university students, is discussed through a workshop."

Universities: The term "universities" was used throughout the thesis as opposed to both college and university to improve clarity, as all studies reported were conducted in university settings, unless otherwise stated.

Social Development in Adolescence

This section describes the increasing importance of social status in adolescence, the psychological factors that contribute to this increase, and the resultant greater prevalence of social comparisons observed throughout the adolescent period. It discusses the developmental trajectory of social status among peers, which becomes increasingly significant from childhood to adolescence, and remains important in the university years. It describes work that has examined perceived social standing amongst peers and how this social evaluation might alter over university years. It also defines and outlines the theoretical frameworks associated with social status and social comparison and the methodologies employed to measure social status.

Subjective Social Status in Adolescence

Social interactions and social status amongst peers become increasingly important during adolescence. Adolescence is a period of identity development and developing a status-related identity is a part of identity development (Vidal, 2024). The focus on social context and peer relationships is considered a key characteristic of the adolescent developmental period, which is broadly defined here as the period between 10 and 19 years old. Compared to earlier childhood, peer relationships become more significant during adolescence. Several studies have shown that the adolescent period differs from childhood and adulthood in this respect. Studies consistently emphasise that peer social status is a central focus for adolescents (Koski et al., 2015; La Fontana & Cillesen, 2010). Social status refers to the position or rank of a person or group within a society, and it includes perceived popularity as one dimension or domain of social status (Lease et al., 2002). Popularity studies are prevalent among adolescents given the known salience of this dimension during this developmental period. For example, a key study was conducted by La Fontana and Cillesen (2010) who investigated how much children and adolescents value peer group popularity

over other aspects of their relationships. Participants were 1013 children and adolescents aged 6 to 22 years old who were given a series of social dilemmas in which gaining popularity was pitted against five other priorities: friendship, personal success, obeying rules, prosocial behaviour, and romantic interests. The importance of popularity was found to have a curvilinear tendency that peaked in early adolescence. Participants preferred status enhancement over other dimensions during this stage. This finding is important in indicating the increasing importance of social status during adolescence.

It is essential to gain insight into why social status matters for adolescents to understand its effects on mental health, which will be discussed later. The heightened significance of social connectedness with peers and social status throughout adolescence has been linked to how brain networks attribute value to peer acceptance and rejection. Emerging neuroscientific evidence suggests that adolescents exhibit heightened emotional intensity and irregular activation of socio-affective neural networks when processing information related to social evaluation and the internal states of others (Somerville, 2013). It has been argued that this reflects adolescents' efforts to establish their social standing by evaluating themselves in relation to their peers. However, heightened emotional intensity in socially evaluative situations may increase vulnerability to mental health issues, particularly when social status is perceived as lower compared to peers. Consequently, one's subjective social status relative to peers, is a key component in adolescence, but the perceived social status at this period may potentially lead to adverse effects on mental health.

Establishing status hierarchies is another simple form of social exclusion often observed in social animals such as mice (Uhrich, 1938), birds (Noble, 1939), and baboons (Bergman et al., 2003). The animals at the lowest position in a social hierarchy experience social exclusion in a manner that closely resembles the phenomenon observed in humans. They are deprived of access to economic and social privileges, and in hierarchies, those at

the top restrict access to food, preferred places, and mates to those lower down. The process of being excluded or included in social groups is an essential component of social life during adolescence in humans as well (Hitti et al., 2016) and gaining social status amongst peers is related to being accepted by the social group. Horn (2006) examined the correlation between social group status and group bias in relation to adolescents' cognitive processes about social acceptance. According to this, those belonging to high-status groups were selected more frequently than those belonging to low-status groups to take part in school activities in general. Social status, therefore, is related to social acceptance and rejection and it is known that experiences of social rejection during adolescence can have detrimental consequences for mental health and well-being in adulthood. Therefore, more extensive research is required on social status processes during the protracted period of adolescence encompassing the transition to university.

Acceptance and rejection by the peer group during adolescence and the achievement of higher social status amongst peers are important experiences as they are also likely to influence psychological adaptation in early to middle adulthood. For example, a longitudinal study from age 10 to age 43 by Zettergren et al. (2006) confirms the importance of gaining social status and social acceptance for adolescents. The study comprised a statistically representative sample of 445 females. According to this study, peer status groups consisting of rejected, popular, and average females between the ages of 10 and 13 were linked to adjustment in young and middle adulthood. The findings indicated that girls who were rejected during their youth had a higher likelihood of engaging in criminal behaviour and were particularly prone to alcohol consumption, with a two-fold and eight-fold increased risk respectively by the time they reached young adulthood. This longitudinal study highlights the importance of social status, acceptance or rejection from the peer group in predicting social and emotional outcomes in later life. Therefore, investigating changes in

subjective social status among peers during the transition to university may contribute to mental health during and after university.

Social Comparisons in Adolescence

The importance of peer status explains the greater social comparison observed in adolescents. Heightened self-awareness linked to brain maturation in adolescence, along with a greater emphasis on status amongst peers, might increase the tendency for social comparisons. Social comparisons have an important role in social and identity development and studies indicate that they increase from childhood to adolescence. Social comparison is used for identity formation and is supported by evidence from 20 in-depth interviews with 12-14-year-old boys and girls. This study used the grounded theory approach to understand adolescent comparisons, specifically on body image (Krayer et al., 2008). Social comparisons help adolescents understand information about their social environment during a period of rapid developmental change. According to studies in the literature, social comparisons increase with age from childhood to adolescence. In one study, a total of 90 students from kindergarten, second grade, and fourth grade engaged in a 30 minute game of organising a sequence of five cartoon cards to construct a story with their peers (two females, two males from the same class). They assessed their competency compared to others and made judgements on their future performance. In this study, the social comparison information only consistently influenced the judgements made by the eldest group of fourth graders aged nine to ten years (Ruble et al., 1980). Ruble et al. (1980) state that the findings are in accordance with the study's hypothesis, which posits that the self-evaluations of younger children are not substantially influenced by social comparison. In a second study replicating the findings of Ruble et al.'s research, there was a total of 480 child participants. These included four different grade levels: second grade (7-8-year-olds), fourth grade (9-10-year-olds), sixth grade (11-12-year-olds), and eighth grade (13-14-year-olds) (Keil et al., 1990). The children

were asked if they perceived their performance in a bead-stringing task as a “good job” or “not so good job,” and if they considered their peers had performed a “good job” or “not so good job”. These questions formed the foundation for categorising students based on their use of a social comparison standard in performance evaluation. Among children, a higher percentage of eighth grade participants (76.3%) indicated that their judgments of their own and others' performance were impacted by relative performance, compared to second grade (41.7%), fourth grade (56.3%), and sixth grade (68.1%) participants. As a result of these findings the prevalence of young people assessing their achievement on a task based on their performance compared to that of others increases from middle childhood to adolescence. At present there is a need for more developmental research that directly compares social comparison tendencies in childhood versus young adolescents, and again, studies are needed that compare older adolescents and younger adults. This indicates a lack of knowledge of social comparison processes across development and into emerging adulthood, which would include the university context.

Individual differences in social comparison tendencies should also be addressed to understand subjective social status in adolescents because a key reason for social comparisons is to understand someone else's standing within the peer group (Festinger, 1954; Krayer et al., 2008). The positive and negative effects of social comparisons depend on individual factors (Krayer et al., 2008). Self-esteem, self-consciousness, depression, neuroticism, age, optimism and many other factors were connected to social comparison tendencies (Gibbons & Buunk, 1999). Depression and increased neuroticism may exacerbate negative social comparisons resulting in a decrease in subjective social status, whereas optimism may mitigate the adverse impacts of social comparisons and prevent a decrease in subjective social status. Alongside the individual differences noted by Gibbons and Buunk (1999), factors such as the significance of specific social comparison dimensions (that is, the

perceived social importance attributed to a particular dimension for the individual and their peers) can have varying impacts on subjective social status. The literature on social comparison in adolescents investigates which particular aspects or qualities will lead to the most social comparisons (that is, physical attributes, powerlessness, academic achievement); how much the comparison dimensions are important to the individual (Thwaites & Dagnan, 2004); their perception of how important or valued these dimensions are to other people (Gilbert et al., 1995; Santor & Walker, 1999); as well as the possibility of changing such qualities (Thwaites & Dagnan, 2004). For example, adolescents might prioritise being a popular person and perceive that their peers also give importance to this quality. If they feel less popular and think that changing this feature is also difficult, they might have lower self-perceived subjective social status.

The assessment of several dimensions of social comparisons during adolescence should also be considered. Several social comparison studies with adolescents particularly focused on physical attribute comparisons (Burnell, 2020; Krayer et al., 2008; Price, 2009). However, adolescents compare themselves with their peers on several different aspects such as academic comparisons in class (Boissicat et al., 2020; Pulford et al., 2018) and strive to specify their social status amongst peers as a part of identity development in adolescence. Therefore, it is necessary to concentrate the future research focus on several facets of social comparisons to have a comprehensive understanding of adolescents' social comparisons.

In summary, this section addressed the increasing importance of social status, social comparisons, and peer relationships from childhood through to adolescence, as well as the influence of individual differences, adolescents' self-perceptions, and peer evaluations on social comparisons and subjective social status. Currently, there is limited research addressing changes in subjective social status in late adolescence and emerging adulthood particularly among individuals entering university.

Social Development in University Context

The transition to university represents a significant change in students' lives during adolescence. During this period, the need for peer support intensifies and the meanings of popularity and friendship undergo significant shifts. Living in proximity to peers enhances opportunities for interaction which may increase negative social comparisons among individuals from diverse backgrounds and, in turn, lead to a decline in perceived social status. This section provides a detailed overview of research addressing these issues to facilitate a deeper understanding of the university context.

According to the theory of emerging adulthood, there are changes in friendships in the emerging adulthood period (ages 18-25 years corresponding to the time at university) (Arnett, 2015). Moving away from the family home and starting university are important life events which may lead to the restructuring of friendships. Peer interactions likely increase from high school to university for those students who live in shared accommodation with their peers. During periods of change, it appears that friends are relied upon as key constituents of support systems (Allan, 2011). Over time, students rely more on support from their housemates and less on support from family members. Home support by parents is important but becomes less significant compared to friends' support at university (Wilcox et al., 2005). According to a longitudinal study by Paul and Brier (2001) and a qualitative study by Wilcox et al. (2005) forming new social connections at university is crucial for adapting to the academic environment and improving overall well-being as well as increasing student retention at university. Foulkes et al. (2021) conducted a qualitative study on how UK undergraduate students interact with their housemates, and how it affects their psychological well-being. Themes derived from the data illustrate the various effects that housemates can have on undergraduates' lives. The authors found that participants report that, in one way housemates can significantly improve one's well-being. When a student is close to their housemates, they

provide a vital source of amusement, friendship, and support; a link that is made possible by their proximity and cemented by their shared life experiences. However, strained relationships with housemates can also lead to significant stress and reduced well-being. Living with peers in shared accommodation during the transition to university appears to be an important factor influencing overall adjustment to university; therefore, social comparisons and perceived social status should be evaluated within this context.

Both the nature and quality of friendships in early university life can be highly impactful on the individual and similarly, are likely to only lead to further increases in social comparisons with peers. Engaging in social comparisons that do not have detrimental consequences might promote personal growth and development. However, unfavourable social comparisons are more likely to result in insecurity about one's social standing among peers. As there is a focus on developing new friendships during the transition to university, there is an additional reason to focus on understanding changes in subjective social status and social comparisons with peers during this time of greater proximity and emphasis on relationships with peers.

A factor that leads to conflicts among peers at university might be insecurity related to social status. A study conducted by Li and Wright (2014) in a younger age group revealed that participants from diverse ethnic backgrounds held two important social status goals: popularity and social preference (that is, the desire to be popular or well-liked). These goals were found to be associated with social status insecurity (for example, "I worry that my peers do not like me") and social status insecurity predicted relational aggression and prosocial behaviours with peers. Consequently, social status insecurity might heighten relational aggressiveness and conflict while feelings of being preferred, liked, and popular among peers may mitigate social status insecurity. These social processes may also be active in the early years of university. Intensified interaction with peers in transition to university could

heighten the potential for experiencing insecurities about social status and lead to relational issues. Therefore, subjective social status within peer groups during the university years warrants examination.

Research on social status during the university period remains relatively limited compared to that conducted during early adolescence or the high school years. Lansu and Cillessen (2012) indicated that, although peer relations and social status have been extensively studied in high school settings, limited research has examined social status beyond high school. They also emphasised the significance of investigating social interactions and social hierarchies after high school as well. The significance and meaning of popularity, which is an important dimension of subjective social status in adolescence, evolves from high school to university. There is some evidence indicating that the importance of popularity declines in later adolescence (La Fontana & Cillessen, 2010), even though an emphasis on attributes related to popularity persists into the university period and early adulthood (Lansu & Cillessen, 2012). For example, O'Mealey and Mayeux (2022) reported supportive findings in their comparative analysis of popular peers throughout adolescence and emerging adulthood. They found a change in the description of popularity from high school to university in their cross-sectional retrospective study. A total of 218 undergraduates (70% female, mean age of 19.6 years) in the United States of America participated in this study. These participants provided assessments of their popular male and female peers at university, as well as retrospective assessments of their popular male and female peers from high school. Popularity at university is defined as being well-liked by peers and is characterised by helpful and cooperative behaviours, positive relationships with others, strong social skills, and active participation in campus groups. In contrast, the characterisation of popular high school students typically centres around their physical attractiveness, financial status, and athletic ability. During the stage of emerging adulthood, there is consequently a notable change in how popularity is

understood with a greater emphasis on qualities and actions that promote healthy connections and cooperation with others (O'Mealey & Mayeux, 2022). The significance attributed to popularity and social status should be evaluated in the context of the university. Throughout university, the significance attributed to popularity, as understood in the high school setting, is seen to diminish but what popularity entails also transforms. The value assigned to social status, therefore, has not diminished but instead has changed in meaning.

Social expectations and friendship objectives in the transition to university also coincide with a change in the definition of popularity. For example, Keup (2007) conducted a study that analysed in-depth interview data from nine students at three critical points during their transition to university. The purpose was to gain new insights into the nature of students' university expectations, their subsequent first-year experiences, and how expectation fulfilment or disillusionment affected students' adjustment to university. The study found that students' social expectations for the first year of university placed an even greater emphasis on interpersonal relationships and casual socialising. Additionally, most students anticipated that their university friendships would be deeper and more mature than their relationships with peers in high school. They believed that relationships in high school were built on a more superficial foundation of status, popularity, and appearance. Two new areas of student expectations about university emerged from the study's findings: interpersonal relationships and personal development (Keup, 2007). During the transition to university, the meaning and salience of popularity and friendships tends to evolve, as they become more mature yet continue to play a central role in students' social lives and adjustment processes. Therefore, understanding changes in perceived social status during the university period is essential.

Research is limited regarding the changes in subjective social status among the general university student population during the transition to university. However, Rahal et al. (2020b)

conducted a longitudinal study on university students to assess the connection between two forms of subjective social status (SSS) (SSS relative to same-dormitory peers and SSS relative to people at the university) and anxiety and depression symptoms reported in the past week. The findings indicated that both forms of SSS were uniquely negatively correlated with positive mental health during the early transition to university, although these associations diminished over time. Loeb and Hurd (2019) also measured SSS to predict its connections with grade point averages of underrepresented students at the end of their first year. They retrospectively measured high school SSS concurrently with university SSS. A total of 329 first-year university students participated, including individuals from historically underrepresented racial and ethnic minority groups, first-generation university students, or students from economically disadvantaged families who all attended a predominantly white university. SSS decreased for most students when they transferred from their hometown to the university. Gender, race or ethnicity, family wealth, and standardised test scores were all controlled, but the finding remained: a more significant reduction in SSS correlated with a lower spring grade point average (Loeb & Hurd, 2019). Students from underrepresented groups are more likely than the majority to struggle academically and eventually drop out. In summary, the evidence suggests students' self- perceptions of their social standing can significantly influence mental health in the first year of university. More studies are required to examine changes in SSS and how this may moderate mental health outcomes.

Theories and Theoretical Perspectives

The following subsection provides details of the key theories related to social status and social comparisons. Most of the theories are drawn from social psychology and the individual differences literature as there is no corresponding framework or model available from a child developmental perspective.

In adolescence and the university context, several theoretical frameworks are relevant,

including the social rank theory, social comparison theory and its sub-theories (such as selective accessibility and target immediacy), as well as complementary perspectives like self-esteem theory which posits that self-evaluations are shaped by the social environment, and reward system theory which emphasises adolescents' heightened responsiveness to social rewards. These theories provide a valuable framework for explaining the increase in depression and anxiety during adolescence and university terms.

Social Rank Theory

Social rank theory (SRT), initially known as social competition theory, has been investigated in numerous research studies within the context of depression. This theory proposes that depression arises from feelings of failure and entrapment which results from perceiving oneself to be of lower status than others or having a perceived lack of control over one's social status. Also, depression can be observed in some individuals after attaining and then losing status or possessions (Gilbert, 2016; Price et al., 1994).

Social rank theory provides significant insights to enhance the comprehension of depression among university students and is very relevant to the university students' population (Li, 2025). As students proceed to university, their academic self-concept can decline in the presence of classmates with high academic accomplishments (Marsh, 1987) leading them to see themselves as holding a lower subjective status than they have. Different departments establish distinct expectations, workloads, and cultural norms that influence students' academic self-perception and subjective social status. In departments marked by heightened workloads, a widespread culture of stress, and intense competition, university students may frequently compare their accomplishments with those of their classmates. For example, a contributing factor to the challenges faced by some first-year medical students is the feeling of falling behind their classmates and the general and academic social comparisons with their peers (Picton et al., 2022). Interacting and socialising with peers from diverse backgrounds including

socioeconomic status, race, and gender, may influence a student's view of their social standing (Posselt & Lipson, 2016). Emotions and moods are greatly impacted by an individual's assessment of their social standing, namely how much they feel inferior to others and are being looked down upon. Submissive behaviour often results from these perceptions. Shame, social anxiety, and depression are linked to defensive submissive techniques that individuals use when they are placed in undesired low-status or rank situations. Gilbert (2000) found that social anxiety and depression are strongly correlated with feelings of inferiority and submissive behaviour in a self-report study of students and depressive patients. The review by Wetherall et al. (2019) is also evidence for the social rank theory of depression. As a result of this review, as perceptions of social standing declined, depression symptoms (including suicidal thoughts and self-harm) increased. They emphasised the significance of comprehending an individual's perspective of their social status compared to others to understand the causes of depression and depressive symptoms.

Social Comparison Theory

According to Festinger's (1954) social comparison theory, people have an urge to compare themselves with others to assess their opinions and abilities. The concept of "social status goals" pertains to the desires that individuals develop to attain a specific peer status, including social approval or popularity. Cognition and ability assessments will influence behaviour. Having wrong ideas and making wrong assessments of abilities can be detrimental. A person's assessment of their ability to write poetry, for instance, will depend on their internal understanding of that ability. If the benchmark is clear and well-ordered it provides an objective basis for assessing one's own ability. Thus, it allows us to be less attached to other people's opinions. In the absence of objective and non-social self-evaluation measures, people compare their own opinions and abilities with others. For example, Festinger (1954) illustrates that in a situation where jumping ability is being evaluated, the assessment would be straightforward

if the criterion involved jumping from a single start point. However, Festinger (1954) questions how one determines their own intelligence or what running a certain distance in a specific time truly signifies about one's overall ability. During the transition to university, students may exhibit an increased tendency to compare their social and academic competencies with those of their peers as they manage a period of heightened uncertainty influenced by an unfamiliar academic and social setting.

Individuals engage in social comparisons for a variety of reasons. Festinger's (1954) social comparison theory posits three underlying reasons for social comparisons: self-evaluation, self-improvement, and self-enhancement. Self-evaluation comparisons are used to ascertain one's position in relation to others in terms of traits, abilities, and societal expectations (for example: how athletic am I compared to my peers?). Self-improvement comparisons are used to understand how to develop a specific trait or to solve problems (for example: how could I learn from her to be better in school?). Self-enhancement comparisons defend self-esteem and self-worth at times of uncertainty, allowing the individual to maintain positive self-perceptions. This includes discounting information as irrelevant to the self and portraying the other as inferior or less advantaged in a certain quality (for example: may be good at sports but not very academic) which also helps one feel superior and are typical self-enhancement processes. Adolescents engage in self-evaluative comparisons during their identity development, helping them to determine their position within the peer hierarchy.

The presence or absence of individuals with whom social comparisons can be made should be evaluated in a bidirectional manner. There is evidence from research on "degree of aspiration" that clearly indicates the volatility of ability appraisals in the absence of comparison with other people. According to the aspiration experiments, if the person scores as high as they expect after a certain test, they feel successful; however, if they score below expectation, they feel unsuccessful. If a person scores better than before, their previously perceived good

performance is no longer sufficient and their aspiration level rises. Conversely, if their performance decreases, aspiration also decreases. Even after a person has considerable experience on a task, the assessment of what constitutes good performance continues to fluctuate. Subjective assessments of opinions and abilities are not fixed in the absence of both physical and social comparisons (Festinger, 1954). On the other hand, the competitive environment at university, especially for disciplines like medicine, law, and engineering, may elevate students' internalised performance standards. Furthermore, when there are many options for comparison, individuals tend to choose the person closest to their own opinions and abilities for comparison. Conversely, when available comparison targets are too disparate, individuals may be unable to make accurate self-assessments of their own opinions and abilities. According to a study synthesising 60 years of social comparison research, people often engage in upward comparisons seeking out those superior to them in some manner even when their self-esteem is threatened, resulting in decreased mood and lower ability appraisal. These impacts are amplified when compared to proximal individuals (those closer to us) and on novel dimensions (Gerber et al., 2018). In conclusion, while the absence of social comparisons may affect the stability of self-evaluations, the lack of similar peers with whom individuals can make social comparisons may lead them to engage predominantly in upward comparisons by increasing internalised standards causing them to perceive their own abilities as considerably lower.

Social comparison theory encompasses several other relevant theoretical perspectives including downward comparison theory; construal theory and upward social comparisons, the selective accessibility model (SAM), target immediacy; and self-evaluation maintenance model (SEM) (Gerber et al., 2018).

Downward Comparison Theory. In his theory of downward comparison Wills (1981) claimed that when faced with a threat, individuals engage in downward comparison

as an attempt to recover their self-esteem. The hypothesis of downward comparison suggests that individuals who are feeling negative emotions might improve their overall sense of well-being by comparing themselves to someone who is less fortunate (Wills, 1981). Adverse emotions act as a threat to a person's sense of self; therefore, a downward comparison can act as a protective strategy against such threats. At university, students, particularly in highly competitive disciplines such as medicine, may be less likely to engage in downward comparisons when surrounded by peers with equal or superior academic abilities.

Construal Theory and Upward Social Comparisons. People may assimilate their self-evaluation upward to others who are perceived as having higher social status, according to Collins (1996, 2000). Collins was informed by early research on comparison selection based on the rank-order paradigm (Thornton & Arrowood, 1966; Wheeler, 1966) which showed that people prefer to compare upward.

The Selective Accessibility Model (SAM). Mussweiler and Strack (2000) and Mussweiler (2003) have also presented the selective accessibility paradigm which emphasises assimilation. When confronted with a potential social comparison, a person makes a shaky and quick assessment of likeness or dissimilarity to the comparison target. A university student with high grades can selectively emphasise their strengths when comparing themselves to a top-performing peer.

Target Immediacy. In self-evaluation, local information is more heavily weighted than distant information (Zell & Alicke, 2010). For example, although comparison information regarding other students at a university may have effects on a person's self-evaluation, those effects can be easily removed or muted by comparison information about other students in one's study course; those effects can be easily removed or muted by comparison information about students in one's residence.

Self-Evaluation Maintenance Model (SEM). Tesser's (1988) SEM is a predictive

model that examines how individuals maintain their self-evaluation when three distinct variables interact: self-performance in relation to another person, psychological closeness to the other as well as the importance of the comparison aspect in shaping one's self-identity. When faced with an upward social comparison involving a close individual in a personally significant domain, individuals might decrease either the self-relevance of the ability being evaluated or their perceived proximity to the other person.

Self-Esteem Theory

Self-esteem theorists also propose that an individual's ideas about the significance of areas related to oneself are profoundly affected by the social environment (Harter, 1990). As a support to it, evolutionary psychologists argue that an individual's self-worth is determined by how much they believe their traits can attract and maintain the interest of others (Gilbert et al., 1995). Another study showed that there was considerable correlation between how much individuals valued their self-worth based on certain qualities and how much they believed others were interested in them (Santor & Walker, 1999). In summary, the social environment influences an individual's self-assessment, self-worth, and the significance of the specific social comparison dimension. The increasing need for peer acceptance and the heightened significance of peer interactions during adolescence may increase the impact of peers' opinions on social comparisons.

Reward System in Adolescence

As previously stated, adolescents place a higher value on attaining social status than other age groups. The reward system, which is more receptive to rewarding stimuli during this period, is one major cause. Adolescents strive to be a part of a popular peer group; to be noticed by their peers, and to have a high standing among them holds significant reward value. Adolescence heightens social sensitivity and teenagers are more susceptible to social rewards. Blakemore and Mills (2014) argue that adolescence is a phase of both biological

and social transformation. During adolescence, the social cognitive skills required to handle more complex and personal connections continue to mature. During this stage of development, neuroplastic changes occur in the brain related to acquiring skills for navigating social settings. During the second decade of life, the regions of the brain responsible for social interactions experience changes in both their physical structure and their function. These changes are believed to be important for adapting to one's social environment and are considered a crucial phase of development.

Adolescents are assumed to be more responsive to social incentives than adults. Nevertheless, the process by which sensitivity to social reward evolves during adolescence and early adulthood remains uncertain. In a cross-sectional study conducted by Altıkulaç et al. (2019), the researchers examined the influence of age and gender on self-reported sensitivity to various social incentives. The study included a total of 271 participants aged between 11 and 28 years. The results indicated that there were distinct age and gender effects for each form of social reward. The feeling of being rewarded by receiving favourable attention from others peaked in late adolescence which coincides with the university period. This may indirectly highlight the necessity of evaluating peer acceptance and the pursuit of social status among university peers, as gaining social status serves as a reward that can attract peer attention. The enjoyment of positive reciprocal interactions with others also increased linearly with age, which aligns with study findings, indicating a shift in the interpretation of popularity towards more collaborative relationships at university. Girls reported less enjoyment of antagonistic actions toward others as they grew older, whereas boys reported higher levels across all age groups. The reward derived from giving control to others exhibited a decline around mid-adolescence, although the enjoyment of group interactions remained stable across different age groups. Overall, the results indicate that social reward is a complex construct that encompasses multiple aspects, each with distinct

connections to age and gender.

A Note on Measures of Social Status

There are several different ways to measure social status including objective social status, subjective familial social status, and subjective school-based social status. Objective social status describes the education and income of a family while subjective familial social status is the opinion of an adolescent about their family's social status. Subjective school-based social status is an adolescent's perception about his/her own standing among peers. Studies in the literature considered popularity or likeability nominations by classmates as a type of objective measure of social status (Van der Linden et al., 2010). According to this, a sociometric approach was used to assess likeability and popularity: On each of the eight questions, each participant could nominate an unlimited number of classmates. They were asked to provide names of classmates they thought to be (1) most liked, (2) a leader, (3) most popular, (4) most relationally aggressive, (5) a best friend, (6) cooperative, (7) humorous, and (8) physically attractive.

When they researched the subjective social status of adolescents, they asked about their position in society or the relative social status of their family instead of the young person's own perceived social status among their peer groups. For example, in a recent study by Rubin (2020), MacArthur's Subjective Social Status Scale (SSS) was used to investigate adolescents' perceptions of their place within broader society instead of amongst their peer groups. The measure consists of a 5-point ladder on which adolescents rate the social standing of their families relative to other families in their society.

In a different approach to measuring SSS, a study by Sweeting and Hunt (2014) used a 'school-based' subjective social status measure. That is, assessing a young person's place within their immediate peer group or their school year group. This study found that subjective school-based social status had stronger connections with adolescent smoking and drinking

habits than objective SES and subjective social status as measured by the McArthur ladders. The school-based subjective social status includes different areas such as school performance, attractiveness, and popularity, which are common indicators of peer status, and dimensions frequently addressed in the adolescent social development literature. There is, therefore, a clear need to assess school-based subjective social status when researching adolescence. According to the study findings reviewed above, assessment of school-based subjective social status is a better predictor of health and well-being outcomes than objective measures of socioeconomic status. These include the frequently reported mental health difficulties seen in adolescents and young people, notably depression and anxiety. This section highlights the growing significance of social status in adolescence and emphasises that, despite extensive research on social status and peer relationships before university, there has been insufficient investigation into these matters during university. The importance of social status is explained by alterations in brain growth throughout adolescence, heightened sensitivity to rewards due to alterations in the reward system, and certain aspects of identity development. The significance of utilising peer comparisons to assess perceived social status was highlighted more than comparisons with the members of society and the comparisons of their families in society, as this is a period when adolescents increasingly prioritise the achievement of social status among their peers. The subsequent section will examine another significant feature of adolescent development: sleep and circadian rhythms. This will expand on the neural connections between the reward system and the circadian system, clarifying the connection between perceived social status and sleep.

Sleep and Circadian Rhythms in Adolescence

This section addresses the influence of circadian rhythm on sleep and wakefulness, highlighting a developmental shift towards ‘eveningness’ in adolescence, the biological mechanisms (for example: homeostatic system) influencing this change, and the changes in

sleep and sleep patterns due to living together with peers in shared accommodation and increasing peer interactions during the transition to university. In addition, methods for measuring sleep are mentioned. This section clarifies the rationale for focusing on sleep throughout the adolescent developmental period which generally extends into the university years.

Biological Aspect of Sleep in Adolescence

The circadian timekeeping system plays a significant role in determining the timing of sleeping and waking. Chronotype is the term used to describe an individual's sleep-wake preference. It is not known to what extent it is inherited, whether a person is a night owl (late chronotype) or a morning lark (early chronotype) (Kalmbach et al., 2017). Kalmbach et.al. (2017) evaluated studies that used genome-wide association analyses to identify genes related to trait chronotype. Chronotype expression is found to be normally distributed in the population implying that many common genetic variations with mild effects contribute to the chronotype trait.

There is also clear evidence that there are developmental changes in chronotype that occur across the lifespan with a notable shift toward an evening preference during adolescence. Roenneberg et al. (2004), while studying chronotypes across the lifespan, observed a dramatic shift in the time of preferred sleep onset toward a later evening time during puberty that peaked at around the age of 20 before shifting (advancing) back to an earlier preference. The authors interpreted that the peak was a biological marker of the end of adolescence. Even if adolescents' preference towards evening may be perceived as their choice by parents, this is now understood to be a biological change in development that adolescents are unable to control. The preference toward an evening chronotype that appears during puberty is likely due to developmental changes in the internal daily timekeeping circadian mechanism. Research shows that many laboratory species exhibit pubertal changes

in chronotype like human adolescents. A delay in the sleep phase (sleep onset shifting later) during puberty is a widespread phenomenon among mammals, not only human teenagers, and the processes underlying this phenomenon have been examined in the review by Hagenauer et al. (2009). This review revealed that all five mammalian species studied showed a later circadian phase during puberty. Furthermore, adolescents were reported to sleep later than children and adults before the advent of modern technological devices such as computers, the internet, and mobile phones. This later sleep onset phenomenon has also been recorded in more than 20 countries across six continents, ranging from pre-industrial to modern, which means it is pervasive and cross-cultural (Hagenauer & Lee, 2012).

Studies of adolescent brain development also show changes in the type and frequency of the electrical waves seen in the different sleep stages. In brief, there are two main sleep states called rapid eye movement (REM) and non-rapid eye movement (NREM) that can be further divided into three or four different stages. Patterns of cortical oscillations are measured using an electroencephalogram (EEG) and different stages show different waveforms. There is a reduction in high-amplitude slow waveforms that is likely due to a decrease in synaptic density that happens during adolescence and is commonly assumed to be linked to puberty (Jenni & Carskadon, 2004).

The Two-Process Model of Sleep: Process S and Process C

The two-process model was used as a framework to study and explain adolescent sleep/wake regulation. Crowley et al. (2007) reviewed studies that looked at pubertal changes in the circadian and homeostatic sleep systems. They summarise a two-process model in which sleep/wake homeostatic (Process S) and circadian (Process C) components are defined. When Process S (homeostatic sleep pressure or sleep need) exceeds an upper threshold, sleep occurs, and wake occurs when Process S falls below a lower threshold. According to this model, sleep begins at one circadian phase and wake begins at a different

phase. As a result, the frequency of the sleep/wake cycle is proportional to the distance between the two thresholds or phases (Crowley et al., 2007).

Sleep/Wake Homeostatic (Process S). The homeostatic sleep/wake cycle is believed to be relatively insensitive to circadian rhythms. The process can be summarised simply as follows: "sleep pressure" increases the longer one is awake and decreases as one sleeps. Slow wave sleep (SWS, stages 3 and 4) and electroencephalographic (EEG) slow wave activity (SWA, power in the 0.75–4.5 Hz range) have both been used as physiological markers for "sleep pressure". Under sleep deprivation conditions, mature adolescents (Tanner 5) accumulated Process S at a slower rate than pre- or early pubertal adolescents (Tanner 1 and 2). "Sleep pressure" may rise faster in the pre-pubertal adolescent allowing sleep to begin sooner than in the mature adolescent. Furthermore, adolescents may have a longer intrinsic period than adults. Slower accumulation of homeostatic sleep pressure during puberty allows the older adolescent to stay awake longer, postponing the sleep/wake (dark/light) cycle. One proposed mechanism was differences in light sensitivity in the circadian system as melatonin, the sleep hormone, is triggered by greater dim light at dusk. Studies that compared younger and older adolescents' melatonin at different light exposures did not support this hypothesis. Further studies are needed to clarify if, when compared to younger adolescents, older adolescents have a weaker response to light. Also, more bright light exposure during the day reduces the response to subsequent light exposure as measured by melatonin suppression. This is difficult to assess because of the need to control light exposure throughout the day across different individuals. Crowley et al. (2007) further suggest that the build-up of "sleep pressure" throughout the day may be different between younger and older adolescents. A developmental delay of the circadian phase during adolescence may also be associated with a lengthening of the intrinsic period of the circadian clock, resulting in a longer "internal day length" (Crowley et al., 2007).

Circadian Timing (Process C). The circadian timing system organises time for regulatory mechanisms that aid in adaptive behaviour such as feeding, reproduction, and sleep/wake cycles. These self-sustaining coordinated temporal patterns, or circadian rhythms, oscillate over about 24 hours. Circadian time or phase can be estimated using biological events or markers associated with these rhythms (Crowley et al., 2007). The circadian timing system oscillates with an intrinsic period that differs slightly from 24 hours but synchronises (entrains) to the 24-hour day in response to external time-givers, or ‘zeitgebers’. The daily variation of daylight and darkness is the primary synchronising stimulus for the circadian timing system. As described above, during adolescence, the circadian timing system goes through developmental changes. The role of zeitgebers in these changes should be understood.

Environmental Aspect of Sleep in Adolescence

The review of Mistlberger and Skene (2004) demonstrated that the circadian rhythms of mammals are regulated by light which synchronises them with the local environmental time. However, social cues are also widely acknowledged as zeitgebers, or time cues. Maternal signals have a significant role in regulating the biological rhythms during gestation and prior to weaning in various species. Interacting with adults of certain species, either occasionally or regularly, can also modify the phases of some species but these effects are usually minor and seem to be mediated by the social stimuli that trigger arousal. According to this review, social zeitgebers in humans are insignificant against the bright sun. The most compelling evidence of social synchronisation in humans is derived from a limited number of individuals who are entirely blind. These individuals, when placed in controlled laboratory settings, demonstrate synchronisation with a 24-hour day or a sleep-wake cycle that closely approximates 24 hours. However, the crucial cues that trigger synchronisation have not been found yet, and there is no reported evidence of social synchronisation in individuals who are

blind in both eyes. The impact of social zeitgebers on mammalian behavioural dynamics remains uncertain, including their mechanisms of action and their potential to modulate human circadian rhythms (Mistlberger & Skene, 2004).

According to the social zeitgeber theory by Ehlers et al. (1988), there is a relationship between the occurrence of a life event and a shift in the stability of social rhythms; it is proposed in the theoretical model that unique social impulses or social zeitgebers be handled as unobservable variables. The strength of a particular relationship, task, or requirement to determine biological cycles (that is to behave as a zeitgeber) is assumed to be a function of instability. Ehlers et al. (1988) created a social rhythm measurement to demonstrate that disturbance of the social rhythm leads to alterations in biological rhythms. This social rhythm metric reflects the regularity of social zeitgebers, such as getting out of bed, having the first contact with another person, having a morning drink, or having breakfast. It also considers whether these activities occur alone or involve others, such as parents, friends, or a partner (Szuba et al., 1992).

The transition to university is an important time when social zeitgebers (that is, social cues that function to entrain biological rhythms) might be affected. Living close to peers in a shared accommodation might affect biological rhythms. There is a clear potential for the disruption of biological rhythms in the context of the university. In Moore's (2020) dissertation, the data showed that students influenced others' sleep patterns and therefore, this could result in forms of "chronodisruption". In their qualitative study, interviews revealed that living in a dormitory impacted sleeping habits. For example, one participant indicated that alterations in their sleep schedule (from an earlier time at home to a later time at university) with the influences of living with friends and late-night socialising, disrupt their sleep and sleep habits (Moore, 2020). Throughout the interview, this participant described the differences between life at home and living in the dormitories at university. She

reportedly did not eat at night, woke up at dawn, and exercised every morning when at home, but not when in the dormitories. According to the interviews in this study, roommates also influenced sleeping schedules. They shared a room with up to four others, while some participants had separate bedrooms and shared common areas. Students sharing the same room with peers did almost everything together as roommates. As a result, sleeping patterns became synchronised. Furthermore, misaligned morning and intermediate types were more likely to stay up late studying or participating in social activities. Night owls, however, said they stayed up late (past midnight) because they “felt like it” or “weren’t tired” (Moore, 2020). This qualitative study provides evidence that residing with peers in shared university accommodation impacts social zeitgebers, including mealtimes, socialising times, and sleep-wake patterns, subsequently impacting the circadian rhythm. The observed effects were particularly evident among individuals classified as morning and intermediate types. Individuals identified as evening types exhibited a natural inclination towards staying awake till late hours. Changing social zeitgebers in transition to university appeared to have no clear impact on their circadian rhythm. In this context, organising dormitories based on students with morning and intermediate type of chronotypes might be beneficial to some extent.

Urner et al. (2009) conducted a longitudinal study to investigate the impact of changes in social zeitgebers on the sleep habits of students transitioning to university. A total of 24 high-school students with a mean age of 18.4, and 12 of them being females, participated in a two-week actimetry study using actigraphy. Subsequent recordings were done five years later during their time as university students. There were notable differences in the amount of sleep students obtained on school days versus leisure days during high school, but not during their time at university. Furthermore, there was a noticeable delay in the time at which they fell asleep on school days, but not on leisure days, during their time at university. The authors argued that these findings are consistent with a circadian phase

shift caused by changes in class schedules, other zeitgebers, and lifestyle preferences. Although they noted that some individual differences in sleep patterns were maintained over the five-year study period, they argued that age-related developmental changes may have occurred (Urner et al., 2009). Another study revealed that sleep-deprived university students are unaware of the effects of sleep loss on their performance and overrate their performance in comparison to their non-sleep-deprived peers. Although this may not be reflected in their grades, they do not recognise the connection between sleep deprivation and poor performance (Buboltz et al., 2006). Sleep changes in the transition to university, therefore should be investigated.

Poor sleep quality is frequent among university students, raising the risk of mental illness and poor academic performance. Adequate sleep has a significant impact on both the academic and personal aspects of students' lives. Due to their unique sleeping circumstances, first-year students living on campus deserve special attention because they mostly adjust to a new lifestyle, sleeping close to new friends in shared accommodation during the transition to university. Students' poor sleep quality, therefore, may be exacerbated by fundamental characteristics of the university transition which may include living with peers (Foulkes et al., 2019). Despite the prevalence of sleep disorders among young individuals, there has been a shortage of studies specifically targeting university students who reside in shared accommodations. In a qualitative study conducted in the UK, participants reported that friends and flatmates affected sleep even when they were not making noise since they provided an easy opportunity to socialise (Foulkes et al., 2019). Students stayed up late in dormitories because they joined their friends to watch a movie or went to a party. Many participants went out late with their flatmates to bars and clubs, and they expressed that their sleep was disrupted due to socialising until late at night. Participants were aware that socialising interfered with sleep, yet they were willing to forego a good night's sleep to have

fun with their peers. According to participants' responses, socialising with friends was prioritised over sleep (Foulkes et al., 2019).

Brown et al. (2017) also indicated that few studies have focused on university students living on campus. They investigated in-residence university students' sleep habits, sources of support, and preferred information sources in Canada. According to the results, 66.8% of individuals reported insufficient sleep, whereas 18.9% of students actively looked for assistance for their sleep-related problems. Many students struggled to sleep in campus residences. Furthermore, according to Qin and Brown's (2017) findings, students at the University of Alberta (USA) who lived in shared rooms slept for less than 4.5 hours per night. Students residing in individual dormitories typically slept for between 4.5 to 6.4 hours, whereas those residing in apartments with one or two bedrooms slept for 6.5 to 8 hours or more. Galambos et al. (2013) also supported the finding that living on campus meant sleeping and waking later. This study investigated the variations in sleep duration, sleep disturbances, and sleep timing, as well as the connections between sleep and other variables such as housing circumstances, stress levels, social support, drinking habits, and grade point average (GPA) among a group of 186 Canadian university students over a span of four years. During periods of living away from home, students had a higher prevalence of sleep disruptions, delayed bedtimes, and delayed rise times. They indicated that there was a correlation between residing on campus and experiencing delayed bedtimes and rise hours. Little is known about how students' sleep patterns alter over time at university or, perhaps more importantly, how life experiences throughout university influence sleep (Galambos et al., 2013). Adams et al. (2017) also indicated that USA university students are a sleep-deprived population, with first-year students facing a variety of unique sleep challenges. Sleep may be sacrificed as students enter and progress through their first year of university for a variety of reasons. These findings from various countries indicate that first-year university students, as well as university

students in general, suffer from sleep deprivation and sleep-related issues due to the changing conditions at university, proximity to friends, residing in shared accommodations, and socialising late into the night.

The quality of sleep is necessarily influenced by the process of social integration at university. University students are in adolescence and interaction with peers is a crucial developmental goal. The fact that university students prefer socialising over sleeping should be taken into account in sleep interventions aimed at alleviating mental health problems. Sleep is a significant factor influencing the increasing prevalence of depression and anxiety in adolescents and can impact the severity of these disorders over time. A variety of sleep factors at age 15 predicted the severity of anxiety and depression symptoms, as well as the diagnoses of anxiety and depressive disorders at ages 17, 21, and 24, according to Orchard et al.'s (2020) longitudinal study. In university sleep and mental health interventions, students can receive guidance on university-specific factors such as proximity to peers, late-night socialising, increased alcohol consumption, and the tendency to prioritise social interactions over sleep. Students can be encouraged to establish a personalised routine by approximately specifying their bedtime, wake-up times, and mealtimes.

Biological and Environmental Combined Effects Leading to Sleep Loss in Adolescence

Biological and environmental changes associated with sleep may result in detrimental consequences for adolescents. As Colrain and Baker (2011) described, older adolescents will go to bed later, prefer evening activities, and sleep less. Increased academic, social and extracurricular pressures, as well as the biological circadian factors, are all drivers of this behaviour change. While changes in sleep patterns toward a later sleep onset during adolescence are normal, many adolescents lack sleep due to their demanding schedules (early mornings) and sleep deprivation is a significant factor in poor academic performance (Curcio et al., 2006), mood disorders (Harvey, 2011), obesity (Knutson et al., 2007), an increased risk of traffic

accidents (Martiniuk et al., 2013), and alcohol and drug abuse (Kwon et al., 2019). Therefore, scientists and public health officials are increasingly interested in the mechanisms underlying adolescent sleep delay. The misalignment of the sleep/wake schedule and the internal circadian clock is known as circadian misalignment. Circadian misalignment is commonly associated with night shift work and jet lag. Circadian misalignment can also occur when work or school schedules are not in synchronisation with individual circadian tendencies, a situation known as "social jetlag". As was indicated previously, individuals differ in their chronotype, or preferred sleep-wake timing, along a spectrum ranging from extreme morning types (larks) to extreme evening types (owls). Evening types may struggle with the early wake-up times required by traditional work or school schedules resulting in significant circadian misalignment on weekdays. Furthermore, evening types frequently resume their preferred sleep-wake timing on weekends (sleeping in late), which experimental studies show leads to additional delays in their internal timing. During adolescence, there is a tendency for the timing of sleep to shift later. This can be attributed, at least in part, to developmental changes in endogenous circadian rhythms which tend to become more delayed (Hasler & Clark, 2013).

The amount of sleep (sleep duration) decreases from childhood to adolescence due to the combined effects of the biologically driven later circadian rhythm and environmental factors. This does not mean, however, that they begin to need less sleep, and adolescents are known to experience the adverse effects of sleep deprivation. Research indicates that early school hours lead to sleep deprivation and modifying school hours can be advantageous in mitigating this issue. According to a study conducted by the National Sleep Foundation (2006) in America on 1602 participants, sleep time during school nights reduced from, on average, 8.2 hours in sixth and eighth grade to 6.9 hours in twelfth grade. On school days, 45 percent of adolescents reported being sleep-deprived. They were getting less than eight hours of sleep. According to a study assessing adolescents' diaries in the UK, approximately 8% and 6% were

short sleepers on weekdays and weekends, respectively. Their sleep duration decreased from 10.23 hours on weekends to 9.36 hours on weekdays (Mireku, 2021). However, delays in school start time helped them to decrease sleep deprivation. Wheaton et al. (2016) examined 38 studies about delays in school start time hours. Most of the research shows that delaying the start of school on weekdays increases the amount of time teenagers spend sleeping at night, mostly because they get up later in the morning. In most trials, a half-hour delay in start time resulted in a considerable increase in sleep duration. Late start times are also associated with fewer depression symptoms, better attendance, less tardiness, fewer students who fall asleep in class, higher grades, and fewer car crashes. In conclusion, this simple environmental change reduced sleep deprivation caused by circadian misalignment during adolescence. It improved the mental health of adolescents who have late circadian timing but more sleep needs. Social factors, which are important environmental factors in adolescence, should also be examined to investigate sleep in adolescence. Implementing such interventions for sleep-deprived university students might provide advantages including less sleep deprivation and enhanced mental health. In university, given that sleep deprivation results from factors such as proximity to peers, late-night social interactions with peers, and that university students prioritise socialising over sleep, adjustments to academic timetables could be beneficial to decrease sleep loss.

Measuring Chronotype and Sleep

There are different ways of measuring chronotypes that are termed either objective (polysomnography and actigraphy) or subjective measurement methods (self-report).

Polysomnography

Polysomnography (PSG) is considered the best way to measure some sleep-related disorders such as sleep apnoea, even though actigraphy and self-reports are more frequently employed methods of sleep measurement in non-clinical settings. Polysomnography

employs a methodical strategy to gather information on physiological indicators associated with sleep. It is used in clinical settings to investigate and diagnose sleep disorders. The polysomnogram (PSG) utilises the electroencephalogram, electrooculogram, electrical muscle activity, and pulse oxygen saturation to ascertain the cause of a patient's sleep difficulties. PSG is used to diagnose many sleep disorders, including sleep apnoea, obstructive sleep apnoea, central sleep apnoea, and sleep-related hypoventilation/hypoxia (SAH). PSG is the gold standard for detecting these respiratory disorders in the absence of other methods. Furthermore, a PSG can be utilised to diagnose nighttime epilepsy, narcolepsy, periodic limb movement disorder, and rapid eye movement sleep behaviour disorder (Rundo & Downey, 2019).

Actigraphy

One of the objective measurement ways of chronotype and sleep patterns is actigraphy which is worn like a wristwatch. It measures sleep and wakefulness based on motion. It measures the time taken to fall asleep, sleep onset time, sleep duration, waking hours during the night after falling asleep, and the wake-up time. Data gathered by the actigraphy can be used to help diagnose and evaluate several clinical sleep disorders and their treatment effects. Wrist actigraphy validity has been studied extensively in the last few years. Wrist actigraphy is useful in the estimation of total sleep time (TST), sleep percentage, and wake-after-sleep onset (WASO). As an objective measure of sleep/wakefulness, actigraphy has not been validated for evaluating the stages of sleep. Additionally, actigraphy tends to overestimate sleep in some patients (Martin & Hakim, 2011).

Self-Report

The most commonly used subjective instruments are the Morningness-Eveningness Questionnaire (MEQ) and the Munich Chronotype Questionnaire (MCTQ). Horne and Östberg (1976) published the first chronotype measurement of the MEQ, measuring

individual's preferred sleep and wake-up time, when they do not have any work or study obligations, peak alertness level to work efficiently, as well as for cognitive, behavioural and emotional functioning. To ask about preferred sleep and wake-up times gives better information about chronotype instead of actual rest and wake-up time, because children and adolescents' sleep timing might be obligated by school time and parental rules. The MEQ includes 19 items, measured in a four-point Likert scale that asks about waking up time, sleep time, preference for doing physical and mental activities, and morning alertness. There are three groups categorised based on the MEQ scores: Morning type (scores of 59 and above); intermediate type (scores between 42-58); and evening type (scores of 41 and below). Lower scores show a more eveningness tendency. The original study by Horne and Ostberg (1976) that was conducted in a student population (N =48, 18-32 years) reported a Cronbach alpha of .84, which shows good internal consistency. The MEQ has been used extensively in research and is cited around 7000 times on Google Scholar.

Chronotype and Heritability in Self-Report Instruments

The MEQ has been shown to be heritable and several associations between MEQ scores and polymorphisms in candidate clock genes have been reported (Leocadio-Miguel et al., 2021). However, the authors also noted that the MCTQ had no published studies to date that reported data on heritability or genetic associations. Recent large cohort genome-wide association studies have reported multiple associations with chronotype as assessed by a single self-evaluation question. Leocadio-Miguel et al. (2021) used data from all the instruments from a single sample of 597 people from the Brazilian Heart Study. The cohort's family-based design allowed the calculation of heritability. MEQ heritability was estimated at 0.37, and for the MCTQ, it was estimated at 0.32; a single question about chronotype on the MEQ was found to return a heritability estimate of 0.28 (MEQ Question 19: 'One hears about "morning types" and "evening types." Which one of these types do you consider

yourself to be? 1. Definitely a morning type. 2. Rather more a morning type than an evening type. 3. Rather more an evening type than a morning type. 4. Definitely an evening type).

The findings therefore suggest that from the large genome-wide association studies that a single chronotype question captures a significantly larger proportion of chronotype dimensions than previously thought.

Validation of Self-Report Measures

Studies however comparing questionnaire-based and actigraphy-based chronotypes are lacking, despite actigraphy possibly being used to objectively measure chronotype characteristics, which has many applications in chronobiology. Schneider et al. (2022) collected 122 women's MCTQ and MEQ results over three months of actigraphy. Actigraphy and questionnaire-based chronotype were correlated. To predict unknown data, features that were estimated from three -weeks or longer recordings had sufficient predictive power. Longer-term recordings of three or more weeks' duration, as demonstrated in this study, could be used as an objective evaluation of chronotype, and demonstrate good agreement with MCTQ and MEQ questionnaires that have traditionally been used to ascertain chronotype. Actigraphy was significantly associated with the questionnaire-based chronotype, and the best single-feature-based models explained 37% of the variability for MEQ (Schneider et al., 2022).

This section helped to understand sleep and sleep patterns in adolescence and in the transition to university. It also highlights that sleep is affected by environmental and social elements, such as zeitgebers (time cues) including light and social interactions. Staying in shared accommodation with peers in the first year of university and being together and socializing with peers, are factors known to be connected to disrupted sleep behaviours at university (Adams et al., 2017; Foulkes et al., 2019). Sleep difficulties during this period are

associated with depression, anxiety, and burnout, which are prevalent issues among university students. The subsequent section will examine depression anxiety and burnout and their interrelations with sleep and subjective social status.

Depression, Anxiety and Burnout in Adolescence

Developmental characteristics of adolescence, such as heightened emotional reactivity, increased sensitivity to peer evaluation, and ongoing brain maturation, contribute to the vulnerability to depression and anxiety during this period (Blakemore & Mills, 2014; Casey et al., 2008; Romeo, 2013; Somerville, 2013; Steinberg, 2005). Depression and anxiety, which reach their highest levels during early to mid-adolescence (around 13.5 years for females and 16 years for males), continue to increase into late adolescence; up to approximately 20 years of age (Kwong et al., 2019). The average prevalence estimates for children under 13 years old are 2.8%, whereas for adolescents aged 13 to 18, the estimates are 5.6%, which is double (Jane Costello et al., 2006). These patterns are particularly relevant for university students as the transition to higher education frequently coincides with late adolescence.

University students represent a particularly vulnerable population for depression and anxiety. This vulnerability arises from factors such as living with peers, disrupted sleep patterns, changes in academic schedules and demands, difficulties in balancing social and academic responsibilities, and the psychological effects of leaving their parents' home, often for the first time, along with several other challenges. In a recent self-report longitudinal study in the UK, students aged 18-19 years exhibited a higher prevalence of common mental disorder symptoms (depression and anxiety) compared to non-students at the same age (McCloud et al., 2023). Especially as a first-year student, it can be challenging to deal with the pressures of university and the accompanying feelings of anxiety and despair. The study by Bewick et al. (2010) examined the mental health of students from various faculties during their undergraduate course at a UK university, beginning from pre-registration to the second semester of their third

year. University students have more pressure on their well-being than their pre-university situations. Stress levels peak in semester one but decrease notably from semester one to semester two in both first and third years. However, distress levels never returned to their pre-registration levels. These results indicate that university is a period of increased stress. They suggested ensuring that students receive adequate support during their studies to help them complete their degree successfully and transition smoothly into university and working life (Bewick et al., 2010).

Research conducted in several countries, including the United States of America, Japan, and Canada, has demonstrated elevated levels of stress, anxiety, and depression among university students. For example, a correlational study evaluated stress, coping, depressive symptoms, and social support in a sample of first-year students from two private USA universities. According to the findings, 45% of students had stress levels above the national norm, and 48% had clinically significant depressive symptomatology (Brandy et al., 2015). Supporting this finding, a secondary analysis was conducted on data from 66,159 USA undergraduate students about their mental health; this was collected by the American College Health Association-National College Health Assessment II. The results showed that first-year students had greater rates of self-injury and seriously considered suicide. In addition, students in their senior year reported that their mental health was affecting their academic performance. Student mental health is a significant concern and it is widely acknowledged that detrimental changes to mental health can occur at this transitional time. Wyatt et al. (2017) also suggest that students' first year of university is the ideal time to encourage awareness of, and techniques for, preventing mental health difficulties and unfavourable academic outcomes. In another study in Canada, depression and anxiety problems had increased by the end of the first year of university. Students were asked to fill out online surveys at the beginning and end of their first year at a Canadian university. Students ($N = 1530$) met the criteria for clinically

severe depression and anxiety symptoms at 28% and 33% upon entering university, and these percentages rose to 36% and 39%, respectively, by the end of the first year of study. Additionally, these mental health outcomes demonstrated persistence and often overlapped. However, exceeding clinical cut-off scores and screening tools for mental health outcomes at the first year were linked to modifiable psychosocial and lifestyle factors at the entrance (Duffy et al., 2020). Therefore, Duffy et al. (2020) suggested that behavioural interventions at entry to university may help mitigate some of this decline in mental health.

In addition to survey studies, the one-year incidence and prevalence of depression among 116 first-year university students were also retrospectively studied using structured interviews in a Japanese University. The study investigated the prevalence and incidence of depression in a non-clinical university student population over the course of a year. In the 12 months leading up to the study, more than half met the clinical criteria for a Major Depressive Episode (MDE), and more than 20% of the sample met the clinical criteria for MDE and for Major Depressive Disorder (MDD). The high prevalence of depression may be explained by students' struggles when adjusting to university which could persist in the longer term (Tomoda et al., 2000).

As a result, studies in the UK and in other countries have shown the increasing rates of depression and anxiety in transition to university and high rates of depression and anxiety when at university. As stated by Cage et al. (2021), there remains limited research that has documented students' transitional experiences. There are not enough prospective or longitudinal studies, especially in the UK. Given the rising incidence and widespread occurrence of depression and anxiety among first-year university students and university students in general, it is imperative to examine the potential factors that contribute to this heightened risk in the UK.

Alongside depression and anxiety, burnout is also a prevalent issue among university students. Studies indicated that burnout and depression have similarities; however, burnout is specifically associated with professional life and work (Maslach et al., 2001; Schonfeld et al., 2016), whereas depression is independent of context (Bakker et al., 2000). Although burnout is commonly associated with work settings, university students can also experience burnout and burnout symptoms. During university, students experience regular stress, excessive pressure, a sense of meaninglessness, unmanageable tasks, and a lack of comprehension, all contributing to academic burnout (Shankland et al., 2019). Moderate levels of burnout syndrome are prevalent among various groups of university students across several disciplines globally, according to a systematic review of twenty studies conducted in North America, Asia, Latin America, and Europe (Rosales-Ricardo et al., 2021). Therefore, particular factors contributing to burnout in university students need to be investigated.

Connections Between Social Factors, Sleep and Mental Health

Previous chapters have addressed fundamental topics such as social development, sleep, and the prevalence of depression and anxiety. Building on this foundation, the current section examines the relationship between social factors, sleep, and the broader social context, as well as its connection to mental health. Adolescence represents a developmental stage in which the importance of social status among peers becomes increasingly evident, circadian rhythms shift toward later sleep patterns, and susceptibility to depression and anxiety increases as a result of biological and psychosocial changes. Building on reward system theory, the relationship between subjective social status and sleep will first be examined through the neurobiological connection between the circadian system and the reward system. Subsequently, the associations between subjective social status, depression, and anxiety will be discussed in relation to the interconnected mechanisms of social and non-social reward processing and psychological outcomes.

The Neurobiological Connection of Reward and Circadian Systems in Framing the Link Between Subjective Social Status and Sleep

The interrelationship between perceived social status and sleep can be better understood through the theoretical connection between the reward system and the circadian system as attaining social status among peers represents a form of social reward. The reward system and circadian system are interconnected via shared neurocognitive networks. Emotional, hormonal, and social changes are experienced during adolescence. With hormonal effects, adolescents begin to sleep later in this period compared to childhood and adulthood, and they might have sleep issues with the contribution of environmental factors (for example: school times and late socialisation with peers). Disturbances in sleep patterns can adversely affect the brain due to the connection of the suprachiasmatic nucleus, the region that controls sleep, and the ventral striatum, which is the structure underpinning the reward system (Avinun et al., 2017). As a support to the connection between sleep and social rewards, Holm et al. (2009) indicated that sleep disturbances in adolescence, which is a sensitive period to social rewards, are known to increase sensitivity to social rewards. They also found that less activation in a part of the reward system was connected to lower sleep quality. It is important to investigate the processes behind the link between circadian system and reward system. The circadian clock influences reward processing in animals, but the mechanisms behind this phenomenon are not as well comprehended in humans. Byrne et al. (2019) conducted a thorough evaluation of human functional magnetic resonance imaging (fMRI) research to address this limitation. This narrative review examined 13 research publications that fulfilled the inclusion criteria. The review focused on studying how the brain responds to rewards and used one or more indicators of circadian function as predictors. The review identified four types of circadian proxies (circadian system biology, downstream circadian rhythms, circadian challenge, and time of day) that are associated with brain reward

activation. This alteration in reward-related brain activity activated sub-networks of regions associated with rewards including the medial prefrontal cortex, ventral striatum, putamen, and default mode network. Both reward anticipation and reward receipt-related activations were found to be influenced by circadian rhythms (Byrne et al., 2019). However, most studies were on non-social rewards. There is a need to investigate the connection between social reward and circadian rhythm.

The relationship between circadian rhythms and social reward processing is not well understood; there are, however, some studies showing the connection between the circadian system and non-social reward processing. Hasler, Casement, Sitnick, et al. (2017) investigated whether circadian preferences in late adolescence predicted the brain response to reward two years later. 93 male participants participated in an fMRI paradigm with a monetary reward and reported their circadian rhythm preferences at ages 20 and 22 years. Primarily, this research looked at the long-term relationships between circadian preference and reward responses in the medial prefrontal cortex (mPFC) and ventral striatum (VS). Results showed that a preference for eveningness at age 20 was associated with mPFC and VS responses to 'win' rewards at age 22. Eveningness at age 20 indirectly predicted alcohol dependence at age 22 via the level of mPFC response to 'win' rewards. Reward responses may mediate the connection between circadian preference and alcohol use. The authors argue, therefore, that circadian misalignment may impair reward pathways, speeding up the transition toward alcohol use disorder in sensitive adolescents. Circadian misalignment is also linked to increased risk-taking behaviours and sleep deprivation. A growing body of evidence suggests that circadian disruption may affect teenage alcohol use by altering reward-related brain function. Circadian misalignment may affect inhibitory control and other cognitive functions related to alcohol use. This imbalance is hypothesised to explain greater risk-taking and sensation-seeking in adolescence (Hasler & Clark, 2013; Hasler, Franzen, de Zambotti,

et al., 2017).

Subjective Social Status and Sleep-Related Factors

From a socio-evolutionary standpoint, the shift in circadian rhythm aligns with young people's need to establish their identity and interact with their friends. An important part of adolescent development is learning how to negotiate the complexities of peer connections and interactions while remaining dependent on parents for basic needs (Walker, 2017). Hagenauer and Lee (2012) proposed that a biobehavioral framework may explain the delayed phase observed in adolescents. They hypothesised that this delayed phase is an adaptive response to the process of forming and navigating social hierarchies; that is to say, evenings may have provided opportunities for socialising with peers and experiencing independence from authoritative figures. Adolescents' circadian rhythms advance to a later time in the day compared to adult caregivers which may be one way nature has helped them disentangle themselves from the oversight of parents. This biobehavioural mechanism puts adolescents into a later period when they can operate autonomously for a few hours and do so as a group of peers for a few hours at a time. It is not a complete separation from parental care, but adolescents might be partially, yet safely, independent from their parents. The importance of sleep patterns for social development is still being investigated; however, a compelling argument can already be made in favour of protecting sleep time throughout the adolescent years rather than denigrating it as a sign of laziness (Walker, 2017). The change in sleep patterns may be an important part of identity development and independence from parents during adolescence. In the university context, university students residing with peers rather than their parents might stay up late due to factors such as peer-driven social pressure and academic demands. Students seek acceptance and status within their peer group, requiring late nights for communal activities such as socialising, collaborative learning, gaming, or nightlife. The delayed phase can facilitate bonding, sustain friendships, and strengthen a

sense of community which is essential for status among peers.

It is essential to consider an individual's objective socioeconomic status as an important factor that may influence subjective social status in examining the relationship between subjective social status and sleep. Research has shown that during adolescence, subjective social status among peers became more important than the objective socioeconomic status of families. In one study, school and society's subjective social status (SSS) was examined to see if it predicted adolescent health outcomes differently compared to objective socioeconomic status (Huynh & Chiang, 2016). In this study, Latino and Asian American adolescents ($N = 246$) completed questionnaires about their sleep, school and societal subjective social status, and somatic symptoms. Parents reported income and education levels which are considered objective metrics of social status. Societal subjective social status and school subjective social status, measured by the McArthur Social Status Scales, were connected to sleep quality, independent of familial objective social status. Jarrin et al. (2014) found that subjective economic status (their rank compared to society) in adolescents ($N = 239$, 69.6% Caucasian, age range 11-17 years) was associated with sleep quality and parent-reported sleep duration even when accounting for objective socioeconomic position. According to the findings of these studies, subjective social status (SSS) is a stronger predictor of sleep outcomes in adolescents than objective socioeconomic status (SES). Furthermore, SSS at school and in the community can affect health indicators in different ways and sleep plays a role in outcomes.

Research literature supports the link between chronotype, which is another important sleep factor, and subjective social status. For example, Marvel-Coen et al.'s (2018) study among university students showed that morning-types on average perceived themselves to possess a lower social status than evening-types. Furthermore, Zajenkowski et al. (2019), in a non-student adult population, found that evening types viewed themselves as more

intelligent (a dimension of perceived social status) compared to morning types. However, both studies indicated that personality factors (for example: extraversion, narcissism, and neuroticism) could play a moderating role. One further study by Lunn et al. (2021) has shown that higher perceptions of subjective social status in different school-based domains may vary along the morningness to eveningness continuum. More specifically, they reported that later evening chronotypes ranked themselves higher on the subjective social status domain of 'troublemaker' (How much of a troublemaker do you consider yourself compared to your peers?). In contrast, intermediate types (people who are between the extremes of morning and evening chronotypes) scored higher on subjective reports of a more 'powerful' domain of subjective social status compared to peers (How powerful do you feel compared to your peers?). These findings support a potential connection between differences in preferred sleep patterns and subjective social status domains and therefore warrant further investigation. There is a lack of sufficient research examining the relationship between chronotype and overall subjective social status rather than domain-specific social status. The relationship between shifts toward greater eveningness (for both morning and evening chronotypes) and SSS should be investigated in different contexts. The first year of university is an important context for examining the potential connections between chronotype, sleep and social status due to the potential change in sleep patterns and greater interactions with peers that could combine to elevate the risk of mental health difficulties.

Social Factors and Sleep in Transition to University

There are studies with varying results on how proximity to peers and socialisation affect sleep at university. Findings of studies by Foulkes et al. (2019) and Adams et al. (2017) revealed that living close to peers has disruptive effects on the sleep quality of university students. The systematic review of 200 relevant studies investigating the associations between sleep and social relationships demonstrates that sleep and social processes, such as responses

to socially stressful situations (for example: feeling rejected, disagreement with someone, or experiencing bias) have a reciprocal connection (Gordon et al., 2017). In addition to these findings, however, some studies show that sleep quality and sleep length in first-year university students increase with increasing social activities, socialisation with peers and active participation in social activities. In connection with this, Galambos et al. (2009) conducted a study on a group of 191 Canadian 17–19-year-olds who were in their first year of university. The study aimed to examine how the amount and quality of sleep correlated with their emotional, stressful, intellectual, and social experiences on a daily basis. Throughout their initial semester, students filled out online checklists for 14 consecutive days. The multilevel models demonstrated that increased time spent on schoolwork, anticipation of a test, and alcohol use were associated with reduced sleep quantity and quality. Conversely, engaging in social activities was found to be associated with increased sleep duration (Galambos et al., 2009). A subsequent study with the same aim, conducted by Galambos et al. (2011) among 187 Canadian first-year university students, confirmed the association between socialisation and sleep. The quality of sleep was diminished during months characterised by elevated levels of negative affect and general stress (with the impact of financial stress being reduced), whereas it improved during months with a greater number of days spent socialising with friends. Fluctuations in sleep amount and quality during the first year of university may reflect students adjusting to new demands, both academic and social (Galambos et al., 2011).

Another study indicated that the consistency of daily routines and engagement in social activities enhanced sleep among university students (Carney et al., 2006). It was noted that good sleepers were more likely to participate in social activities with active participation in social interactions. Participating in social activities with others has been linked to improved sleep hygiene based on findings from a sample consisting primarily of white female university

students. Carney et al. (2006) measured social activities by the Social Rhythm Metric, designed for measuring social zeitgebers. It included 15 common zeitgebers such as getting out of bed, having first interpersonal contact, lunch, going to bed. In comparison to individuals who have good sleep, poor sleepers exhibited lower levels of average regularity in common zeitgebers and average regularity of activities with active social engagement. It appears that participating in activities with other individuals who are actively engaged promotes consistency and therefore serves as a sleep protector. Heightened fluctuation in the daily rise time has harmful impacts on sleep. Numerous activities are accompanied by social customs such as the practice of having lunch at noon and dinner at 18:00. Furthermore, even after accounting for depression, the impact of reduced frequency of social engagement activities on sleep remained statistically significant. This suggests that this effect is not influenced by mood (Carney et al., 2006). In the first year of university, the connection between social factors and sleep should be explored more deeply because of the association between sleep and being far away from parental control and starting to live with peers.

The research mentioned about sleep and social aspects indicates that socialisation has both disruptive and sleep-regulating effects, including improving sleep quality. The sleep-disrupting or sleep-enhancing effects of socialisation may vary depending on whether it is associated with peer acceptance and a sense of belonging to a peer group. Rather than socialising for its own sake, a sense of belonging to a group may regulate sleep through the rewarding effects of peer acceptance. In summary, whereas social connections that structure university students' daily routines (social zeitgebers) and active engagement in social activities enhance their quality of sleep, things such as late-night socialising with peers and noise problems because of living together with peers adversely affect sleep. In this context, it would be advantageous in interventions for university students to support them to establish their own routines by considering the social zeitgebers and engaging in activities with others (for example:

getting out of bed around 09:00am, having dinner with a friend).

Reward Related Mechanisms and Mental Health

In this section, before examining the relationship between subjective social status and mental health, studies on the reward system and its association with depression and anxiety will be discussed. This will then be linked to subjective social status and mental health.

Reward processing has been identified as a neurobiological mechanism in anxiety and depression in both social (for example: social approval) and non-social experimental contexts (for example: monetary rewards) (Schwartz et al., 2019). The brain reactivity linked with anticipating and receiving positive experiences such as monetary winnings or social approval, as well as behavioural learning that stimulates future acts, is referred to as reward processing. No difference was noticed between social (adult faces indicating social approval) and non-social rewards (monetary) related to clinical improvement in depression and anxiety in this study. However, Schwartz et al. (2019) recommended more interactive activities and peer feedback as a treatment technique for future research, considering that the faces used as social rewards in this study were rather passive stimuli and represented adults. The absence of difference may also be related to this. They also indicated that results regarding social reward stimuli (for example: happy faces) align with the notion that therapeutic improvement for depression and anxiety is possible through increased recognition of social rewards. This is because young people might have a negative bias in social interactions, interpreting peer behaviour with excessive criticism and anticipating negative experiences to validate their misconceptions. Tasks based on monetary incentives or tasks focusing on social appraisal have been employed in studies of reward processing in paediatric samples. Sensitivity to social rewards and a sense of failure about social rewards are connected to depression and anxiety disorders (Sankar et al., 2019; Schwarz et al., 2020). Sankar et al. (2019) reported that

individuals with major depressive disorder exhibited less sensitivity to monetary stimuli regardless of gain or loss, and heightened sensitivity to social cues irrespective of acceptance or rejection. When adolescents are suppressed about reaching rewards and have low reward anticipation, it might suppress the reward system, and suppression is shown to be connected to episodes of depression. For example, a study by Olino et al. (2014) showed that the social reward response in the ventral striatum and anterior cingulate cortex was lower in children of depressed parents. The findings showed that depression may be caused by neurobiological and behavioural suppression of social reward. They suggested that increasing social involvement may help avoid young people's depression (Olino et al., 2014). In another study by Stringaris et al. (2015) on non-social monetary rewards, clinical depression was associated with lower ventral striatum activity compared to healthy people. At a two-year follow-up, ventral striatum activation in anticipation of rewards predicted clinical depression in previously healthy adolescents. Brain reactions to reward anticipation also declined in healthy adolescents in those with subthreshold depression with the lowest reactions in those with clinical depression. They indicated that their fMRI study was on non-social rewards instead of social rewards and suggested that future longitudinal research needs to differentiate between forms of rewards and processes of depression (Stringaris et al., 2015). Another study found that an increase in reward responsiveness improved the effectiveness of cognitive-behavioural therapy in youth with anxiety. Norris et al. (2021) investigated whether youth reward responsiveness, as measured by the Behavioural Inhibition and Behavioural Activation System Scales for Children, predicted post-treatment anxiety depressive and irritability symptom severity in a sample of 136 youth aged 7-17 years with a primary anxiety disorder. Increased reward responsiveness was associated with lower anxiety and depressive symptom severity. However, it has been suggested that employing social rewards as incentives in adolescent interventions will enhance their motivation.

According to the studies discussed in this section, reducing negative self-judgements about how peers perceive themselves and enhancing the recognition of social rewards such as peer acceptance and specifically fostering a sense of belonging within the peer group can help prevent a decline in perceived social status and may alleviate depression and anxiety.

Subjective Social Status and Mental Health

This section will first review studies highlighting the significance of subjective social status compared to objective social status on predicting mental health outcomes during adolescence. Subsequently, individuals' perceptions of their own and their family's social status within society, as well as their perceived social standing relative to peers at school, will be comparatively examined in relation to mental health outcomes. Lastly, the long-term effects of perceived social status on depression and anxiety will be examined with a particular focus on the association between declines in perceived social status during the transition to university and subsequent mental health outcomes.

The connections between SES and mental health problems in adolescents are mostly influenced by their perceived social standing which is a component of SES that can be more easily addressed through interventions compared to the objective features of SES (McLaughlin et al., 2012). Russell and Odgers (2020) reported that independent of objective measures of SES, adolescents' subjective familial social status, as measured by the MacArthur Scale, was linked to both mental health and behavioural outcomes. They present the findings of a longitudinal study including 151 adolescents from low-SES neighbourhoods who were identified as being at risk for early substance use and behavioural disorders. The authors investigated whether adolescents' SSS predicted mental health outcomes (depression, anxiety, and inattention/impulsivity) assessed over 30 days using ecological momentary assessment, as well as the risk of substance use at an 18-month follow-up. After controlling for objective SES and past psychopathology, the results demonstrated

that with each perceived step "up" in the SSS ladder, teenagers experienced fewer mental health symptoms in everyday life and had a decreased future drug use risk. It is clear from these studies that self-perception of one's own and one's family's place in the social hierarchy better predicts mental health outcomes than measures of SES alone. Subjective familial social status was a stronger predictor of mental health outcomes than SES.

Similarly, Rivenbark et al. (2020) report findings on a longitudinal twin study and found that subjective familial SES was a stronger predictor of both depression and anxiety symptoms than objective family SES at 18 years. The authors claim that siblings frequently do not perceive their family's social position in the same manner even though they were raised in the same house. Eighteen-year-old twins who rated their family's socioeconomic status higher than their siblings experienced fewer challenges in transitioning to adulthood. They exhibited lower rates of criminal convictions, were less likely to be unemployed or not engaged in school or training and had a reduced prevalence of mental health issues. Irrespective of their families' financial resources or their previous mental vulnerabilities, the judgements of young individuals regarding their family's position in the social hierarchy during late adolescence indicated how well they were doing at the age of 18. However, when the twins were 12 years old, they did not have the same pattern of findings. The authors suggested that changes in the subjective social status of adolescents will improve their mental well-being (Rivenbark et al., 2020). Despite the fact that this study investigated the impact of perceived social status, it also examined subjective familial social status. In adolescence, however, perceived social standing among peers is arguably more important than subjective familial social status, given the growing significance attributed to acquiring social standing among peers.

In relation to subjective social status among peers, Huynh and Chiang (2016) conducted a study by measuring familial subjective social status and school-based subjective

social status. They measured familial subjective social status in society and individual status in school (school SSS) by using the MacArthur Scale of Subjective Social Status–Youth Version (Goodman et al., 2001). According to this study, school-based SSS was connected to sleep duration, while stress was connected to both school and familial SSS. In light of these findings, subjective social status and specifically school-based subjective social status of first-year university students should be considered to better understand depression and anxiety in this population.

Importantly, both one's position in the adolescent peer social hierarchy in high school and adjustment to it can have an impact on both adult behaviour and well-being in the long term (Sandstrom & Cillessen, 2010; Zettergren et al., 2006). SSS accounted for 9.9% of the variation in depressed symptoms of adolescents according to Goodman et al. (2001). A key objective of psychological research is to understand the relationship between peer social status and mental health and well-being outcomes in later adulthood. Additional study is needed to establish the relationship between these changes in subjective social status (SSS) and health, as well as to understand how SSS operates in terms of future health consequences. Lange et al. (2023) conducted a longitudinal study on 3054 adolescents in high school in Denmark. They found associations between subjective social status among peers at school (self-perception of one's social standing and relative position in comparison to classmates) at age 15 and depressive symptoms at ages 18, 21 and 28, which are indicated as three important life stages. There is a scarcity of longitudinal research that examines changes in subjective social status throughout development and the impact of changes in perceived social status at university on individual perceived social status, depression, anxiety and sleep throughout adulthood following graduation. Understanding these connections in the transition to university will help to develop programmes to improve the mental well-being of students.

Rahal et al. (2020a) also conducted a longitudinal study on the connection between societal and school subjective social status and well-being during high school and after high school. They found that subjective social status (that is: 'where do you believe your family would rank on societal hierarchy?') decreased after grade 12 in high school and stayed stable three years after graduation from high school. Lower subjective social status among peers in school was connected to depressive symptoms. Similarly, Goodman et al. (2015) researched developmental trajectories of the subjective social status of 7436 non-Hispanic and white youth (13-17 years old) in the USA. Participants reported their family's social position within USA society and depressive symptoms and parents provided information on objective social status (for example: education and income). The majority of adolescents held the belief that their families occupied a position slightly higher than the average in terms of social standing. Furthermore, these opinions remained unchanged in the transition to adulthood except for the high-low subjective social status group. In the high-low trajectory group, subjective social status, although elevated during early adolescence, declined during the transition to adulthood, and they exhibited the most elevated levels of depressive symptoms during both adolescence and young adulthood, regardless of high perceived familial social status. Inclusion in this high-low trajectory group was shown to correlate with non-Hispanic black ethnic background, poorer household income, and poor parental education. Goodman et al. (2015) indicated that subjective social status stability remains consistent over the transition into adulthood for the majority of adolescents and is indicative of objective SES measurements. They suggested the need to determine how the assessment of family social standing during adolescence influences the view of an individual's own social status later on. Further studies, therefore, should explore the correlation between changes in perceived status among peers at school throughout the transition to university and the subsequent consequences after graduation.

Also, according to one study by Loeb and Hurd (2019), SSS decreased in the transition to university in an underrepresented student group in the USA. This study observed a decrease in SSS in a predominantly white institution and noted that a greater difference before university and at university was connected to an increase in depressive symptoms in the underrepresented group. Rubin (2016) also found that subjective social status in the community influenced the quantity of social contact with university friends and both characteristics predicted mental health and well-being in the long run in their two-wave self-report study with university students in Australia. In addition, social interaction with university friends was a significant mediator of the relationships between subjective social status and depression, anxiety (Rubin et al., 2016). These research studies have clarified the influence of perceived social status throughout adolescence and as a predictor of future depression and anxiety. There is evidence of a connection between changes in perceived social status and mental health outcomes, and how subjective social status plays a role in social interactions at university is also highlighted. Further research will shed light on how changes in peer social status relate to mental health across the broader student population during the transition to university.

The relationship between lower perceived social status and increased levels of depression and anxiety may be influenced by difficulties in emotion regulation among underrepresented groups. As discussed, the feelings of adolescents about their social standing are associated with their perceived social status. Emotional regulation facilitates maintaining healthy relationships, managing peer dynamics (for example: peer acceptance and rejection, power dynamics), and exhibiting socially desirable attributes such as resilience, empathy, and confidence, especially in university because the importance given to connection and cooperation increases (O'Mealey & Mayeux, 2022). Research findings revealed that lower perceived status was associated with heightened emotional dysregulation

among university students from ethnically diverse backgrounds (Kauffman et al., 2020). Zvolensky et al. (2017) found that subjective social status was indirectly associated with anxiety and depression via emotion regulation in the economically disadvantaged group. These findings demonstrate the mediator role of emotion regulation in the connection between lower perceived social status and its adverse effects on mental health among university students, especially in underrepresented groups.

The Mediator and the Moderator Factors Between Social Comparisons, Subjective Social Status and Mental Health

It is well established that social comparisons influence perceived social status and mental health outcomes. However, the positive or negative effects of social comparisons on perceived social status and mental health are contingent upon certain mediators and moderators. The mediators and moderators discussed in this section are important because they align with key characteristics of adolescence and the transition to university such as increased independence, heightened uncertainty, a greater need for peer support and belonging to a peer group, and higher levels of depression and anxiety. For instance, elevated levels of depression during university, arising from various factors, may intensify negative social comparisons and lead to declines in perceived social status.

An increased discrepancy between the ideal and actual self following social comparisons may heighten levels of depression and anxiety. Adolescence is characterised as an important period for the formation of self-concept, marked by a heightened engagement in social comparisons as a way of acquiring self-knowledge and making self-evaluation. Those in the mid-adolescent stage (aged 15-17) experience the greatest detrimental impact from these social comparisons compared to individuals in other age groups (late childhood, early adolescents, and young adults) according to Van der Aar et al.'s (2018) experimental study.

Social comparisons may increase the disparity between the ideal self and the actual self, thereby potentially resulting in depression and anxiety. According to the self-discrepancy theory by Higgins (1987), inconsistencies between the actual self-state and ideal self-states (representations of a person's opinions regarding personal or significant others' expectations, wishes, or aspirations) indicate fewer positive outcomes for the self, and are linked to feelings of dejection (for example: disappointment, dissatisfaction, sadness). A discrepancy with the ought self (feelings of duty or responsibility to be a certain way) may further result in a sense of shame or increased anxiety. For instance, when a student with lower grades (actual self) perceives high achievement as the ideal self and compares themself to peers with higher grades and wishes to achieve higher grades, this self-discrepancy may result in emotional states of disappointment and frustration. To address this disparity, they could choose to intensify their effort, seek additional assistance, and establish improved study habits. However, if they use dysfunctional strategies it might adversely impact their mental health.

Various studies in the literature examined the factors determining the impact of social comparisons on mental health. For example, Wetherall et al. (2019) conducted a systematic review examining the mediators or moderators influencing the link between social rank and depressive symptoms. This work indicated that the impact of social comparisons on mental health depends on a variety of mediator and moderator factors such as the individual's approach to social comparison, the importance of the specific comparison domain (for example: physical attractiveness, academic achievement) for themselves or other people, psychological factors (for example: rumination, self-esteem, self-criticism and shame, emotional dysregulation) and demographic factors such as gender and education, and personality. Another study by Butzer and Kuiper (2006) revealed that self-concept, clarity, and intolerance of uncertainty fully mediated the associations between both general and upward social comparisons, and depression and anxiety. Thwaites and Dagnan (2004) also conducted a study

on 174 people (Mean age = 34.63; SD = 12.28 years) that included clinical and non-clinical samples. Findings indicated that the relationship between social comparison on a certain dimension and depression is moderated by the perceived significance of that dimension ascribed to others (how significant individuals feel others consider it to be) but not the personal importance of the dimensions. However, they stated that the sample was not deliberately chosen to include a broad spectrum of depression levels. Thwaites and Dagnan (2004) did not report the differences between the clinical and nonclinical groups on measures of social comparisons. However, there is a significant role of social comparison processes in both the onset and persistence of depression according to the cognitive vulnerability model of depression (Swallow & Kuiper, 1988). There is a clear need for more research that measures social comparisons across the spectrum of the population with depression.

Academic Social Comparisons and Professional Burnout

Numerous factors can exacerbate burnout and burnout symptoms including workload, social relationships, academic assessments, financial difficulties (Boudreau et al., 2004; Shankland et al., 2019) and a competitive environment (Muzafar et al., 2015; Shadid et al., 2020). Among these factors, the experience of existing within a competitive environment is the one most likely to encourage an increase in social comparisons and a bidirectional link with burnout. Research showing the link between social comparison and burnout symptoms has mainly focused on professionals. For example, Buunk et al. (2001) indicated that increasing degrees of burnout are associated with lower levels of positive emotion in reaction to upward comparison in sociotherapists. Furthermore, increased levels of burnout evoked more negative affect in response to downward comparison although this effect was observed just in those with a high orientation towards social comparison (Buunk et al., 2001). In addition, downward comparison was associated with decreased burnout levels, but upward comparison led to increased burnout levels following two months in working adults

(Halbesleben & Buckley, 2006). This evidence suggests negative outcomes are related to both individual differences and the direction of the comparison. According to one qualitative study by Picton et al. (2022), academic social comparisons were one of the main reported struggles of medical students in the first year of university. In university students, therefore, academic social comparisons are conceptually associated with burnout. Given that burnout is directly associated with occupational and academic challenges, it is key to better understand the connection between academic social comparisons and burnout.

Sleep Related Factors and Mental Health

University years are marked by biological and behavioural phenomena that may impact mental health such as increased sensitivity to social stressors and sleep quality and quantity constraints (Adams et al., 2020). It is well recognised that sleep, anxiety and depression symptoms of university students are often found to be interrelated. However, studies in the literature did not focus on sleep changes in the transition to university and the respective connections with mental health at university. A better understanding of these associations will enhance the likelihood of formulating university-specific interventions. This section will first discuss the relationship between disruptions in social circadian rhythms and mental health. It will then address the potential for such disruptions within the university context based on university-related factors. Finally, drawing on large-scale studies conducted with university students across various countries, the bidirectional associations between poor sleep quality and mental health will be examined.

The transition to university might change social circadian rhythms due to factors such as living in shared accommodation with peers, a change in academic schedules and an unfamiliar environment at university. Ehlers et al. (1988) hypothesised that a disruption of social rhythms, potentially leading to instability in biological rhythms, may serve as a trigger in the initiation of a major depressive episode among vulnerable people. Szuba et al. (1992)

also studied these social rhythms in the context of clinical depression (bipolar and unipolar) and found that the depressed group in the inpatient hospital had lower social rhythm scores (total score in social rhythm metric) than the control group. In addition, there was no difference in the overall quantity of social interactions, as assessed by the activity level index of the social rhythm metric (SRM) between the control group and the patient group. However, they did observe a distinction in the consistency of participation in these activities. The control group in the study exhibited consistent SRM scores across time. However, they also mentioned that they could not rule out the possibility that the differences in SRM may be attributed to external factors, such as the daily schedule. They stated that this paper presents the initial evidence of disturbances in social circadian rhythms in individuals with depression. All in all, it led to the hypothesis that disturbance to external (social cues) cues that are used to entrain biological rhythms result in the onset of depressive episodes.

In addition, the study of Van Tienoven et al. (2014) reports findings that support the social zeitgeber theory indicating people's social lives are connected to circadian rhythms. Disruption of these social cues may cause circadian rhythm disruption and somatic symptoms that increase the risk of mood disorders. Interpersonal and social rhythm therapy uses the social rhythm metric (SRM) to re-establish patients' social cues and to re-entrain their circadian rhythms. The SRM measures a patient's interactions with their social environment. In this study, SRM scores of a healthy population ($N = 1249$) were calculated and compared to those from a pilot study. This revealed little variance across different population characteristics and across months of the investigation period. Low SRM scores consistently indicated a higher level of social and emotional dysfunction (Van Tienoven et al., 2014). This evidence shows the occurrence of social zeitgebers and their effects on mental health. The impact of changing rhythms on mental health needs to be considered throughout the university years as well. The reduction in parental control effect on sleep during the transition to university may

exacerbate sleep deprivation and mental health issues. The significance of bedtimes established by parents has been demonstrated in two research studies (Gangwisch et al., 2010; Short et al., 2011). According to the findings, young people who have their bedtimes set to midnight or later are more likely to experience depression or suicidal thoughts than parents who set their child's bedtime at 22.00 hours or earlier (Gangwisch et al., 2010). More sleep and less daily exhaustion were reported by South Australian teenagers who reported a parental-set bedtime compared to those who did not record a set bedtime (Short et al., 2011). Having a bedtime that is an hour earlier and sleeping for an additional hour has been shown in these two studies to have good effects on depression, drowsiness, and fatigue. It would appear therefore that behavioural interventions like a set bedtime that is an hour earlier can help to reduce the circadian phase delay that is associated with maturation in adolescents. Contextual conditions at university, including the absence or lessening of parental oversight or control and peer socialisation in later evening and nighttime may result in a delaying of sleep onset (going to bed later), thereby potentially exacerbating the aforementioned adverse effects. Behavioural interventions should consider changes to sleep patterns in the university context in order to increase students' awareness of risks for adverse consequences.

Several studies across multiple countries have shown heightened sleep deprivation among university students and its associations with anxiety and depression. For example, a study demonstrated a significant frequency of sleep deprivation among university students and that distinct mental health symptoms were associated with sleep issues. In this study, 7,626 students ranging in age from 18 to 29 years ($M_{age}=19.14$, $SD=1.42$) from six USA universities completed questionnaires assessing mental health symptoms and the Pittsburgh Sleep Quality Index. Across all sleep components, a sizable minority of students endorsed sleep issues. More precisely, 27% rated their sleep quality as bad, 36% reported sleeping less than seven hours each night, and 43% indicated that falling asleep takes more than 30

minutes at least once a week. 62% of individuals fulfilled the cut-off criteria for inadequate sleep. Both anxiety and depression symptoms were found to be uniquely linked with disturbances in the majority of PSQI sleep domains. However, anxiety symptoms were correlated with increased sleep disruptions and sleep medicine use, whereas depression symptoms were explicitly associated with increased daytime dysfunction. Each of the anxiety and depression symptoms was individually, however, significantly connected with a lack of sleep (Becker et al., 2018).

Orzech et al.'s (2011) four-wave longitudinal study and interview study also corrected the connection between sleep quality and depression in university students in the USA. According to the results of this study, students who reported experiencing anxiety or depression during the academic year had higher PSQI ratings, indicating lower sleep quality, compared to those who did not report anxiety or depression. Also, those who self-reported depression and anxiety exhibited the most significant variations in PSQI scores when compared to those who did not report these variables. They reported that the connection between mental health problems and sleep was evident in interviews as well and demonstrated a comprehension of the reciprocal relationship between sleep and mental health.

Dinis and Bragança (2018) conducted a systematic review including studies in Mexico, USA, Austria, Japan, Turkey, Thailand (not included the UK) on the connection between sleep quality and depression in university students. The results of it support a bidirectional association between sleep and depression, and sleep quality is becoming an increasingly important factor (Dinis & Bragança, 2018). Stores et al. (2023) also indicated that sleep disruption has detrimental psychological and physical consequences and university students are particularly susceptible to it due to several biopsychosocial and environmental factors. They also reported that given the significance of this subject matter,

there exists a lack of research, particularly in the UK. In their mixed method (quantitative and qualitative) study on 153 first and third year undergraduate students in two large universities in the UK, they found an association between disturbed sleep and anxiety and depression (Stores et al., 2023).

Understanding the links between sleep and mental health in people who have typically good sleep habits and absence of mental health problems is also crucial because (a) student sleep patterns tend to deteriorate with time, and (b) even short-term sleep issues can have serious consequences for the onset of mental health disorders. For example, 69 university students with typically healthy sleep patterns answered questionnaires about sleep quality and mental health. Even though individuals did not report any clinically significant mental health problems as a group, overall sleep quality was linked to poorer mental health (Milojevich & Lukowski, 2016).

Sleep deprivation and inadequate sleep quality are associated with a rise in mental health issues. However, the effects of sleep disturbance on the relative risk for depression and anxiety may vary by chronotype. The results of a meta-analysis by Au and Reece (2017) suggest that those with a preference for evening activities tend to experience more severe mood disorders. Van Den Berg et al. (2018) also support the connection between evening chronotype and depressive symptoms in students. Chronobiological methods have the potential to help in the prevention and treatment of depressive illnesses.

In summary, studies conducted with university students across various countries indicate bidirectional associations among sleep, depression, and anxiety. University-specific factors influencing changes in sleep patterns and their links to mental health during the transition to university should therefore be taken into account. As disruptions in social circadian rhythms and an increase in eveningness are likely during this period, both students

with sleep disturbances and those with healthy sleep habits may be at risk of developing symptoms of depression and anxiety.

The Connection Between Subjective Social Status, Sleep, Depression and Anxiety

Previous studies have shown that subjective social status is connected to both sleep and mental health and there is a strong relationship between sleep and mental health in adolescents. While research on mediator effects among higher education students remains inadequate, some research has examined the mediator effect of sleep between social status and mental health. For example, the findings by McGuffog et al. (2023) indicated that sleep variables such as sleep schedule variability, pre-sleep concerns, sleep quality, sleep duration, and sleep disturbances mediated the association between social class and mental health among university students in Australia and Ireland. Social status measurement included both objective and subjective aspects of social status. They measured social status by using five different measurements including 11 items in total: educational level (the highest education level of parents, two items), occupational status (participants' perceptions of other people's ideas on the status of their parents' jobs, two items), childhood socioeconomic status (an example item: my family usually had enough money to buy things when I was growing up, three items), subjective social status indicating the participant and their families' social status based on their perceptions (three items), McArthur Subjective Social Status Scale measuring participant' perceived social status in the society (one item). Sleep quality, sleep duration, sleep disruptions, pre-sleep worries, and variations in sleep schedule were mediators of the relationship between social class and mental and physical health (depression and anxiety) in higher education students (McGuffog et al., 2023). This study evaluated social status comprehensively; however, future research could provide an additional perspective by incorporating the assessment of perceived social status among peers, considering the significance of social status acquisition during adolescence.

Rubin (2020) also conducted a study on 402 first-year psychology undergraduate students in a large Australian university by using the impact rating approach. Students identified financial constraints, inadequate time management, coursework assessment items, insufficient sleep, and course grades as the primary factors affecting their mental well-being. The results showed that the positive correlation between mental health and perceived social status (where they would place themselves relative to other people in Australia in terms of their income, education, and occupation) over the previous week and month was mediated by financial constraints and ineffective time management. (Rubin, 2020). However, they did not report the mediator role of inadequate sleep between subjective social status and mental health.

As a summary of the whole section about connections, adolescents transitioning to university often experience sleep disruptions due to factors such as gaining independence from parents, balancing academic and social demands, and adapting to a new environment. During this period, peers become the primary source of social support, and the need to belong to a peer group intensifies. Moreover, as this developmental stage places a strong emphasis on social status within peer networks, living in shared accommodations and being in proximity to peers may further heighten social comparisons. Sleep disturbances and declines in perceived social status during this time, when both the need for peer support and concerns about social standing are particularly salient, are likely to exacerbate symptoms of depression and anxiety.

COVID-19 Pandemic and Its Effects on this Programme of Work

The Covid-19 virus abruptly arose in 2019 in the world and has had global implications. Governments implemented various extraordinary measures to prevent and control the spread of Covid-19. During the Covid pandemic, the UK government also took some strict measures between 2020 and 2021, such as school closures, social distancing rules, restrictions on

social gatherings and quarantines. From March 2020 to March 2021, three lockdowns in March 2020, November 2020, and January 2021 obligated people to stay at home. Further measures were also implemented including limitations on non-essential contact and travel; a reduction in public transport usage; the closure of public venues such as restaurants and pubs; social distancing regulations; a requirement for face masks; restrictions on the number of participants in indoor gatherings; and the provision of an NHS Covid Pass to verify vaccination status in certain places (Institute for Government Analysis, 2022). These extraordinary restrictions, implemented to mitigate the transmission of Covid, changed socialisation patterns, resulted in financial consequences, and affected mental health (Evans et al., 2021; Fruehwirth et.al. 2021).

The COVID-19 pandemic created considerable obstacles for higher education institutions and caused significant interruptions in teaching and learning. Travel restrictions prevented numerous international students from starting the semester in March 2020. Universities quickly changed from in-person to online lectures to maintain continuity in education (Dodd et al., 2021). Online education presented limitations in fields requiring practical training, such as medicine and health sciences (Gaur et al., 2020).

The challenges of distance learning and the social isolation caused by the pandemic significantly contributed to the rise in anxiety and depression symptoms among first-year university students according to a longitudinal study by Fruehwirth et.al. (2021). They found a 39.8 percent increase in moderate to severe anxiety rates and a 47.9 percent increase in moderate to severe depression rates from before to mid-pandemic. They also determined that these alterations were not influenced by a rising trend in anxiety and depression symptoms related to typical first-year stresses before the pandemic. A longitudinal study involving undergraduate students in the UK, carried out prior to (Autumn 2019) and during lockdown (April/May 2020), also revealed a rise in depression levels and eveningness; however,

contrary to expectations, no change in sleep quality was observed (Evans et al., 2021). It is within this context that the work described in this thesis was undertaken, and the impact of the covid pandemic on the sleep patterns, chronotype, social status, and mental health of university students was investigated.

Overview of Main Issues in the Literature and Summary

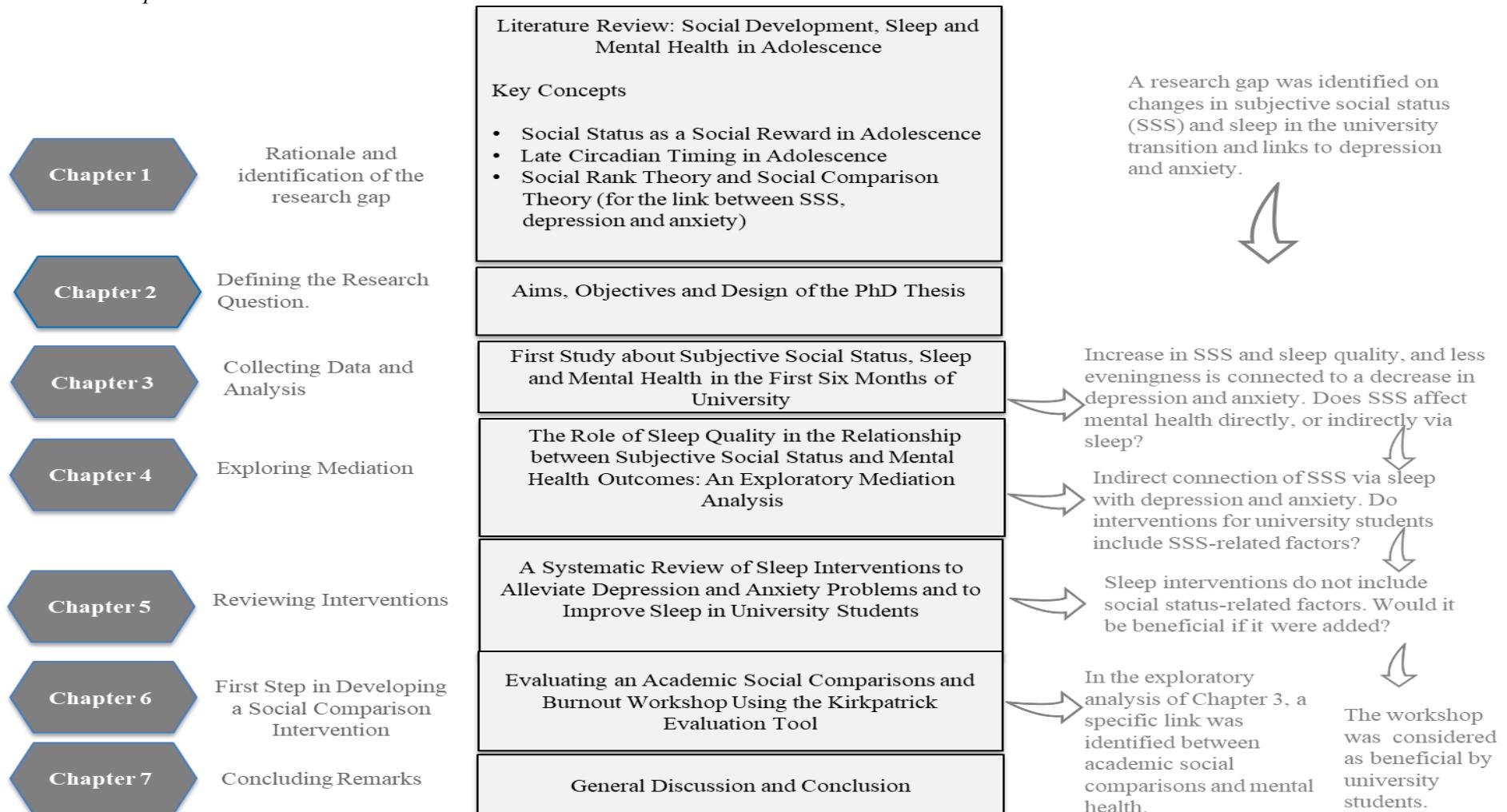
The typical age at which students attend university falls within the adolescent developmental period. Therefore, there are two processes that likely interact to influence mental well-being in the transition to university. First, the psychological significance attributed to social status amongst peers increases during this developmental period. Second, there is a propensity toward a greater eveningness profile in the sleep-wake cycle during this time. More specifically, gaining status is considered a form of social reward and, therefore, social status and sleep are theoretically interrelated constructs given the neurocognitive connectivity between the reward and circadian systems (Avinun et al., 2017; Hasler, Casement, Sitnick, et al., 2017). Proximity to peers during the transition to university, along with academic pressures and challenges in combining social and academic responsibilities, a competitive environment and being surrounded by peers with high accomplishment levels may result in both diminished perceived social status compared to peers and sleep deprivation. Despite the abundance of studies on social status during high school, research examining subjective social status among peers throughout university, its changes over time, and its associations with mental health remains limited. In addition, although subjective social status among peers gains importance during adolescence, existing studies have predominantly measured it in terms of individual and their families' subjective social status within society. In some studies, the dimensions of subjective social status and their associations with mental health have not been evaluated separately but rather assessed through a single-item measure. Assessing school-based subjective social status among peers in a way that captures multiple dimensions of perceived

social status may yield more accurate and comprehensive insights for mental health of this age group.

Research indicates that depression and anxiety are prevalent among university students as shown in studies conducted in various countries (Brandy et al., 2015; Duffy et.al., 2020; Tomoda et al., 2001). These mental health issues are notably more common among university students than the general population, according to a study conducted in the UK (McCloud et al., 2023) and also when compared to pre-university levels (Bewick et al., 2010). The prevalence of depression and anxiety disorders increases from childhood to adolescence (Costello et al., 2011) with several anxiety and depression issues in young adults potentially emerging during the adolescent period (Pine et al., 1998). Considering that university students are typically in adolescence as a developmental stage, evaluating the factors that lead to the increase of mental health issues would provide opportunities for intervention and potentially long-term protective benefits. Various factors influence the mental health of university students, including challenges in adjusting to the new academic and social environment, as well as academic demands (Lund et al., 2010; Garett et al., 2017); different levels of social support (Hefner & Eisenberg, 2010); financial issues (Richardson et al., 2017); and need for flexibility to cope with different challenges (Campbell et al., 2022). In addition, university students are known to report greater sleep disturbances, often associated with living in shared accommodation with peers as well as other social and environmental changes that are part of the transition to university life (Brown et al., 2017; Foulkes et al., 2019). In addition to sleep disturbances triggered by external events, a change in sleep patterns towards more eveningness has been reported in adolescence and can potentially exacerbate depression and anxiety issues (Dinis & Bragança, 2018; Van den Berg et al., 2018).

In summary, this chapter initially examined perceived social status, social comparisons, sleep, and mental health during adolescence separately, highlighting the growing

significance of social status, changes in sleep patterns, and an increase in eveningness during this developmental stage. Subsequently, it addressed the connections between subjective social status, sleep and mental health and Covid-related changes in the university context. While the effects of peer status and sleep on mental health have been widely studied in adolescents, less is known about how these dynamics evolve beyond high school. University-specific conditions may negatively affect mental health by increasing sleep disturbances and leading to declines in subjective social status among peers. The next chapter about aims, objectives and design, will provide additional details on future research.

Figure 1.1*Thesis Roadmap*

CHAPTER 2

AIMS, OBJECTIVES AND DESIGN OF THE PhD THESIS

Aims, Objectives and Design of the PhD Thesis

This chapter firstly presents an overview of the aims, objectives, research questions, hypotheses and structure of the PhD thesis. The second section of the chapter outlines the research design and methods used in the included studies that comprise the PhD thesis. This Chapter also includes information related to ethical approvals and the source of funding.

Aims and Objectives

The aim of this PhD research is to investigate the relationship between subjective social status, sleep and mental health in first-year university students. More specifically, it explores how students' perceptions of social standing amongst peers and their social comparisons, their sleep quality and their sleep preferences (chronotype), are related to depression and anxiety outcomes. It also reviews existing interventions to assess if social factors should be included to enhance sleep quality and mitigate depression and anxiety symptoms in the transition to university.

The PhD has the following specific objectives:

- 1) To assess school-based subjective social status (SSS), sleep quality and chronotype, and depression and anxiety at the start of university and after six months.
- 2) To examine if changes in subjective social status and sleep quality and chronotype predict mental health outcomes (depression and anxiety) after the first six months at university.
- 3) To conduct a systematic review of interventions targeting sleep, anxiety, and depression outcomes among university students, evaluating whether they consider perceived social status and other social-related factors.
- 4) To explore university students' needs and opinions on incorporating perceptions of social status and social comparisons into mental health interventions for

students.

Research Questions

1. How do subjective social status, sleep and chronotype change in the first six months after the transition to the first-year university?
2. How are changes in subjective social status and sleep related to depression and anxiety outcomes in the first six months of university?
3. Do published sleep and mental health interventions for university students consider subjective social status and social comparisons to improve sleep and alleviate depression and anxiety?
4. What are university students' needs and opinions regarding the inclusion of subjective social status and social comparisons into mental health interventions for university students?
5. Do lockdowns due to the COVID pandemic influence the results?

Motivation and Reflection for Undertaking Research

This part will address the personal factors that influenced my decision to undertake this PhD research. The most significant aspect was my master's thesis, which investigated the influence of circadian rhythms and time of day on risk-taking behaviour among university students. It led me to explore a sleep-related topic in my PhD research. I decided to conduct a doctoral research in this area, due to my background in the sleep topic and the considerable interest in sleep and social development in general, and interest in my supervisor's project about social rewards and the circadian system and mental health in adolescents. This PhD research will provide an opportunity to develop evidence-based interventions for student mental health, aligning closely with my interest in intervention studies and my aspiration to make practical contributions to the area. My ongoing interest in health topics, particularly sleep health and mental health in this project, increased my

motivation to explore this research topic.

The Study Context

The transition to university is a significant life event, often marked by profound change in social, academic, and personal domains. For many first-year university students, this period involves adapting to a new social environment, managing increased independence, and navigating academic expectations. Adolescence and early adulthood are crucial phases in this transition, as individuals are highly responsive to social rewards, including peer acceptance and status, which significantly influence mental health and well-being. However, in the transition to university, when significant changes occur, there has been insufficient focus on the changes in these factors and their connection to anxiety and depression, which are common mental health problems among university students. It is important to understand the changes in these factors and their connection to mental health in order to improve the mental health of university students during and after university. The target population was first-year university students living in shared accommodation with peers because living with peers possibly increases social interactions and peer influence. Also, they are likely to have more opportunities for an active social life in the evening. Prior literature has examined the connections between sleep, social status and mental health. At present, however, there is no integrated framework for these factors that is specific to the context of the transition to university. This research aims to examine the interplay between perceived social status, social comparisons, and sleep factors in predicting mental health outcomes and thereby offering a more in-depth understanding of the interrelationships between these factors. The results may be utilised to develop specific programs that include social comparisons to enhance sleep quality and alleviate mental health issues.

Research Design

This thesis employs a mixed-methods research design that includes quantitative and

qualitative data collection methods and the conduct of a systematic review of the literature.

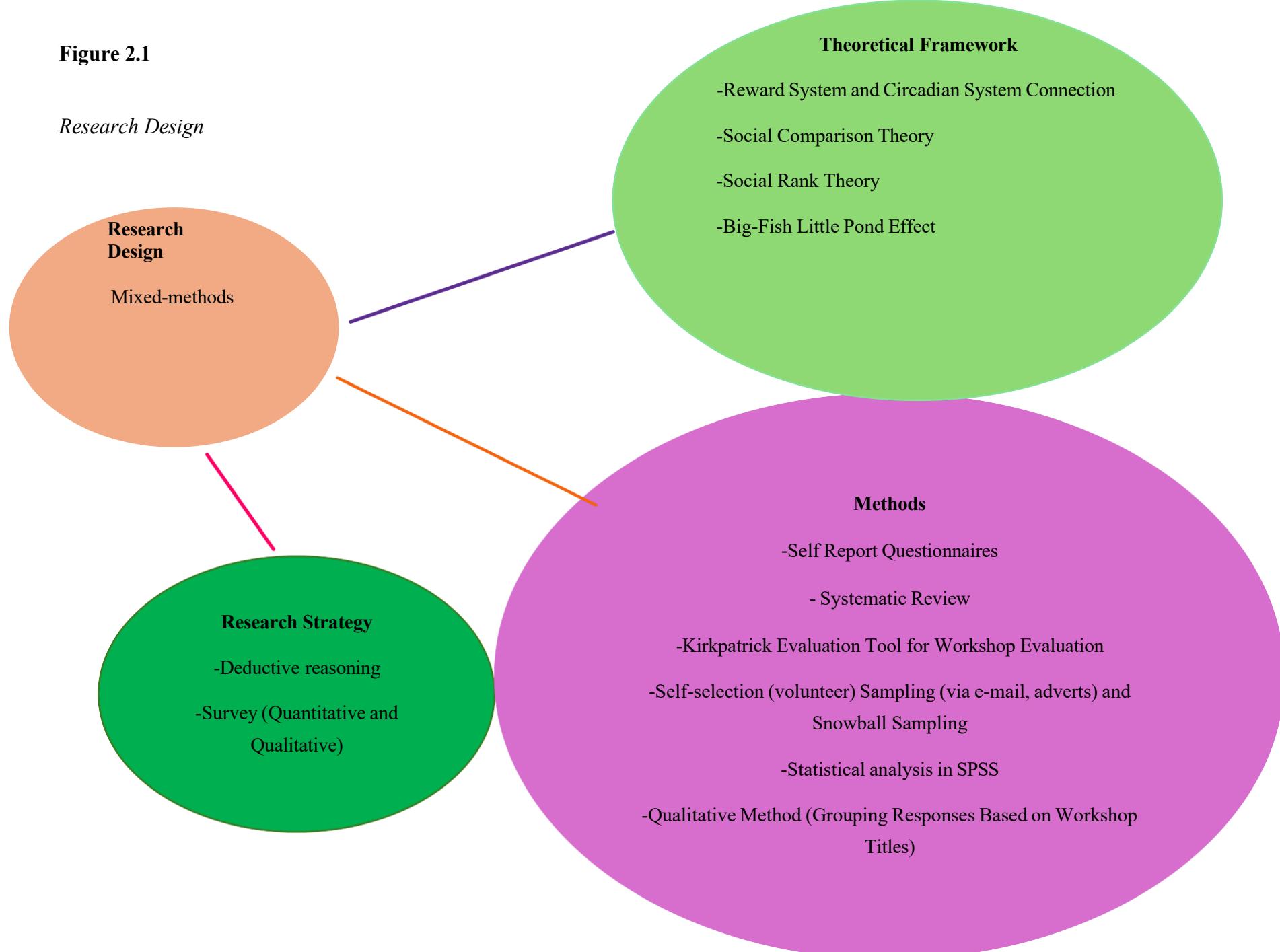
Table 2.1 provides a summary of each of the three studies that comprise the thesis and provide details of the specific methodology used.

Table 2.1

A Summary of the Aims, Design, Measures and Approach to Analysis in the Three Studies.

Study Aims	Study Design	Measures	Approach to Analysis
Study 1. To investigate subjective social status and sleep in mental outcomes in the first year of university	A Two-Wave Prospective Cohort Design	Self-Report Questionnaires	Descriptive and Inferential Statistics
Study 2. To review interventions in the literature to determine the inclusion of social aspects that	Systematic Review	PRISMA framework was followed. Cochrane Risk of Bias Tool was used to assess bias risk	Descriptive and Qualitative Analysis

improve sleep and mental health.			
Study 3 To understand the usefulness of a workshop on social comparisons and burnout to increase awareness of these factors and improve mental health of university students	Mixed Design	Self-Report Questionnaire (based on Kirkpatrick Evaluation Tool)	Mixed Approach

Figure 2.1

Ethical Approval

Ethical approval was granted by the Faculty of Health and Medicine Research Ethics Committee (FHMREC) at Lancaster University for the main study titled “The effects of chronotype and social reward needs on the mental health of 1st-year students” on 3 September 2020 (Reference Number: FHMREC19117). The first amendment (adding ethnicity and department questions, removing Social Reward Questionnaire and adding Social Comparison Questionnaire) was approved on 29 March 2021 (Reference Number: FHMREC20122). Lastly, the final amendment (adding questions about widening participation, low-income grants and scholarships, and a question asking whether university is a first time to move from home and lived with peers, alcohol question, adding Social Comparison and Interest Scale) was approved on 28 September 2021 (Reference Number: FHMREC21006). Ethics approval for the second study titled “Social Comparisons and Burnout Workshop” was granted by FHMREC on 9 March 2023 (Reference Number: FHM-2023-3360-RECR-2). All participants gave informed consent in Qualtrics. See Appendix A for copies of the ethical documents (including participant information form and consent form) and ethical approval letters.

Funding

This research was carried out as part of a PhD Scholarship funded by the Turkish Ministry of Education.

Research Timeline and Impact the Covid-19 Pandemic on the Research Design

This section presents a chronological overview of the activities related to my PhD study (Table 2.2).

The COVID-19 pandemic had several implications for the research design. First, in the main study, sleep, subjective social status, and mental health were assessed exclusively through self-report questionnaires. In addition, an eye-tracking study was planned but could not be carried out during the pandemic and was instead conducted later as a supplementary study. Initially, the research was designed to explore changes in subjective social status, sleep patterns, and mental health, as well as their connections, particularly within shared student accommodation where students live in proximity to their peers. Accordingly, the initial plan was to recruit university students at the household level. However, because the study had to be conducted online due to the pandemic, this approach could not be fully implemented. Without the restrictions imposed by COVID-19, data could have been collected through face-to-face interactions with students, which might have increased the likelihood of recruiting participants at the household level. The workshop study was also initially intended to be conducted as a randomised controlled trial with follow-up assessments, incorporating measures of sleep, subjective social status, and mental health. Assessing the long-term effects of the workshop in student groups who participated in it compared to those who did not could have provided additional valuable insights. However, since it was implemented after the pandemic, time constraints prevented the inclusion of follow-up assessments.

Table 2.2*Chronology of PhD Research Activities*

Year	Month(s)	Activities
2020	February- June	<ul style="list-style-type: none"> • Literature Review • Planning Research • Specifying Questionnaires and Target Population
	June-September	<ul style="list-style-type: none"> • Ethics Application Process
	September-December	<ul style="list-style-type: none"> • Getting Ethics Approval • Collecting first time-point data (Cohort 1) • Getting the systematic review module • Planning systematic review of sleep interventions
2021	February	<ul style="list-style-type: none"> • Annual Review of PhD
	March	<ul style="list-style-type: none"> • Ethics Application for Amendment
	April-May	<ul style="list-style-type: none"> • Collecting Second-Time Point Data (Cohort 1)
	June-August	<ul style="list-style-type: none"> • Analysing Data • Preparing Confirmation Panel Documents
	September	<ul style="list-style-type: none"> • Confirmation Panel: Confirmation of PhD Status
	October-December	<ul style="list-style-type: none"> • Collecting First Time Point Data (Cohort 2) • Writing Literature Review Chapters and Systematic Review of Sleep Interventions Chapter
2022	January-May	<ul style="list-style-type: none"> • Getting Feedback for Chapters and Editing

		<ul style="list-style-type: none"> • Having Appraisal Meeting • Collecting Second Time Point Data
	June-December	<ul style="list-style-type: none"> • Data Analysis of Cohort 1 and Cohort 2 • Writing Results of Cohorts (mediator effects, change scores) • Preparations for Workshop Study and Eye-Tracking Study
2023	January- February	<ul style="list-style-type: none"> • Submitting Ethics Application for Workshop Study
	March-May	<ul style="list-style-type: none"> • Continuing Data Analysis and Writing Up • Planning Workshop Study
	June-December	<ul style="list-style-type: none"> • Recruiting Participants and Organizing Workshop • Trial of Actigraphies and Learning Analysis of Actigraphy Data for Eye-Tracking Study
2024	January- March	<ul style="list-style-type: none"> • Writing up and Getting Feedback for Workshop Report • Planning for Eye-Tracking Study (Preparing Tasks)
	April -July	<ul style="list-style-type: none"> • Recruiting Participants and Collecting Actigraphy and Eye-Tracking Data • Preparing Workshop Toolkit • Last Editings and Submitting Thesis

This section outlined the aims, objectives, research questions, research design, and overall research process of the thesis. The following section will present the main study, focusing on changes in perceived social status, sleep, and mental health, and exploring the relationships among these factors in first-year university students.

CHAPTER 3

SUBJECTIVE SOCIAL STATUS, SLEEP QUALITY AND MENTAL
HEALTH IN THE FIRST SIX MONTHS OF UNIVERSITY: A TWO-
WAVE PROSPECTIVE COHORT STUDY OF FIRST YEAR
UNIVERSITY STUDENTS IN 2020 AND 2021

Abstract

University is frequently the first experience of living together with peers. Living with others increases interactions but can impact sleep and mental health. Subjective perceptions of social status compared to others can also impact mental health. Research has shown that COVID-19 lockdowns impacted sleep and mental health however effects on subjective social status are unknown. A two-wave study was conducted with first-year university students in 2020/21 and 2021/22. This study investigated if changes in subjective social status and sleep were related to depression and anxiety after six months of university. Analyses of 145 students found a change towards a lower subjective social status from high school to university, poorer sleep quality and a greater eveningness profile were all associated with poorer mental health outcomes in the first six months of university. In conclusion, the study shows social comparisons with peers affect mental health outcomes during the first year of university.

Keywords: subjective social status, sleep quality, anxiety, depression, mental health, first-year university students, Covid-19

Subjective Social Status, Sleep Quality and Mental Health in the First Six Months of University: A Two-Wave Prospective Cohort Study of First-Year University Students in 2020 and 2021

Social relationships are important during adolescence. There is an increase in the salience of peer interactions and in the value attached to social connections during this period (Blakemore, 2008). This includes a greater emphasis on social status that is the perceived position of one's social rank compared to peers than seen in younger children (LaFontana & Cillessen, 2010). According to a study by Loeb and Hurd (2019), there was a decline in subjective social status reported by some students when they move from their home community to university. This was explained by perceptions of status in relation to other students in the university. Research shows lower perceived social status is connected with both depression and anxiety (Russell & Odgers, 2020) as well as sleep problems (Jarrin et al., 2014). At present, there is an absence of studies looking at changes in subjective social status and sleep-related characteristics during the first year of university, and how they could predict poor mental health outcomes in transition to university. It is important to understand changes in sleep factors and subjective social status in the transition to university. A poorer sleep quality and a perception of a lower social rank compared to peers are both factors previously implicated in mental well-being in students, including both anxiety problems and depression. In regard to changes in mental health in the transition to university, two-wave studies conducted with various first-year student populations in Belgium (De Coninck et al., 2021) during first semester at university , Canada (Duffy et al., 2020) and Japan (Tomoda et al., 2000) during first year of university

indicated that first-year students had an increase in the prevalence of depression or anxiety, or met the diagnostic criteria for severe depression. Stewart et al. (1997)'s two-wave survey study also showed that high self-report ratings of anxiety and depression in a sample of 121 medical students at the start of the university persisted over the first 8 months at university. More recently, moderate to severe levels of anxiety and depressive symptoms were found in students at entry to university and were found to persist over the first year (Adams et al., 2021). This study also found subjective perceptions of social integration was one mitigating factor in persistent problems. In summary, these findings suggest a need to explore social and sleep factors in depression and anxiety problems reported in the first year of university.

As previously discussed, living in a shared accommodation, and interacting with peers from different backgrounds is a typical experience during the first year of university. This proximity to peers can impact subjective perceptions of social rank, that is defined as how they feel compared to their peers or within the group, that in turn can have an impact on a person's mental health and well-being. Additionally, in the transition to university, negative comparisons with peers may reduce students' sense of status, and in turn mental health and well-being. There is a well-documented 'big-fish–little-pond effect' (BFLPE) that observes better academic self- concept when a highly capable student is in a regular school or class, as compared to the university context where the social referent group are all as equally highly capable (Fang et al., 2018). The transition from perceiving highly talented compared to peers to being perceived as equal with their peers may cause a decrease in their perceived status, that can lead to an increase in depression and anxiety. One explanation provided by social rank theory is that depression arises

as a result of perceiving oneself to hold a lower social position than others, leading to feelings of defeat and entrapment (Wetherall et al., 2019). Also, social anxiety is explained in terms of a drive in affected individuals to avoid undesirable confrontations with dominant members of social groups (Trower & Gilbert, 1989). According to Gilbert (2000), shame, social anxiety, and depression are linked to defensive submissive responses when people are placed in unwanted low status or rank. One prospective study by Rahal et al. (2020) examined how perceived subjective social status (SSS) compared to wider society and to school referent groups changed over time, and how this predicted overall health and mental health both in high school and beyond. In this study, a sample of 336 adolescents with an average age of 16 at study entry in the US rated their subjective social position at three distinct points between 10th grade and the three years following graduation. Lower socioeconomic status and school SSS were related to more depressive symptoms. Another two-wave prospective study with an 18 months follow up period showed that with each perceived step up the SSS ladder, adolescents experienced fewer mental health symptoms in daily life in the US (Russell & Odgers, 2020). However, there is currently little evidence from prospective studies addressing the transition into the first year of university in the UK.

A frequent problem among university students is poor sleep quality with a contribution of living in a communal residence. This is partly attributable to the disruptive effects of living in shared accommodation (Lund et al., 2010; Qin & Brown, 2017). Galambos et al. (2013) reported poorer sleep quality in students and several studies on the transition to university reported that the close proximity to peers affected students' sleep because of easy opportunities to socialize, and noise (Adams et al., 2016; Foulkes et al., 2019; Qin & Brown, 2017). Lower sleep

quality of first-year university students was associated with a decrease in positive affect, and an increase in negative affect and stress (Galambos et al., 2009). According to a cross sectional three-wave study by Orchard et al. (2020), sleep problems were strongly implicated in the increase in depression and anxiety reported in student populations. A two wave prospective study with 686 male university students found that poorer sleep quality was associated with an increased risk of anxiety symptoms one year later (Zou et al., 2020). Also, a cross-sectional study found a correlation between lower sleep quality and a greater eveningness preference (prefer to be more active in the evening and go to bed later) among first-year university students. Research further showed that poorer sleep quality and a more eveningness chronotype was associated with depression in first-year university students (Zhou et al., 2021).

Alongside the unique characteristics linked to the university setting, the Covid pandemic, which emerged unexpectedly and had impacts worldwide, is also likely to have some effects on sleep, social status and mental health of university students. In covid pandemic, the UK government also imposed a series of measures that included the closure of schools, social distancing rules, the restriction on social gatherings, and quarantines in 2020 and 2021. There were three lockdowns from March 2020 to March 2021 that restricted people's activities and to travel freely, in order to decrease the spread of the covid-19 virus. By the end of 2021, measures became more flexible only requiring the use of masks in public, or presenting covid passes in specific settings (Institute for Government Analysis, 2022). Lockdowns and restrictive measures affected the social lives of first year university students in 2020/2021 in addition to presenting challenges in the transition to university. Research indicated that the challenges of distance learning

and social isolation contributed to the rise in depressive and anxiety symptoms (Fruehwirth et al., 2021). Furthermore, according to Dodd et al. (2021) lower subjective social status was connected to lower well-being of university students aged 18 years and over (not only first year students) in the first months of the pandemic (May- July) and emphasised the need to support the well-being of students with low self-reported social status. A two-wave prospective study on 254 undergraduate students in a UK university showed a significant increase in depressive symptoms and a decrease in well-being at lockdown from autumn 2019 (pre- pandemic) to April/May 2020 (under 'lockdown' conditions). In this study, the prevalence of clinical depression among the sample increased from 15% at baseline to 31.7% during lockdown. There was no significant impact on the quality of sleep observed in the whole sample even though there was an increase towards greater eveningness chronotype. Also, there was a strong correlation between a rise of depressive symptoms and a decline in sleep quality (Evans et al., 2021). This evidence indicates that social and sleep factors, including sleep quality and eveningness, were affected during the pandemic period. It is not clear, however, if any observed changes in SSS and sleep quality in the first six months of university were associated with anxiety and depressive symptoms of first-year university students in the pandemic period.

In the current study, we will investigate the connections between a change in subjective social status, as well as changes in sleep quality and chronotype, and rates of self-report depression and anxiety after six months of university. We will also investigate if changes in the first six months of university differ in those in the 20/21 compared to 21/22 cohort. We might also expect a relationship between subjective social status and sleep factors. Firstly, we will focus on the separate

relationships of these predictors to mental health outcomes. Subsequently, we will explore the link between change in subjective social status and change in sleep factors and mental health to inform future research. We conducted this study with students that began university during lockdown (2020/21) and after lockdown (2021/22) and therefore will take account of any differences in the two academic cohorts.

Method

Study Design

Two cohorts of first-year university students who started university in 2020/21 and 2021/22 participated in a study that had two data collection time points. The first month after starting university (October) and six months later (April).

Population, Sample and Recruitment Procedure

The population comprised two cohorts of first-year university students at Lancaster University in the UK. The study was advertised to first-year medical students, and participants were recruited from the population of first-year medical students and their housemates studying in a variety of departments via a non-probability snowballing recruitment strategy in Cohort 1. Flatmates were recruited to understand subjective social status among peers who live in close proximity. In addition to this, participants were recruited from the student portal of the university via volunteer sampling. The college administration assisted in the circulation of an advertisement on the student portal. Since it was not possible to contact all students in a household in the first cohort, the snowballing approach

was not utilised in the second cohort, only the method of volunteer sampling was employed. Only first-year university students in shared campus accommodation took part in the study. This is because the first year of university is often a transitional period characterised as the first time to leave family and begin to live with peers in a shared accommodation. Understanding changes in subjective social status among peers, sleep, and mental health during this time is crucial, as peer social status plays a significant role in these ages. We did not include students not living in shared accommodation and not in their first year of university. There were a total of 230 first-year students (both Cohort 1 and 2) living in shared accommodation initially recruited to the study.

In addition to basic demographic information such as age, gender, and ethnic group, data were also collected on variables including gap year status, college, flat and house numbers, academic department, eligibility criteria for widening participation activities (Did you meet the eligibility criteria to take part in our widening participation activities and initiatives?), low- income status (Do you receive a low income grant, scholarship or bursary to help with your University fees?), whether university was the first time participants had moved away from home to live with peers, and alcohol use. Detailed information regarding the rationale for collecting this information from participants, frequencies and why variables were included or excluded in the main analyses is provided in Table 3.1.

Table 3.1

Demographics of Participants in Cohort 1 and Cohort 2 with Reasons for Inclusion and Exclusion in the Main Analysis

Cohort 1	Cohort 2	Reason for	
		Inclusion	Exclusion
Age	Age	To include students around the 18-25 age range in late adolescence and compare groups.	There was no significant difference based on age between cohorts. Participants aged 19–20 comprised 68.7% (N = 118) of Cohort 1 and 90% (N = 40) of Cohort 2.
Gender	Gender	To understand gender differences in results.	There was no significant difference based on gender between cohorts. Female participants comprised 59.8% (N = 107) of Cohort 1 and 71.8% (N = 40) of Cohort 2.

Gap year	To control for students transitioning directly from high school- to university	There were not enough participants in each group to compare. A small percentage of students had a gap year (N = 23, 14.4%).
College, Flat and House Numbers	To group students in the dataset and tests for group effects in the changes in subjective social status, sleep, and mental health. outcomes.	It was not possible to code students due to variation in reporting of addresses by participants.
Ethnicity	Ethnicity	To compare based on ethnic groups. Majority of participants (85%) were white.

Faculty	Department	To compare based on faculty and departments.	There were not enough students from each department ^a , so we merged and compared based on the faculty. There was no significant difference based on faculty between cohorts.
			<p>In Cohort 1, 33.6% of participants were from the Science and Technology Faculty, 27.3% from the Faculty of Health and Medicine (FHM), 23.6% from the Faculty of Arts, Humanities and Social Sciences (FASS), and 12.7% from the Management School (N = 110) while 63% of participants were from FHM and 35% from FASS (N = 40) in Cohort 2.</p>

Widening Participation Eligibility Criteria	As a proxy measure of objective social status and to compare groups.	No differences were found between students who met and did not meet these criteria.
Low Income	As a measure of objective social status and to compare groups.	More than half of the students answered no to question regarding Widening Participation eligibility criteria (N = 41, 58.6%)
Is University First Time you have moved from home and lived with peers?	To understand effects on sleep, subjective social status and mental health and to compare groups.	No difference in the analysis. More than half of the students answered no to the question regarding low income (N= 40, 57.7%)
		Insufficient participants in each group. Most of the students (77.5%) gave the response 'Yes'

Alcohol	Alcohol might affect	Not enough
	sleep. It is to	participants in
	understand	each group
	differences based on	So, no
	alcohol	comparison
	consumption.	could be made.
		The proportion
		of students who
		had not
		consumed any
		alcohol in two
		weeks was more
		than half of the
		sample (N= 42,
		60.9%).

^a The departments were medicine and other disciplines including, business, accounting and finance, biology, chemistry, sociology, psychology, computing and communications, law, mathematics, physics, politics, philosophy and religion, English Literature and Creative Writing , English Literature, English and Linguistics and history.

Instrument

The survey consisted of five self-report questionnaires. Chronotype, sleep quality, subjective social status were predictor variables while anxiety and depression are primary outcomes, and there were no secondary outcomes in the study.

The first was the Morningness-Eveningness Questionnaire (Horne & Östberg, 1976) used to assess when the biological clock (chronotype) can achieve peak alertness, which indicates the time of day people are more likely to behave more efficiently in their work and in their cognitive, behavioural and emotional functioning. This questionnaire includes 19 items, measured in a 4-point Likert scale. Scores are combined to estimate circadian rhythm preference. Three groups were categorized based on the MEQ scores: Morning type (59 and above scores); Intermediate type (scores between 42-58); Evening type (41 and below). Lower scores show more of an eveningness tendency. The original study by Horne and Ostberg reported a Cronbach alpha of .84, which shows good internal consistency. The Cronbach alpha reliability score of chronotype measured by the Morningness Eveningness Questionnaire in young people aged 18-25 was 0.79 (Van Den Berg et al., 2018). In another study conducted with university students by Digdon and Howell (2008), the Cronbach alpha score of chronotype, measured by MEQ, was 0.77.

The second instrument was the Pittsburgh Sleep Quality Index (Buysse et al., 1989) which elicits information concerning sleep quality during the past month. This questionnaire includes 19 items, measured in a 4-point Likert Scale and open-response questions. A PSQI total score was obtained according to the procedures

suggested by Buysse et al.(1989). The higher score the participants gained means the lower sleep quality. Cronbach's alpha was reported as 0.83, indicating good internal consistency. The Cronbach alpha reliability score of the PSQI among university students has ranged from 0.69 to 0.90, as reported in various studies in the literature (Becker et al., 2018; Mishra et al., 2022; Dietch et al., 2016; Gusman et al., 2021). A score of 0.69 was reported in a large multi-university sample of U.S. university students (Becker et al., 2018), 0.90 among university students in the U.S. at the beginning of the pandemic (Gusman et al., 2021), and 0.72 among undergraduate medical students entering university during the pandemic (Mishra et al., 2022).

The School-Based Subjective Social Status (Sweeting et al., 2011) was included which assesses an adolescent's perceived rank compared to their peer group. Participants choose their perceived social status on a ladder with ten rungs of stairs. There are seven domains 'popular', 'doing well at school', 'powerful', 'trouble-maker', 'attractive stylish', 'sporty' and 'respected'. A SSS total score was used that was the sum of the seven scales. In respect to reliability, Sweeting et al. (2011) conducted a principal component analysis on responses from adolescents (N = 3194) and found three dimensions labelled 'Scholastic', 'Peer' and 'Sporty'. All scales loaded onto one 'SSS-Peer' scale (factor loadings range .261 - .829 and 47% variance explained) with higher scores that were significantly associated with higher friendship nominations ($\eta^2 = .027$) and interviewer-rated attractiveness ($\eta^2 = .020$). The MacArthur Scale of Subjective Social Status–Youth Version demonstrated good two-month test-retest reliability among adolescents, with an intraclass correlation coefficient (ICC) of 0.79 (Goodman et al., 2001).

The General Anxiety Disorder Assessment (Spitzer et al., 2006) was used, which asks about anxiety-related problems over the last two weeks. This questionnaire includes 7 items, measured on 4-point Likert Scale. The GAD-7 score ranges from 0 to 21. Cronbach Alpha was reported as 0.92, indicating excellent internal consistency. The Cronbach alpha reliability score of GAD-7 in a sample of university students in the UK was 0.92 (Akram et al., 2023).

The Patient Health Questionnaire (Kroenke et al., 2001) screening for depression symptoms over the last two weeks was also used. It is 9-item questionnaire measured in 4 - point Likert Scale. The PHQ-9 score ranges from 0 to 20. Cronbach's Alpha was reported as 0.89, which indicates excellent internal consistency. The Cronbach alpha reliability score of PHQ-9 in a sample of university students in the UK was 0.90 (Akram et al., 2023).

Study Procedure

The study obtained approval from the University Research Ethics Committee (FMHREC19117) (Appendix A). All the invited participants provided written informed consent before completing the online surveys. Participants filled out questionnaires via Qualtrics Survey software.

Statistical Analysis

Firstly, the means (m) and standard deviations (SD) were calculated for all variables (MEQ, PSQI, SSS, GAD7, PHQ9) at Wave 1 and at Wave 2 in the 20/21 and 21/22 cohorts. An independent samples t-test was used to compare students who continued to participate and those lost to follow-up. The analysis was conducted on measures of sleep quality, chronotype, social status, depression and anxiety, and chi-square analysis was used for the categorical variable of gender.

Cronbach's alpha coefficients were used to assess the internal consistency of standardised instruments in each cohort and wave in the present study. Cronbach alpha values above 0.90 indicate excellent reliability, values between 0.80 and 0.89 suggest good reliability, values between 0.70 and 0.79 reflect acceptable reliability, while values below 0.70 may indicate questionable or poor reliability (Ahmad et al., 2024). To test for the effects of wave and cohort, repeated measures analysis of variance in SPSS (mixed ANOVA) was used. Effect sizes are reported as partial eta square, the magnitude interpreted as a small effect (between 0.01 and 0.06), a medium effect (between 0.06 and 0.14), or a high effect (>0.14) (Cohen, 1988). Wave was the within-subjects comparison with two levels (Wave 1 in October, Wave 2 in April), and Cohort was included as a between-subjects effect with two levels (Cohort 1 in 20/21 and Cohort 2 in 21/22) to test for any effects of the academic year. Significant main effects or interaction terms were followed up with simple main effects to understand where differences existed. A wave*cohort interaction term was included to test for differences in the size of the change in the first six months of the university in those in the 20/21 compared 21/22 cohort.

Next, the difference (change score) in Wave 1 and Wave 2 scores was calculated (Wave 2 minus Wave 1) for SSS, MEQ and PSQI scores. To test if change scores predicted GAD-7 and PHQ-9 after 6 months (at Wave 2) at university, independent of Cohort and baseline (Wave 1) values. Univariate general linear models were used with change score as the main predictor and Wave 1 and Cohort as the covariates. The three variables for SSS, MEQ, or PSQI were entered into separate models onto GAD-7 or PHQ-9. The data was analysed using IBM SPSS Statistics 28.

Results

Descriptive Statistics

There were 160 in Cohort 1 (2020, October) and 70 in Cohort 2 (2021, October) who agreed to participate in the study. The overall sample of 230 students who agreed to participate consisted of students from across the faculties of Lancaster University (23.61% Arts and Social Sciences, 45.14% Health and Medicine, 9.72% Management School and 19.44% Science and Technology). There was a total of 230 students who completed the first wave of data collection early in the first term (October) of the first year of university. Participants were matched between the initial questionnaire and the 6-month follow-up using the last four digits of their student numbers. In Cohort 1, 160 students responded at Wave 1 (October) and 118 (74% of Cohort 1) completed questionnaires at Wave 2 (April). In Cohort 2, there were 70 who completed questionnaires at Wave 1 and 39 who continued to participate at Wave 2 (56% of Cohort 2). There were no systematic differences in the variables of interest between students who continued to participate compared to those who were lost to follow-up in Cohort 1 and Cohort 2 (Appendix C). In the final sample ($N = 145$) included in the analyses, 91 (62%) identified as females and 54 as males (38%) and 117 (80%) described themselves as white, strongly consistent with the published ethnicity profile of the university (Detailed information is in Appendix B). Table 3.2 shows the mean and standard deviations of the study variables for the final sample of 145 students. There was one missing PSQI score in merging process. It was excluded by the SPSS programme because both Cohort 1 and Cohort 2 had same participant number (last 4 digits of student number).

Table 3.2

The Mean and Standard Deviations of the Study Variables on Social Status (SSS), Sleep Factors (MEQ, PSQI) and Mental Health Outcomes (GAD-7, PHQ-9).

Variables	Cohort 1 (n = 105)				Cohort 2 (n = 41)			
	Wave 1		Wave 2		Wave 1		Wave 2	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
SSS	36.11	1.36	39.63	1.58	34.61	1.56	36.25	1.63
MEQ	50.39	9.70	46.93	8.49	48.07	8.10	47.63	9.21
PSQI	8.63	2.35	6.33	2.86	6.30	2.95	6.40	3.22
GAD-7	7.96	5.78	8.39	5.81	8.39	5.91	6.45	5.11
PHQ-9	8.33	6.02	8.49	6.21	8.06	6.00	6.93	4.98

Internal Consistency of Measurements

Internal consistency of the measurement scales was evaluated independently for each cohort and wave using Cronbach's alpha (α) to determine reliability over time and between groups. The results indicated that all scales, with the exception of the PSQI sleep quality scale, show sufficient internal consistency, indicating that the items within each scale consistently assess the intended components. You can see the details in Table 3.3.

Across both cohorts, the reliability of the scales remained relatively stable over time. These findings generally support the internal consistency of the measures used in this study and suggest that the scales function reliably across different time points and participant groups. It is important to note that this was not the case for the PSQI where internal consistency was poor to questionable. It suggests the stability of the sleep quality construct was compromised by the pandemic period, most notably in the first wave in Cohort 1 and recovered stability at later time points. Students may have reported atypical and differential sleep patterns during this period.

Table 3.3

Cronbach Alpha Values of Subjective Social Status Scale, Chronotype, Sleep Quality, Anxiety and Depression Measurements in Cohort 1 and Cohort 2

Scale	Number of Items	Cohort 1 Wave 1 (α) ($N=160$)	Cohort 1 Wave 2 (α) ($N=118$)	Cohort 2 Wave 1 (α) ($N=70$)	Cohort 2 Wave 2 (α) ($N=40$)	Interpretation
SSS	7	.75	.82	.81	.81	Acceptable /Good
MEQ	19	.80	.77	.77	.83	Acceptable /Good
PSQI	7*	.52	.66	.65	.69	Low /Questionable
GAD-7	7	.91	.92	.92	.91	Excellent
PHQ-9	9	.87	.88	.87	.86	Good

Note. *PSQI reliability is calculated on the number of components, not items (Buysse et al., 1989)

Table 3.4 shows results of repeated measures for the main variables. There was a significant main effect of Wave for SSS, MEQ and PSQI. Test of simple main effects found that scores increased between Wave 1 and Wave 2 for SSS, and decreased between Wave 1 and Wave 2 for MEQ and the PSQI. The effect of Cohort was significant for the PSQI scores only, with Cohort 1 reporting overall higher scores compared to Cohort 2 (Table 3.4).

The Wave*Cohort interaction was also significant for SSS, MEQ, and PSQI (Table 3.4). The simple main effects comparisons between Cohort 1 and 2 at Wave 1 and 2 showed no significant differences in SSS. The within Cohort comparisons showed that in Cohort 1 at Wave 1, scores were significantly lower compared to scores at Wave 2 (mean difference = 4.27, SE = .68, $p < 0.001$). For MEQ the within Cohort simple main effects comparison showed that scores in Cohort 1 at Wave 1 were significantly higher (less eveningness) than scores at Wave 2 (mean difference = -3.08, SE = .54, $p < 0.001$). This comparison for the PSQI also showed that in Cohort 1 at Wave 1 scores were significantly higher (poorer sleep quality) than Wave 2 (mean difference = -2.42, SE = .25, $p < 0.001$) and were also higher than Cohort 2 at Wave 1 (mean difference = 2.39, SE = .50, $p < 0.001$). Overall, the results showed that within Cohort 1 (20/21) there was a change toward a higher reported subjective social status, a greater shift from morningness toward eveningness, and a greater improvement in sleep quality between the first month at university and six months later. Except for poorer reported sleep quality at Wave 1, there were no other significant differences found between Cohort 1 and Cohort 2.

Table 3.4

Results of the Repeated Measures on Subjective Social Status, Sleep and Mental Health Outcomes

	Variables	df	F	Sig.	Partial Squared	Eta
Wave	SSS	(1, 144)	14.805	<.001	.093	
	MEQ	(1, 144)	9.862	.002	.064	
	PSQI	(1, 144)	24.339	<.001	.145	
	GAD-7	(1, 144)	2.213	.139	.015	
	PHQ-9	(1, 144)	1.594	.209	.011	
Cohort	SSS	(1, 144)	.435	.511	.003	
	MEQ	(1, 144)	.202	.654	.001	
	PSQI	(1, 144)	6.11	.015	.041	
	GAD-7	(1, 144)	1.17	.281	.008	
	PHQ-9	(1, 144)	.734	.393	.005	
Wave*Cohort	SSS	(1, 144)	6.800	.010	.045	
	MEQ	(1, 144)	7.549	.007	.050	
	PSQI	(1, 144)	27.639	<.001	.161	
	GAD-7	(1, 144)	1.385	.241	.010	
	PHQ-9	(1, 144)	.804	.371	.006	

Note. N=145.

The results of the general linear models used to assess if change in SSS, MEQ and PSQI scores predicted GAD-7 and PHQ-9 outcomes after 6 months (at Wave 2), independent of Cohort and baseline (Wave 1) values, are presented in Table 3.5.

The results displayed in Table 3.5 shows that one unit decrease in the SSS change score predicts an increase in anxiety score, after controlling for baseline anxiety and SSS score at wave 1 and Cohort year. The same relationship was observed in the model on depression scores. The models with MEQ change shows one unit decrease in MEQ (i.e toward greater eveningness) also predicted an increase in anxiety and depression scores. The PSQI change score shows the largest effect with one unit increase (i.e worsening sleep) predicted poorer reported anxiety and depression at wave 2 time point.

Table 3.5

Results of the General Linear Models with SSS, MEQ or PSQI as Predictors of Mental Health Outcomes after 6 Months at University

		GAD-7 Wave 2	PHQ-9 Wave 2
SSS	SSS – Change	$b = -.12, SE = .05, p = .03, \eta_p^2 = .03$	SSS – Change $b = -.14, SE = .06, p = .02, \eta_p^2 = .04$
	SSS Wave 1	$b = -.05, SE = .04, p = .22, \eta_p^2 = .01$	SSS Wave 1 $b = -.09, SE = .04, p = .04, \eta_p^2 = .03$
	GAD-7 Wave 1	$b = .56, SE = .07, p < .001, \eta_p^2 = .34$	PHQ-9 Wave 1 $b = .54, SE = .06, p < .001, \eta_p^2 = .35$
	Cohort ^a	$b = 1.72, SE = .86, p = .047, \eta_p^2 = .03$	Cohort $b = 1.53, SE = .89, p = .09, \eta_p^2 = .02$
MEQ	MEQ – Change	$b = -.21, SE = .07, p = .003, \eta_p^2 = .06$	MEQ – Change $b = -.31, SE = .07, p < 0.01, \eta_p^2 = .12$
	MEQ Wave 1	$b = -.10, SE = .04, p = .03, \eta_p^2 = .03$	MEQ Wave 1 $b = -.15, SE = .04, p = .001, \eta_p^2 = .07$
	GAD-7 Wave 1	$b = .55, SE = .06, p < .001, \eta_p^2 = .34$	PHQ-9 Wave 1 $b = .55, SE = .06, p < .01, \eta_p^2 = .37$
	Cohort	$b = .95, SE = .85, p = .27, \eta_p^2 = .01$	Cohort $b = .54, SE = .86, p = .53, \eta_p^2 = .003$
PSQI	PSQI-Change	$b = .74, SE = .15, p < .001, \eta_p^2 = .15$	PSQI-Change $b = 1.01, SE = .15, p < .001, \eta_p^2 = .25$
	PSQI- Wave 1	$b = .22, SE = .17, p = .21, \eta_p^2 = .01$	PSQI- Wave 1 $b = .43, SE = .18, p = .02, \eta_p^2 = .04$
	GAD-7 Wave 1	$b = .53, SE = .07, p < .001, \eta_p^2 = .28$	PHQ-9 Wave 1 $b = .50, SE = .07, p < .001, \eta_p^2 = .27$
	Cohort	$b = 2.66, SE = .90, p = .004, \eta_p^2 = .06$	Cohort $b = 2.62, SE = .90, p = .004, \eta_p^2 = .06$

^a Cohort 1 is the reference category.

Discussion

This prospective study observed a connection between changes in subjective social status in the first 6 months transition period to university. The results showed students' subjective social status on average improved significantly in the first six months of university. This effect was larger in Cohort 1 that coincided with the lifting of social restrictions in early 2021. We however also observed those students who reported significantly less improvement in subjective social status also had the poorest anxiety and depression scores after the six months of university. This study also replicated previous research findings where poorer sleep quality, and a greater eveningness tendency predicted poorer self-report anxiety and depression outcomes. These effects held despite the observed improvement in subjective social status and sleep quality, and a greater than anticipated shift toward eveningness in the 20/21 cohort. This could reflect a return to more activities in the evening. We also observed that after accounting for these shifts, the 20/21 cohort had reported significantly higher anxiety and depression after six months at university. Overall, our study has highlighted the impact of social comparisons with peers on mental health outcomes in the first term of university, as well as confirming the strong links between sleep and eveningness with well-being. There is preliminary evidence that a drop in perceived social status compared to peers at entry to university is associated with a greater reduction in sleep quality (Goodin et al., 2010). This is a potential target for early intervention to address the significant mental health challenges reported in students. The results reported here also indicate that the lower sleep quality reported by some students on entry to university in 20/21 may have contributed to higher anxiety and depression reported after six months compared to the subsequent academic cohort.

The connection between a change toward lower subjective social status and worsening mental health in the first year of university has been observed in prior literature. One prior

retrospective study by Loeb and Hurd (2019) reported a decrease in subjective social status in the first year of university in underrepresented university students (defined as racial ethnic minorities, first-generation students, or from a background of economic disadvantage). They found that a decline in subjective social status was connected to reports of depression in 329 first-year undergraduate students in the United States at the end of the first academic year. Similarly, Rahal et al. (2020)'s study focusing on changes in subjective social status at three-time points during and after high school, found that a decrease in the subjective social status of 336 adolescents in the United States was associated with depression, especially in disadvantaged groups. In the current study, although the change in subjective social status was connected to both anxiety and depression in the first six months, there was a significant increase in subjective social status of participants during this period. Consistent with the research of Russell and Odgers (2020), the findings of the current study indicated that students with a relatively smaller increase in subjective social status reported higher levels of anxiety and depression compared to those with a larger increase in SSS. As a noteworthy strength compared to prior studies, the present study assessed subjective social status among peers in their year group in contrast to some past studies, which measured subjective social status in comparison to wider society (i.e. socioeconomic status). School-based SSS measure uses comparisons in social dimensions that are relevant to adolescents, and this measure has been shown to predict mental health outcomes in younger populations (Sweeting et al., 2011). The observed increase in subjective social status and relatedly in sleep quality in the current study could be attributed to the lifting of restrictions on socialising in the UK in March 2021, shortly before the Wave 2 data collection. This appears consistent to the findings of Galambos et al. (2011) who reported students had better sleep quality in those months when more days were spent with friends. However, despite this general trend of increase in SSS and sleep quality, students experiencing heightened depression and anxiety

showed a decrease in perceived social status and sleep quality.

Analysis in change scores showed that a decrease in sleep quality and an increase in eveningness was connected to a higher depression and anxiety after six months in the first year of university. As far as we know, there is no prospective study showing the connection between these sleep factors and mental health in the first six months of the first year of university. However, Orchard et al. (2020)'s cross-sectional three-wave prospective study in the UK confirmed that sleep problems are strongly implicated in the increase in depression and anxiety in the wider student population. The results showed the connection between a range of sleep variables at age 15 and the severity and diagnoses of anxiety and depression disorders at age 17, 21 and 24. Although findings in prior literature showed worsening sleep at university, there was a significant increase in sleep quality in Cohort 1. This might be explained by pandemic lockdown effects in Cohort 1. It is in direct contrast to a study in pre-pandemic and lockdown period. According to that two-wave prospective study in a UK university, there was no change in sleep quality of undergraduate students from pre-pandemic in 2019 October to the beginning of lockdown in 2020 May (Evans et al., 2021).

As an important limitation, we did not investigate connections in different groups, such as disadvantaged or underrepresented students. It is important to note that the current study included a university population that had a higher percentage of white undergraduate (80%) compared to the UK average 72.6%. We also did not explore relationships within other groups known to be at increased risk of poor mental health outcomes. This would include the LGBTQ+ community. Another limitation of the study is that cohort 2 was smaller than cohort 1. The study findings will need to be replicated in the future with a more balanced sample. Additionally, a small sample size and insufficient diversity in data prevented the determination of the effects of included confounding variables (ethnic group, objective social status indicators such as eligibility for widening participation activities and receiving low-

income grants or scholarships, and alcohol consumption). Future studies should consider possible confounding factors that might influence subjective social status, sleep, depression and anxiety by having a larger sample size.

The method of sampling is also a limitation that needs to be considered. Snowball sampling and volunteer sampling were employed to recruit participants. In the first cohort, the flatmates of medical students were recruited through a snowball sampling method. Beyond the second group of participants, the recruitment process did not proceed further using this method, as snowball sampling did not achieve its aim of reaching students as households. Information was also sought from the accommodation office with regard to the process of allocating students to housing, however this was not provided. There is a risk of biases related to the recruitment methods used in this study. The snowball sampling approach may have introduced selection bias, thereby raising an issue with regard to the generalizability of the findings, and the representativeness of the included sample (Parker et al., 2019). Also, nearly half of the participants were medical students, a group with higher academic success, and it is likely to reinforce the overrepresentation of academically driven individuals, potentially limiting diversity and generalizability. In addition to the snowballing method, the recruitment method via the student portal might also lead to a bias because participants joining voluntarily might have specific features (e.g., being more prosocial) (Lange et al., 2011) or more motivated to engage in research studies. Future research may benefit from using stratified sampling to include students from different groups, such as various disciplines and socioeconomic backgrounds.

A further limitation of this study is the low reliability score of the PSQI (a measure of sleep quality) in the current sample, despite the PSQI being a well-known and widely used reliable instrument. The issues of internal consistency might reflect instability in how participants responded to the PSQI items in the pandemic context. This likely introduced

additional error variance and lower precision of the change scores and the group comparisons. This reduced reliability suggests that the PSQI may not have consistently captured sleep quality, and this may have obscured or inflated group differences or between the time periods. Therefore findings are interpreted with caution, and it provides insights into how context or environmental changes may influence the psychometric properties of the PSQI scale.

As previously stated, some existing research in the literature indicates a decline in subjective social status and an increase in depression and anxiety, particularly among underrepresented groups, during the transition to university. The impact of social determinants on health has also been demonstrated in the comprehensive Whitehall studies by Marmot and Wilkinson (2005), which show that health deteriorates as social status declines. Factors such as financial insecurity, relative deprivation, and income inequality may influence university students' perceived social status and their social comparisons. It is important to consider the social determinants of health in the context of subjective social status and social comparisons. Students from lower socioeconomic backgrounds may be more likely to experience a decrease in subjective social status and heightened mental health challenges, which may, in turn result in a greater tendency for unfavourable social comparisons. This information can be used to develop targeted educational interventions that could also be tailored especially towards disadvantaged or underrepresented students in universities. Given the well established connection between social status and mental health, in addition to providing financial support, fostering awareness of social comparisons and their impact on mental well-being, enabling students' comprehension of their strengths and weaknesses, encouraging help-seeking behaviours, especially in student groups from low socioeconomic backgrounds, and implementing supportive educational policies will be beneficial in mitigating the adverse effects associated with social status (Morales, 2014).

While it may not fully mitigate the negative effects of objective social status, recognising the evidence that perceived status is linked to mental health regardless of objective status (McLaughlin et al., 2012; Rivenbark et al., 2020; Russell & Odgers, 2020) could help raise awareness and promote positive outcomes for these groups.

Our aim in this study was to understand the change in subjective social status and sleep factors in the transition to university and the connection between changes and mental health. This research might help professionals and university students by increasing their awareness about the effects of changes in subjective social status, sleep quality and eveningness on depression and anxiety. In order to better understand the relationships between perceived social status, sleep and mental health, it would be beneficial to examine any potential mediator effects. They can direct focused interventions by identifying adjustable mediator pathways that could be utilised to enhance mental health outcomes. Therefore, in the next section, the possible mediator role of sleep quality in the relationship between perceived social status and mental health outcomes will be examined, thus aiming to understand the dynamics between these variables more comprehensively.

Data Availability Statements

The data that support the findings of this study are openly available in Harvard Dataverse at <http://doi.org/10.7910/DVN/M5Z7WO>.

CHAPTER 4

THE ROLE OF SLEEP QUALITY IN THE RELATIONSHIP BETWEEN
SUBJECTIVE SOCIAL STATUS AND MENTAL HEALTH OUTCOMES: AN
EXPLORATORY MEDIATION ANALYSIS.

The Mediator Effect of Sleep Quality Between Subjective Social Status and Mental Health

This section will focus on the mediation effects in the main study presented in the previous section. Considering the literature and theoretical background, and the results presented in the preceding section, subjective social status, sleep quality, and mental health are interrelated. A frequent problem amongst university students is sleep deficiency due to the effects of living in a shared accommodation amongst other students (Lund et al., 2010; Qin & Brown, 2017), and sleep problems are strongly implicated in the increase in depression and anxiety reported in student populations (Orchard et al., 2020). There might be a decline in subjective social status of university students during university (Loeb & Hurd, 2019), and research shows lower perceived social status is connected with both depression and anxiety problems (Russell & Odgers, 2020) as well as sleep problems (Jarrin & Quon, 2017). Sleep quality may serve as a mediator mechanism by which subjective social status impacts mental health, rather than subjective social status having a direct effect independently. Therefore, this section will examine the mediating effects of sleep quality to clarify the processes behind these connections. Mediation studies allow the recognition of indirect pathways, for example enabling the examination of how characteristics like sleep quality and chronotype elucidate the relationship between SSS and mental health outcomes. By exploring these mediating mechanisms, future research might identify possible points of intervention to enhance mental health outcomes for those with lower subjective social status or lower sleep quality. This chapter will briefly report the mediation analysis of the combined data of Cohort 1 and Cohort 2 in the main study.

Method

Participants

Participants in the study were 145 first-year university students living in campus accommodation in the merged dataset.

Statistical Analysis

IBM SPSS 27 was used to conduct the statistical analysis. Using Pearson Product Moment Correlations, we first tested the associations between sleep parameters (sleep quality and chronotype), subjective social status and mental health outcomes. To examine whether sleep quality mediated the relationship between subjective social status, depression and anxiety, we applied a mediation analysis using the SPSS PROCESS macro, version 3.5 (model 4), developed by Preacher and Hayes (2004). Simple mediation analyses were carried out on depression and anxiety separately by adding subjective social status as an independent variable and sleep quality as a mediator variable. The analyses were conducted on Cohort 1 and 2 merged data.

Results

There were 145 participants (91 females, 63%; 54 males, 37%) included in the analyses. The number of students participating in data collection at each time point was 106 (63 females, 59.8 %; 41 males, 38.3 %; 2 other, 1.9%) in the first cohort and 40 (29 females, 72.5%; 11 males, 27.5%) in the second cohort. There was one missing PSQI data at the first time point; therefore, the number of participants included in the mediation analysis was 145. After checking the data, it was found that two participants had the same student number (based on the last four digits) in both Cohort 1 and Cohort

2.

Correlation Results in the Merged Dataset of Cohort 1 and 2 in Wave 1

Using Pearson product-moment correlation coefficients, the relationship between sleep quality, chronotype, subjective social status (SSS), and mental health outcomes was determined. The SSS score was negatively correlated with depression, anxiety and PSQI scores (lower scores indicate higher sleep quality). The PSQI scores were positively correlated with depression and anxiety scores (Table 4.1).

Table 4.1

Correlations of Subjective Social Status, Sleep Quality and Mental Health in the Merged Dataset of Cohort 1 and Cohort 2 in Wave 1

	1	2	3	4
1. Subjective Social Status	-			
2. Sleep Quality	-.19*	-		
3. Anxiety	-.22*	.49**	-	
4. Depression	-.22*	.57**	-.21*	-

Note. $N = 145$, * $p < .05$. ** $p < .01$.

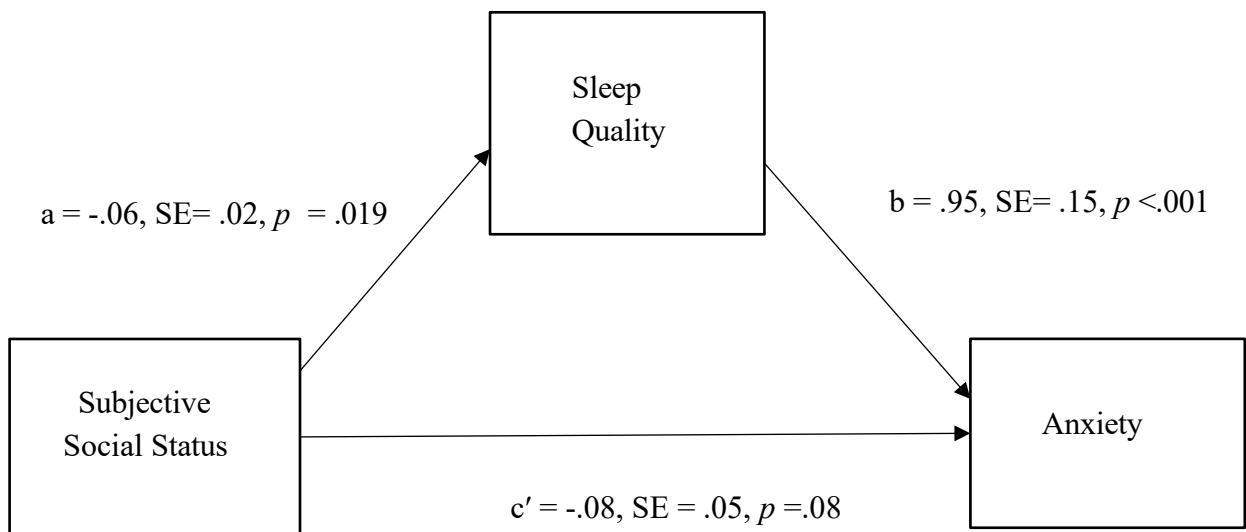
Mediator Effects of Sleep Quality in Wave 1

A simple mediation analysis was performed using PROCESS. The outcome variable for analysis was anxiety in the model. The predictor variable for the analysis was subjective social status while the mediator variable was sleep quality. Approximately 25% of the variance for anxiety was accounted for by sleep quality and subjective social status ($R^2 = .253$). The indirect effect of subjective social status via

sleep quality on anxiety was found to be statistically significant [Indirect effect = $-.06$, 95% C.I. $(-.105, -.009)$]. The direct effect of subjective social status on anxiety was not significant, which shows full mediation of sleep quality between subjective social status and anxiety. SSS had a significant indirect negative effect on anxiety through sleep quality. We showed the regression of variables in Figure 4.1.

Figure 4.1

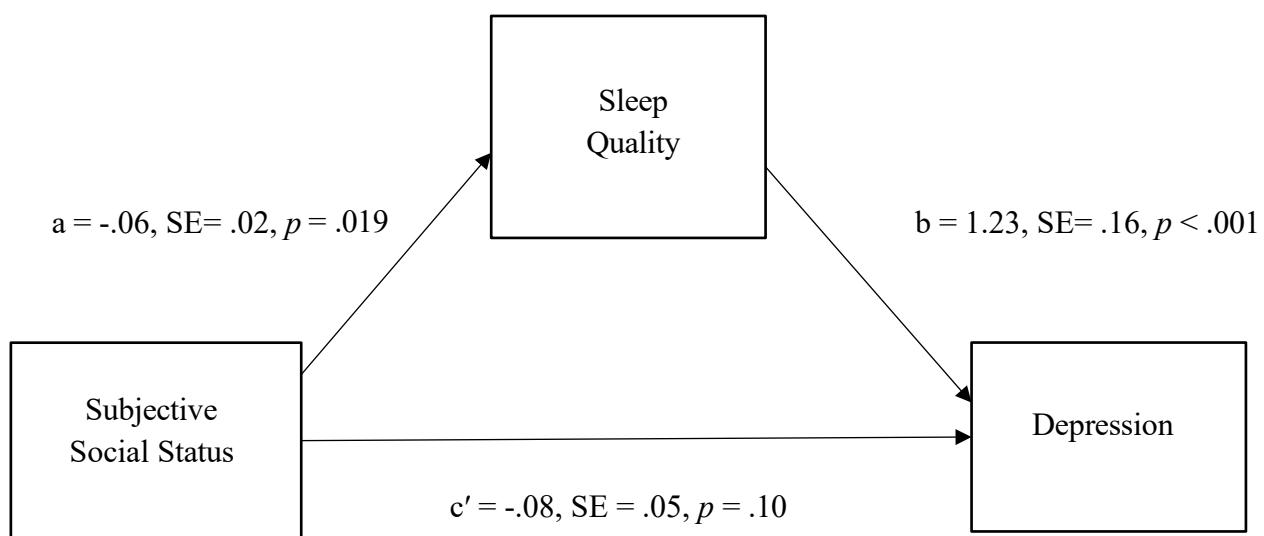
The Mediator Effect of Sleep Quality Between Subjective Social Status and Anxiety in the Merged Data of Cohorts 1 and 2 in Wave 1



In the second model the outcome variable for analysis was depression. The predictor variable for the analysis was subjective social status while the mediator variable was sleep quality. Approximately 34% of the variance for depression was accounted for by sleep quality and subjective social status ($R^2 = .340$). The indirect effect of subjective social status via sleep quality on depression was found to be statistically significant [Indirect effect = $-.07$, 95% C.I. $(-.141, -.012)$]. The direct effect of subjective social status on depression was not significant, which shows full mediation of sleep quality between subjective social status and depression. SSS had a significant indirect negative effect on depression through sleep quality. We showed the regression of variables in Figure 4.2.

Figure 4.2

The Mediator Effect of Sleep Quality Between Subjective Social Status and Depression in Merged Data of Cohort 1 and 2 in Wave 1



Correlation Results in the Merged Dataset of Cohort 1 and Cohort 2 in Wave 2

Using Pearson product-moment correlation coefficients, the relationship between sleep quality, chronotype, subjective social status, and mental health outcomes was determined. SSS score was negatively correlated with depression, anxiety and PSQI scores (lower scores indicate higher sleep quality) and positively correlated to chronotype (higher scores mean higher morningness). The PSQI scores were positively correlated with depression and anxiety scores (Table 4.2).

Table 4.2

Correlations of Subjective Social Status, Sleep Quality and Mental Health in the Merged Dataset of Cohort 1 and Cohort 2 in Wave 2

	1	2	3	4
1. Subjective Social Status	-			
2. Sleep Quality	-.32**	-		
3. Anxiety	-.24**	.49**	-	
4. Depression	-.30**	.60**	-.35**	-

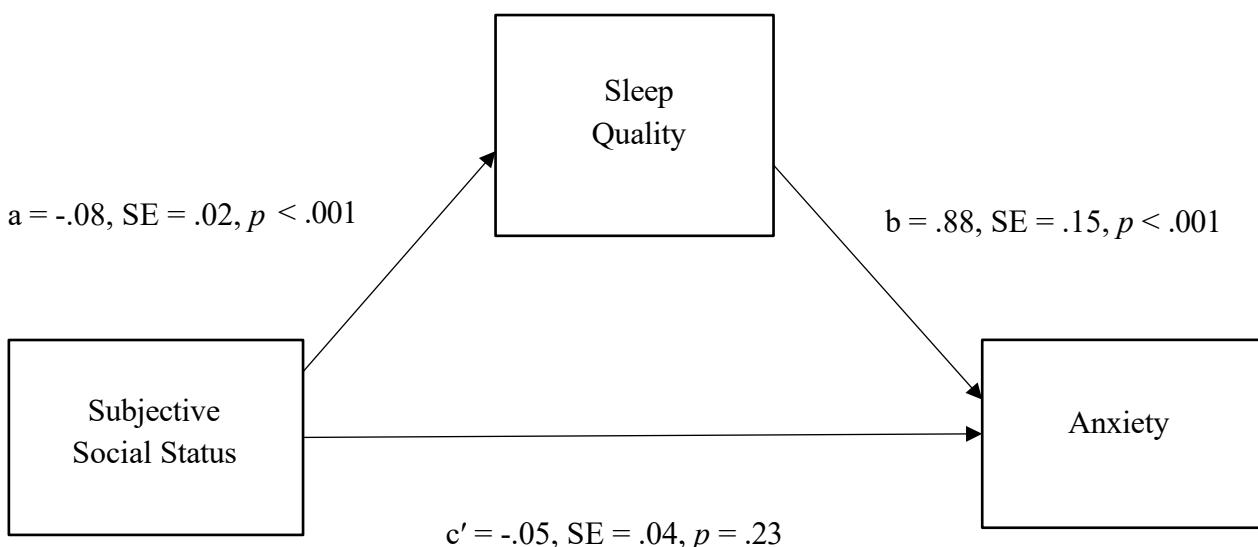
Note. $N = 145$, * $p < .05$. ** $p < .01$.

Mediator Effects of Sleep Quality in Wave 2

The outcome variable for analysis was anxiety in wave 2 of the merged data in the third model. The predictor variable for the analysis was subjective social status, while the mediator variable was sleep quality. Approximately 24% of the variance for anxiety was accounted for by sleep quality and subjective social status ($R^2 = .243$). The indirect effect of subjective social status via sleep quality on anxiety was found to be statistically significant [Indirect effect = $-.07$, 95% C.I. $(-.130, -.026)$]. The direct effect of subjective social status on anxiety was not significant, which shows full mediation of sleep quality between subjective social status and anxiety. SSS had a significant indirect negative effect on anxiety through sleep quality. We showed the regression of variables in Figure 4.3.

Figure 4.3

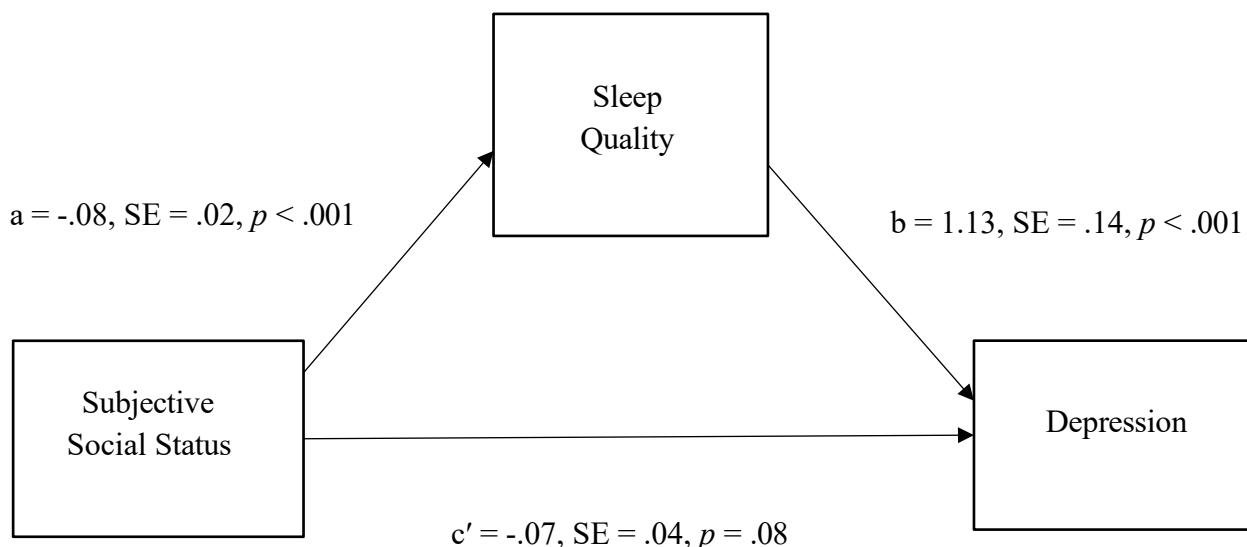
The Mediator Effect of Sleep Quality Between Subjective Social Status and Anxiety in Merged Data of Cohort 1 and 2 in Wave 2



The outcome variable for analysis was depression in the second model of wave 2 in merged data. The predictor variable for the analysis was subjective social status while the mediator variable was sleep quality. Approximately 37% of the variance for depression was accounted for by sleep quality and subjective social status ($R^2 = .365$). The indirect effect of subjective social status via sleep quality on depression was found to be statistically significant [Indirect effect = $-.09$, 95% C.I. $(-.163, -.037)$]. The direct effect of subjective social status on depression was not significant, which shows full mediation of sleep quality between subjective social status and depression. SSS had a significant indirect negative effect on depression through sleep quality. We showed the regression of variables in Figure 4.4.

Figure 4.4

The Mediator Effect of Sleep Quality Between Subjective Social Status and Depression in Merged Data of Cohort 1 and 2 in Wave 2



Discussion

A mediating effect of sleep quality was observed between subjective social status and anxiety and depression in the combined data of Cohort 1 and Cohort 2 in Wave 1 and Wave 2. Therefore, subjective social status was indirectly connected to anxiety and depression via sleep quality. Sleep disturbances are shown here to explain the link between subjective social status and mental health, suggesting that the decrease in subjective social status that increases anxiety and depression is via poorer sleep quality. The lack of direct effects between perceived social status, and both anxiety and depression strengthens the role of sleep in this link. The findings highlight the necessity of managing sleep issues within a comprehensive approach to enhance students' mental health, especially during the transition to university. It is important to address sleep quality and circadian health to mitigate mental health issues among individuals, particularly those with low subjective social status. In addition, it will be beneficial to determine whether social status and related psychological constructs are incorporated into sleep and mental health interventions designed to improve sleep and mental health for university students. A systematic review providing an in-depth evaluation of existing research on sleep interventions for university students can therefore be used to assess if perceived social status and associated factors are included in sleep interventions, and could be useful to aid the design of future interventions for university students.

CHAPTER 5

A SYSTEMATIC REVIEW OF SLEEP INTERVENTIONS TO ALLEVIATE
DEPRESSION AND ANXIETY PROBLEMS AND TO IMPROVE SLEEP IN
UNIVERSITY STUDENTS

Abstract

Sleep problems are common among university students, and low sleep quality is associated with both increased depression and anxiety. Systematic reviews aiming to improve sleep and decrease depression and anxiety have not investigated interventions that address both sleep and anxiety or depression in the university student population. This systematic review aims to summarise the findings of intervention studies that have addressed sleep factors and mental health in university students. In addition, another aim was to identify whether these intervention studies incorporated elements such as social comparisons and social status. Five databases were searched from 30 October 2021 to 5 November 2021; PsycINFO, CINAHL, APA PsycArticles, MEDLINE, Child, and Adolescent Studies. The search terms were related to the topics of sleep, and university students. This review focused on sleep, depression, and anxiety as outcomes and included studies that used objective or subjective measurements on this topic. The exclusion criteria were populations other than university students, non-psychological interventions (studies not including psychological elements, such as yoga, sleep medicine, milk intervention, light therapy), and research that was published in languages other than English. The inclusion criteria were studies published in English involving university students, psychological interventions (the interventions included psychological elements such as cognitive behavioural strategies, sleep education, psychoeducation) and outcomes of sleep, depression, and/or anxiety. A total of 15 studies met the inclusion criteria. The Cochrane Risk of Bias Tool in randomised studies (RoB-I) and the Risk of Bias Tool in non-randomised studies (ROBINS-I) were used to assess the risk of bias in the included studies. The present review comprised a

total of 5870 students from across studies, including both the intervention and control groups. Twelve of the included studies were randomised controlled studies (RCTs). Two of the studies that were included in the review compared two programmes, but they did not include control groups, and one was a non-randomised open trial that included a control group. These studies assessed the effectiveness of cognitive-behavioural-based interventions, psychoeducation, mindfulness-based interventions, interventions including the combination of different elements (e.g., CBT and hypnotherapy), and other interventions (e.g., cognitive refocusing treatment, reality therapy) not fitting one of these categories. Eleven studies were online self-help therapies, while four were in-person interventions. Two of them were a combination of both approaches. Effect sizes ranged from small to large for anxiety, depression, and sleep in the included studies. In the four studies that did not include between-group effect sizes, these statistics were calculated based on the information provided in the research and reported. The duration of interventions ranged from 1.5 hours to 10 weeks. The included studies varied in intervention type, participant group characteristics, intervention duration, and measurement techniques. Summary interpretations of the data indicate effectiveness; however, there is a considerable variation in study designs, highlighting the need for more standardised research in this area.

Keywords: sleep, depression, anxiety, intervention, university students

A Systematic Review of Sleep Interventions to Decrease Depression

and Anxiety Problems and to Improve Sleep in University Students

University students experience sleep problems such as low sleep quality, sleep deprivation, insomnia, and circadian misalignment (Hershner & Chervin, 2014). Sleep problems are widespread among university students. Living in shared accommodation, changing social environment, academic program, concern about studies, time management problems, and nighttime socialization are potential reasons for sleep problems (Qin & Brown, 2017; Adams et al., 2017; Foulkes et al., 2019). Although it is not easy to remove the challenges students face at university, improving their sleep quality is one of the most important things they can do to lessen the severity of their problems (Choueiry et al., 2016; Dinis & Bragança, 2018; Goldstone et al., 2020). It can assist them in avoiding depression and anxiety issues that may have a long-term impact (Orchard et al., 2020).

Sleep problems in adolescence might increase already present anxiety and depression issues or cause depression and anxiety problems to emerge (Goldstone et al., 2020; Orchard et al., 2020). Also, ongoing sleep difficulties may lead to longer-term effects over their lifetime in addition to short-term effects (Medic et.al., 2017). In this regard, a study conducted by Gregory et al. (2005) indicated that persistent sleep problems in childhood predicted adulthood anxiety problems. As a support to this research, the severity of anxiety and depression symptoms and the diagnosis of anxiety and depressive disorders at the ages of 17 and 24 were predicted by a variety of sleep factors (e.g., sleep onset latency, sleep quality variables such as daytime sleepiness,

night time awakening, perception of getting enough sleep) measured at age 15 (Orchard et al., 2020).

There are a variety of sleep interventions ranging from simple ones such as sleep hygiene, exercise, nutritional interventions, relaxation therapy and light therapy to more advanced interventions such as pharmacological and cognitive-behavioural therapies. According to the systematic review of Mitchell et al. (2012) analyzing five studies, when compared to pharmaceuticals, cognitive behavioural therapy for insomnia (CBT-I) is more successful at treating insomnia, and its effects may last longer. Evidence of low to intermediate quality suggests that CBT-I is more successful in the long run than benzodiazepine and non-benzodiazepine medications. Friedrich and Schlarb (2018) investigated psychological interventions (sleep hygiene, cognitive behavioural therapy, relaxation, mindfulness and hypnotherapy, and other psychological interventions) to improve sleep. They revealed that cognitive behavioural therapy had large effects while sleep hygiene, relaxation intervention and other psychological interventions had small to medium effects. In another study, the CBT group maintained a stable sleep state, whereas the pharmaceutical therapy and combined groups (CBT plus medication) exhibited a gradual return to their pre-treatment baseline at the 8-month follow-up (Wu et al., 2006). The effectiveness of three therapies, cognitive-behavioural therapy (CBT), bright light, and physical exercise, was examined in a systematic review study by Montgomery and Dennis (2004). The major outcome measures were sleep quality, sleep duration, and sleep efficiency. CBT appeared to have a mild effect on older persons with sleep issues. There was so little evidence to support the efficacy of strong light and exercise

(Montgomery & Dennis, 2004). In summary, Cognitive Behavioural Therapy (CBT) appears to be the most efficacious approach for enhancing sleep.

It's essential to focus on sleep interventions and their benefits in alleviating and treating both sleep and depression and anxiety because of the link between sleep, anxiety and depression. In connection with this, exploring effective sleep interventions that alleviating anxiety and depression problems of university students might be helpful during university and assist in the longer term. To our knowledge, there has been no systematic review of sleep interventions focused on improving sleep and problems of anxiety and depression in university students. The current study focused on sleep interventions that have effects on anxiety and depression. There are two recent meta-analyses and systematic reviews of psychological interventions to improve sleep in university students and young adults (Saruhanjan et al., 2019; Kodsi et al., 2021). Saruhanjan et al. (2021)'s study included ten randomized controlled trials ($N = 2408$) having appropriate data for the meta-analysis while Kodsi et al. (2021)'s study included thirteen studies ($N = 1724$). Saruhanjan et al. (2021)'s meta-analysis showed that psychological interventions (sleep hygiene, cognitive behavioural therapy, relaxation, mindfulness and hypnotherapy and other psychotherapeutic interventions) for sleep improvement are effective among university students. While sleep hygiene had small to medium effects, cognitive behavioural therapy had a large effect. Other psychotherapeutic interventions had medium effects. The effects of relaxation therapy were from small to large. They suggested that cognitive behavioural therapy and relaxation therapy can be combined. Kodsi et al. (2021) included studies using cognitive behavioural therapy, mindfulness, relaxation training and sleep education.

Their meta-analysis and systematic review revealed that the cumulative effect of all therapies was moderate, indicating that psychological interventions were effective in improving post-intervention sleep levels. Besides, individual cognitive- behavioral therapies improved sleep and secondary outcomes (anxiety and depression), according to subgroup analyses of individual interventions. The recent reviews in the literature focus only on sleep-related outcomes and not mental health outcomes. The current review will focus on psychological sleep interventions with effects on sleep factors and mental health in university students.

Method

The systematic review was conducted following the PRISMA (2009) standards (Moher et al., 2009), following the procedures defined in the Cochrane Handbook for Systematic Reviews of Interventions (Higgins & Altman, 2008; Higgins et al., 2011). Before the review, precise criteria were established, encompassing research objectives, search techniques, and inclusion/exclusion criteria.

Search Methodology

Keyword searches were determined with the assistance of doctoral academic advisers and the librarian. The search strategy for this study was developed with the guidance of an information professional (a librarian in the Faculty of Health and Medicine), who is an expert in systematic reviews. First, keywords were selected, and subsequently using defined search phrases in each database.

The PICO (Population–Intervention–Comparison–Outcome) framework (Higgins and Green, 2008) was considered the most suitable for the search strategy in this systematic review, as its components aligned well with the focus on sleep

interventions and their impact on sleep and mental health outcomes in university students (see Table 5.1).

Table 5.1

PICO Framework for Systematic Review of Sleep and Mental Health Interventions

Component	Description
Participants (P)	University and college students, including undergraduate, graduate, and postgraduate students. No age, country, or language restrictions were applied.
Intervention (I)	Psychological interventions (the interventions included psychological elements such as cognitive-behavioural-based interventions, psychoeducation, mindfulness) aimed at improving sleep and alleviating depression and anxiety.
Comparison (C)	Control groups (e.g., waitlist, no intervention, standard care) or alternative interventions (e.g., comparison between two

psychological programmes).

Outcome (O) Sleep quality and depression or anxiety outcomes. No restriction on measurements.

Criteria for Considering Studies for This Review

Eligibility/Inclusion Criteria

Inclusion and exclusion criteria were established prior to screening to prevent selection bias and maintain consistency in study selection. To the best of our knowledge, this review appears to be the initial examination of psychological interventions aimed at enhancing sleep quality and alleviating depression or anxiety among university students.

Participants were college and university students. The terms "university students" and "college students" were included in the search strategy to increase search sensitivity. Participants were college and university students, but medical students, graduate students, and postgraduate students were also added to search terms to increase sensitivity. There was no age restriction in the search. The search included subjective (questionnaires) and objective measures (actigraphy, polysomnography etc.). There were no restrictions on the country and publication year. The search terms were in English, and the search was limited to the English language.

Interventions included several psychological elements, such as sleep education, perseverance and sleep workshops, cognitive behavioural therapy, hypnotherapy, and mindfulness. There was no restriction on the frequency, intensity, time frame, or trainer qualification for the interventions that were being evaluated.

The current review included randomised controlled trials (RCTs) as well as comparisons of two treatments and one open trial. Psychological interventions having both sleep and depression or anxiety outcomes were included in the review.

Exclusion Criteria

The exclusion criteria included populations other than university students, non-psychological interventions (i.e., studies not incorporating psychological elements, such as yoga, sleep medicine, milk-based interventions, or light therapy), and research published in languages other than English.

Search Methods for Identification of Studies

Search Strategy and Information Sources

Five databases were searched from 30 October 2021 to 5 November 2021 by getting help from a faculty librarian specialised in conducting systematic reviews, and the search was limited to articles published between 1980 and 2021: PsycINFO, CINAHL, APA PsycArticles, MEDLINE, Child and Adolescent Studies (Figure 5.1). The following search string was used: DE "Sleep Quality" OR TI ((sleep OR sleeping OR nap OR napping) N5 (promot* OR interven* OR quality OR improv*)) OR AB ((sleep OR sleeping OR nap OR napping) N5 (promot* OR interven* OR quality OR improv*))) AND DE "Medical Students" OR DE "College Students" OR DE "Community College Students" OR DE "Junior College Students" OR DE "Graduate Students" OR DE "Postgraduate Students") OR TI ((colleg* OR universit* OR "higher education" OR medical) N5 (student* OR postgrad* OR post-grad*)) OR AB ((colleg* OR universit* OR "higher education" OR medical) N5 (student* OR postgrad* OR post-grad*)).

Mental health terms were not included in the search process, as advised by the librarian, as psychology databases were used. Additionally, in connection with the other objective of the systematic review, social factors related to social comparisons

and social status were not included to allow for a more comprehensive search.

Search Process

Search results from five databases were uploaded to the EndNote. After the duplicates were eliminated from the preliminary 1985 studies in EndNote, 1423 studies remained (Figure 5.1).

Subsequently, the titles and abstracts of all 1423 studies were evaluated by one reviewer; 10% of all records were reviewed for verification by the second reviewer (the doctoral supervisor). Any inconsistencies were considered and discussed, leading to a decision to include the articles in the systematic review. Following the review of 10% of the studies by the second reviewer, the decision was made to include two more studies. Exclusion reasons were documented individually in Excel before agreement for analysis. These studies were excluded because:

*The sample did not include university students (they were high school students, veterans, young adults who are not university students, college providers, and young adult patients).

*It was not an intervention (they were reviews, systematic reviews, meta-analyses, dissertations, and research articles).

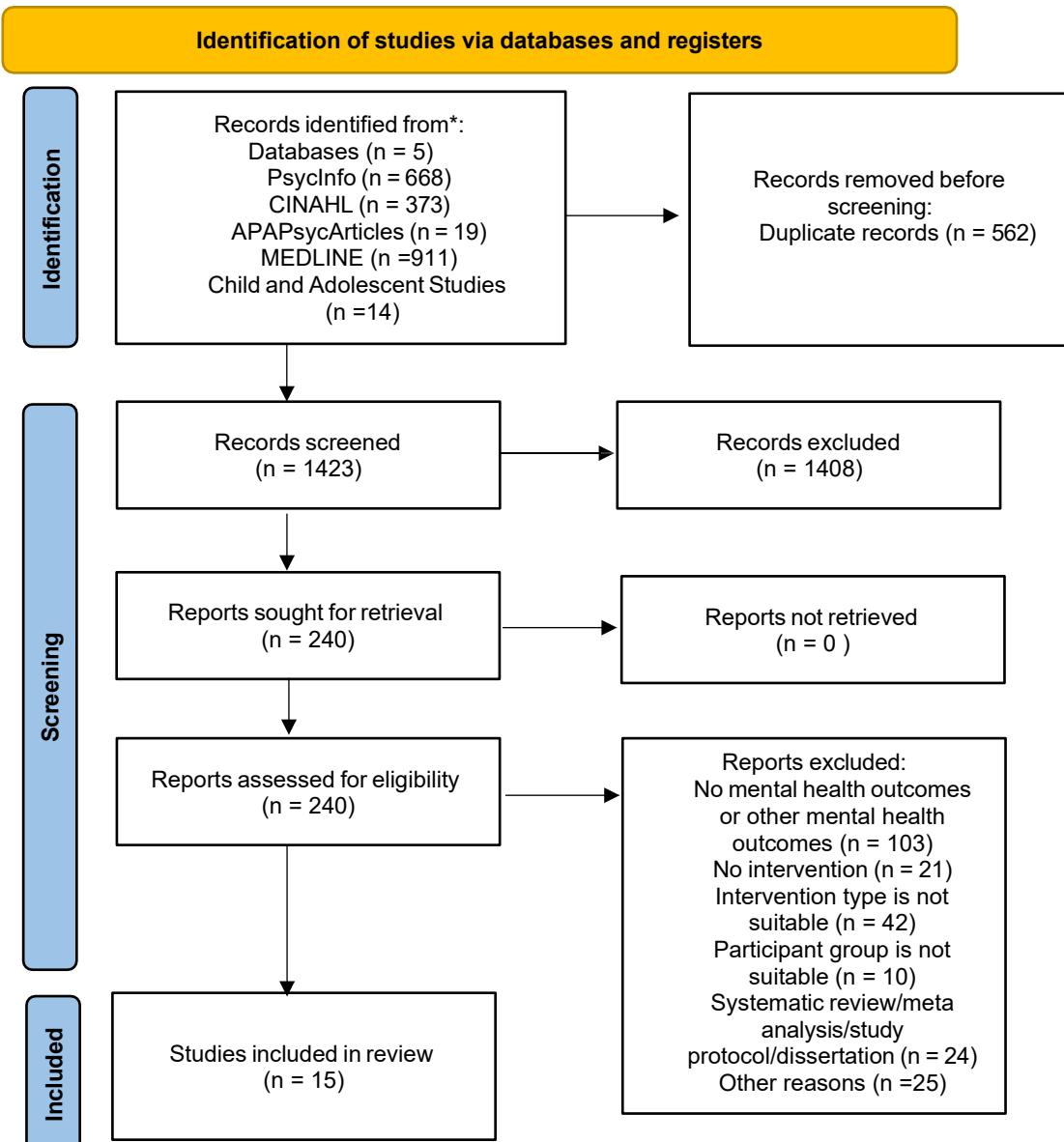
*The intervention measured only sleep outcomes, not mental health outcomes or some of them estimated alcohol use, stress, mood, and burnout after sleep intervention.

*There was no psychological intervention which addressed emotional challenges, or behavioural problems such as cognitive behavioural therapy (they were lavender or rosemary inhalation, aromatherapy, yoga, mind-body exercises such as yoga, pilates,

taji training, thai chai, movement- based training, sleep medicine, light therapy, milk intervention).

* Language was not English.

The remaining 15 studies were evaluated and were included in this review. Backward (reference list of all included articles) and forward citation searching (939 articles citing the included articles) until 5th November 2021 (time range in the current systematic review) were also completed by the first reviewer, but no additional studies fitting all inclusion criteria were identified besides those already included. In addition to them, a Supplemental Table of 515 studies in the systematic review titled “What is Known About Students and Sleep: Systematic Review and Evidence Map” (Bjørnnes et al., 2021) was reviewed. However, no studies were identified that met the inclusion and exclusion criteria in this systematic review.

Figure 5.1*Search Process for the Systematic Review*

Data Collection and Analysis

Data Collection Process and Data Extraction and Management

One author reviewed the titles and abstracts of all potential studies to determine their eligibility. The whole article was read and included in an organised form if the titles and abstracts fulfilled all eligibility criteria. In line with Friedrich and Schlarb (2018)'s systematic review, Table 5.4 (please see results section) includes design, participants (gender, age, course), intervention (mode of delivery, number of sessions, time frame), outcomes (*p-value* and effect sizes), and limitations.

Assessment of Risk of Bias in Included Studies

The risk of bias for the included studies was independently assessed by two reviewers using appropriate tools according to their research design. A final decision was made for the overall risk of bias of each study. The risk of bias of 11 randomised studies was assessed in a table format by using the Cochrane Risk of Bias Tool RoB-I (Higgins & Altman, 2008), while the risk of bias of 4 non- randomised studies was assessed by using the Cochrane Risk of Bias Tool ROBINS-I (Sterne et al., 2016). RoB-I contained seven categories: random sequence generation, allocation concealment, blinding of participants, blinding of outcome assessment, incomplete outcome data, selective reporting, and other biases (Higgins & Altman, 2008). Each study was evaluated across all seven criteria using a four-point scale to determine the level of bias: "high risk, some concerns, low risk, and no information". ROBINS-I contained seven domains: bias due to confounding, bias in classification of interventions, bias in selection of participants into the study or analysis, bias due to deviations from intended interventions, bias due to missing data, bias arising from measurement of the outcome,

and bias in selection of the reported result (Sterne et al., 2016). Each study was rated across these domains using a graded scale: "low, moderate, serious, or critical risk of bias". Most of the randomised studies (72.73%) evaluated were considered to have "some concerns" or a "moderate" risk of bias. Only a small number of studies were evaluated as having a low risk of bias. A significant limitation was that only three of the studies had registered a protocol before conducting the study, which raises concerns over potential reporting bias (please see Table 5.2 and 5.3 for risk of bias in included studies and the detailed table in Appendix E). Furthermore, the limitations of each study have been identified and reported in the table of included studies (Table 5.4).

Assessment of Reporting Biases

This review covered a range of outcomes: sleep quality and other sleep variables, depression and anxiety. A thorough examination was conducted on each outcome variable individually to evaluate selective reporting biases in this review. Studies reported various sleep outcomes, but we focused on sleep quality in bias assessment for selective reporting because it is connected to research aims. Other sleep outcomes, such as sleepiness and insomnia, were assessed if they did not report sleep quality.

Table 5.2*Traffic light” Plots of the Domain-Level Judgements for Each Individual Result in Risk of Bias**Assessment of Randomised Studies*

	D1	D2	D3	D4	D5	D6
1.Morris et.al., 2016	● (Green)	● (Blue)	● (Red)	● (Red)	● (Green)	● (Blue)
2.Hall et.al., 2018	● (Green)	● (Green)	● (Green)	● (Blue)	● (Green)	● (Blue)
3.Hershner and O'Brien, 2018	● (Green)	● (Green)	● (Blue)	● (Blue)	● (Blue)	● (Blue)
4.Ehrampoush et.al., 2019	● (Green)	● (Green)	● (Blue)	● (Blue)	● (Blue)	● (Blue)
5.Friedrich et al., 2018	● (Blue)	● (Green)	● (Blue)	● (Blue)	● (Yellow)	● (Red)
6.Freeman et al., 2017	● (Green)	● (Green)	● (Green)	● (Green)	● (Yellow)	● (Green)
7.Bruehllman-Senecal et. al., 2020	● (Green)	● (Green)	● (Red)	● (Yellow)	● (Green)	● (Green)
8. Lee and Jung, 2018	● (Green)	● (Yellow)	● (Red)	● (Yellow)	● (Green)	● (Green)
9. Raevuori et al., 2021	● (Green)	● (Green)	● (Red)	● (Red)	● (Green)	● (Green)
10.Esmaeili and Ahmadi, 2018	● (Yellow)	● (Blue)	● (Red)	● (Yellow)	● (Blue)	● (Blue)
11.Gellis et al., 2013	● (Yellow)	● (Yellow)	● (Red)	● (Yellow)	● (Yellow)	● (Blue)

Domains:

- D1: Random sequence generation
- D2: Allocation concealment
- D3: Blinding of participants
- D4: Blinding of outcome assessment
- D5: Incomplete outcome data
- D6: Selective reporting

Judgement

● (Red)	High*
● (Yellow)	Some Concerns
● (Green)	Low*
● (Blue)	No information

*High/Low Risk of Bias (Based on RoB 1.0 Cochrane Risk of Bias Tool)

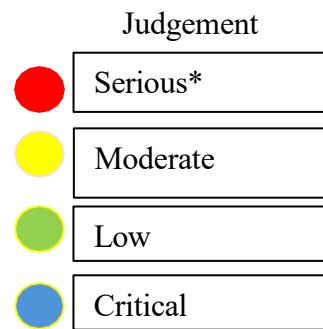
Table 5.3

Traffic light "Plots of the Domain-Level Judgements for Each Individual Result in Risk of Bias Assessment of Non-Randomised Studies

	D1	D2	D3	D4	D5	D6	D7
1.Trockel et al., 2011	Yellow	Green	Green	Green	Green	Yellow	Yellow
2.Baroni et al., 2018	Yellow	Green	Yellow	Green	Red	Yellow	Yellow
3.Ball and Bax, 2002	Red	Green	Yellow	Yellow	Yellow	Red	Yellow
4.Levenson et al., 2016	Yellow	Green	Green	Yellow	Red	Yellow	Yellow

Domains:

- D1: Risk of bias due to confounding
- D2: Risk of bias in classification of interventions
- D3: Risk of bias in selection of participants into the study (or into the analysis)
- D4: Risk of bias due to deviations from intended interventions
- D5: Risk of bias due to missing data
- D6: Risk of bias arising from measurement of the outcome
- D7: Risk of bias in selection of the reported result



*Serious Risk of Bias (Based on ROBINS Cochrane Risk of Bias Tool)

Measures of Treatment Effect

Treatment effects included sleep and mental health outcomes. They were reported using Cohen's d. All included studies reporting effect sizes provided effect sizes using Cohen's d. Effect sizes larger than $d > 0.20$ were considered small, $d > 0.50$ medium and $d > 0.80$ large.

When effect sizes (e.g., Cohen's d) were not provided in the included articles, we calculated them using the available statistical data, including group means, standard

deviations, r value and sample sizes. Between-group effect sizes of the studies by Hershner and O'Brien (2018), Ehrampoush et al. (2019), Friedrich et al. (2018), and Esmaeili and Ahmadi (2018) were calculated using the information provided in the studies. In Hershner and O'Brien (2018), Ehrampoush et al. (2019) and Friedrich et al. (2018)' studies, between group effect sizes (cohen's d value) were calculated by using mean scores and pooled SD (for different group sizes) based on the formula provided by Field and Gillett (2010). In Esmaeili and Ahmadi's (2018) study, the effect size was calculated using the r value based on the formula provided by Borenstein et al. (2021).

The heterogeneity among the included studies did not support a quantitative analysis. We considered that a statistical synthesis required a sufficient level of homogeneity across studies in terms of population, intervention, outcome measures, and methodological approaches. In contrast, the studies in this review vary in intervention types, outcome measurements for sleep and mental health, data collection periods, population characteristics (e.g., university students with insomnia or sleep disorders and the general university students population), and outcome measurements for anxiety and depression (e.g., PHQ-9, CES-D, BDI for depression). Furthermore, there were effect sizes of sleep-related outcomes reported in eight of the included studies. Methodological and clinical homogeneity were not attained in included studies. Low statistical heterogeneity does not necessarily equate to clinical and methodological homogeneity. Melsen et al. (2014) also highlighted the critical significance of study selection, namely the reduction of clinical and methodological heterogeneity, for the precision of pooled estimates obtained from meta-analyses. The methodological and clinical variability in the current study impairs the reliability of the pooled effect

estimates required for a meta-analysis. Therefore, the decision was taken that a narrative synthesis was more appropriate as a means to summarise the evidence.

Moreover, according to Deeks et al. (2024) and as stated in the Cochrane Handbook, an adequate number of studies must be present in each category to facilitate subgroup analysis and meta regression. Research with a high degree of heterogeneity is unlikely to provide valuable insights without a significant number of studies. Standard guidance for doing basic regression analyses requires that a minimum of ten observations (i.e., ten studies in a meta-analysis) should be included for every characteristic modelled.

Missing data

The included studies had missing data such as effect sizes, p values, the number of males and females in groups, the department of students, sleep or mental health outcomes. The missing effect sizes were calculated using statistical techniques in studies that provided the necessary information (please see previous section for the detailed information).

Results

Included studies

The 15 included studies are listed in Table 5.4. All of the studies analysed were published in English. The majority of the studies (46.6%) were conducted in the US while two of them (13.3%) were conducted in the UK. The rest of the studies were conducted in China (6.67%), Germany (6.67%) and Iran (6.67%). The earliest study was in 2002, and the latest in 2021.

Sample

This review included a total of 5870 students (both intervention and control groups in total), with an average of 391 participants per study; 68.38% of the participants were female. The mean age was 21.73 years (SD = 2.80), ranging from 18 to 50, excluding three studies that did not report mean age or standard deviations. Overall, the participants were a general sample of university students in six studies, first-year medical students in two studies, first-year university students in two studies, and university students experiencing stress, having insomnia, nightmare disorders, irregular sleep disorder, persistent sleep problems or students recruited from GP or psychiatric appointments in five studies.

Design

Most studies (80%) were randomised controlled trials. There was no control group in the three studies. They were a comparison of two treatments (Ball & Bax, 2002; Trockel et al., 2011). Treatments included cognitive behavioural therapy (26.67%), psychoeducation (sleep education, self-awareness and self-care training) (26.67 %), mindfulness practice (13.33%), the combination of interventions (20%), and other interventions (reality therapy, cognitive refocusing treatment) (13.33%). The studies addressed sleep and mental health by enhancing awareness of cognitive processes, modifying maladaptive cognitive patterns, and enhancing understanding of sleep-related concepts. There is a correlation between sleep and mental health, meaning that improvements in mental health may also lead to alterations in sleep. The programmes had a duration of 5.5 weeks, ranging from 1 day to 9 months. All studies included either a control group (80%) or alternative comparison therapies (20%).

The studies investigated the following outcome measures: depression, anxiety, stress, sleep quality, sleepiness, sleep hygiene, sleep knowledge, chronotype, insomnia, quality of life, emotion regulation, paranoia, hallucinations, nightmare severity, and psychotic experiences. We focused on sleep quality, depression and anxiety outcomes. In the absence of sleep quality outcomes, findings on sleepiness and insomnia were reported.

Effects of Interventions

The impact of various interventions addressing mental health and sleep factors are presented in Table 5.4. This review includes all research studies, irrespective of whether the studies examined students with sleep and mental health issues or those without these issues. The size of effects of cognitive-behavioural-based interventions, sleep education, mindfulness-based interventions and other approaches in mitigating sleep problems, depression, and anxiety symptoms ranged from small to large (Table 5.4). Four of the studies were conducted in person, nine were self-help internet-delivered, and two were a combination of online and in-person methods. Around 30% of studies had participants with severe sleep problems such as insomnia, nightmare disorder, irregular sleep-wake type and poor sleep quality, and participants experiencing severe stress, whereas all other studies included a general sample of undergraduate and postgraduate students. Four studies included only first-year university students.

This systematic review includes various types of interventions, including sleep education, perseverance training, sleep-wakefulness workshop, cognitive-behavioural therapy (CBT) and mindfulness-based approaches, reality therapy targeting sleep and mental health enhancement through minimising the effects of online social networking

addiction, and integrative interventions that combine several techniques, such as CBT and hypnotherapy. Studies were categorised into cognitive-behavioural-based intervention, sleep education, mindfulness, a combination of several approaches, and those that did not fit into these categories were classified as ‘other’ interventions (e.g., reality therapy).

Cognitive Behavioural Therapy-Based Interventions

In the four studies classified as CBT-based interventions, effect sizes varied from moderate to large for sleep quality and insomnia, from small to medium for depression, and from small to large for anxiety. Ehrampoush et al. (2019) and Morris et al. (2016) conducted a randomised controlled trial comparing two intervention techniques with a control group. Trockel et al. (2011) compared two interventions without a control group. Lastly, Freeman et al. (2017) conducted a randomised controlled trial to assess the efficacy of one cognitive-behavioural-based intervention to improve sleep and mental health. In three of four of these studies, sleep was assessed by the same measurement (PSQI), while several measurements were used for evaluating depression (e.g., CES-D, BDI, PHQ-9) and anxiety (e.g., BAI, GAD-7, STAI). While the interventions are grounded on cognitive-behavioural principles, they show considerable diversity (e.g., CBT for insomnia, CBT for self-help, workshop including CBT components).

Ehrampoush et al. (2019) conducted a randomised controlled study to investigate the effects of cognitive behavioural well-being workshops on anxiety, depression, sleep quality and cognitive emotion regulation in first-year medical students in Iran. They allocated students to “perseverance” and “sleep-wakefulness” workshop groups and

control groups equally. There was no baseline difference in sleep quality, anxiety and depression across the groups. The experimental groups exhibited changes in anxiety and depression. Participants who attended the sleep and wakefulness programme had a significant change in their sleep quality. This study is significant in proving that cognitive behavioural well-being workshops can enhance the well-being of university students. Sleep-focused intervention is helpful specifically for sleep quality. Another cognitive behavioural therapy-based intervention study by Morris et al. (2016) aimed to decrease insomnia problems and anxiety among university students in the UK. They randomly allocated 138 undergraduate students to intervention and control groups. They invited undergraduate students experiencing stress before summer examinations to learn stress management techniques, so the criteria for inclusion in the study were interest and self-referral. They randomly allocated students to anxiety relief, insomnia relief and control groups. Groups did not differ in baseline based on gender, age, anxiety, depression and sleep quality. The anxiety group had an improvement in sleep quality (with a small effect size) and a decrease in anxiety, while the insomnia group had an increase in sleep quality (with a large effect size within the group, and a medium effect size between-group) from pre- to post-intervention. Participants in insomnia and control groups did not have a decrease in anxiety. However, the authors also indicated that there was almost a significant increase in anxiety in the control group, while the increase in anxiety was non-significant in the insomnia group. It shows that the insomnia treatment also had benefits in preventing an increase in anxiety. There was no significant decrease in depression in either anxiety or the insomnia relief groups. This study demonstrates that online cognitive-behavioural therapy (CBT) for anxiety is effective in reducing anxiety levels and enhancing the quality of sleep.

Trockel et al. (2011) conducted an email-delivered cognitive-behavioural sleep-health program on first-year university students staying in the residence hall of a private university in the US to improve sleep and decrease depression symptoms. They randomly allocated participants to the Refresh and Breath intervention groups. There were no significant baseline differences in terms of sleep quality, depression, age, gender and ethnicity in the poor sleep quality group between the refresh and breath groups. There was a significant baseline difference in depression and gender in the good sleep quality group. The Refresh programme focused on improving sleep, while the Breathe programme focused on improving low mood and stress. Students were separated into two groups based on their PSQI scores. The program for students with poor sleep in Refresh program included recommendations to 1) stabilise circadian rhythm by specifying wake-up time, 2) guidance for implementing a bedtime restriction program to improve sleep, 3) relaxation training, 4) mindfulness training, 5) stimulus control strategies and 6) cognitive strategies to decrease the effect of maladaptive thought about sleep. Breathe programme included 1) self-monitoring of stressful events, associated thoughts and emotions, and coping behaviours; (2) challenging automatic negative thoughts; (3) finding solutions to interpersonal conflict; (4) engaging in enjoyable activities; (5) mindfulness meditation; and (6) relaxation. The refresh program (aiming to improve sleep) effectively improved sleep quality and decreased depression compared to the Breathe program in the group of poor sleepers after eight weeks. There was no significant difference in sleep and depression among students with high sleep quality. According to this study, sleep-focused treatment helped to improve sleep and mental health better than mental health- focused treatment in a group of students with poor sleep quality.

Freeman et al. (2015) conducted a randomised controlled study to understand the effectiveness of online CBT for insomnia on some mental health problems. They focused on paranoia and hallucination as primary mental health outcomes; however, secondary mental health outcomes were depression and anxiety. There were online CBT for insomnia and usual care groups. They randomly allocated 3755 university students with insomnia from twenty-six universities in the UK. Treatment and control groups matched at the baseline. Comprehensive treatment for insomnia includes behavioural techniques (sleep restriction, stimulus control, relaxation), cognitive techniques (paradoxical intention (trying to stay awake), belief restructuring, mindfulness, imagery, allocating time for daily reflection) and educational components (information about sleep and sleep hygiene). They reported a decrease in insomnia in the treatment group compared to the control group in week 3, 10 and 22 measurements. They also reported that sleep treatment improved depression, anxiety, psychological well-being and functioning, which sustained over a while. The likelihood of participants meeting the diagnostic criteria for depression and anxiety was lower as well. It shows that a comprehensive sleep treatment itself helps with sustainable improvements in sleep, depression and anxiety.

Psychoeducation-Based Interventions

In the four interventions using a psychoeducation approach, effect sizes were small for sleep quality and depression, and non-significant for anxiety. Note that the studies in this group show methodological diversity (e.g., RCT, open trial). Hershner and O'Brien (2018) and Baroni et al. (2018) conducted a randomised controlled trial. Ball and Bax (2002) compared two interventions without a control group, and Levenson

et al. (2016) conducted an open trial. In three of four of these studies, sleep was assessed by the same measurement (PSQI), while several measurements were used for evaluating depression (e.g., PHQ-9, CES-D, PROMIS) and anxiety (e.g., BAI, PROMIS). The duration of interventions (1.5 hours, 1 week, and 8 weeks) and the method of delivery (e.g., online, in-person, and a hybrid approach) also differed. Three studies conducted in this group mostly focused on sleep education. The intervention of Ball and Bax (2002)'s study was psychoeducation, including sleep training; however, it primarily focused on general well-being, including self-care and self-awareness.

Hershner and O'Brien (2018) conducted an online sleep education program with several components: a sleep personality profile, two videos, and information on healthy sleep behaviours by randomly allocating 254 US university students (freshmen, dentistry, PhD, etc.) to the intervention and control groups. There were no baseline differences regarding sex, ethnicity, housing (apartment, student housing, other), department, weekday and weekend sleep duration in intervention and control groups. Participants in the intervention group had higher sleep quality and lower depression scores after eight weeks of the sleep education program. Another research study about sleep courses was conducted on 145 undergraduate students from a private university in the US (Baroni et al., 2018). Participants were randomly allocated to sleep (intervention group) and psychopathology courses (control group). Participants in intervention and control groups did not significantly differ in baseline measurements of medical/psychiatric conditions, alcohol consumption, sleep quality, anxiety, depression, excessive sleepiness and sleep disturbances, apart from gender and ethnicity. The first group received a sleep course, while the control group received a

child and adolescent psychopathology course and a brochure about sleep hygiene recommendations. The sleep course covered topics such as sleep behaviours, sleep hygiene, stimulus control, circadian stabilisation (dark-light exposure), sleep-related cognitive restructuring and relaxation techniques, and a worry diary to release anxiety at bedtime. As a result, they improved perceived sleep latency, and there was a significant decrease in depression from September to November after the sleep course. Also, at 3-month follow-up, they had lower depression and anxiety scores, and improved sleep quality according to the results of sleep log analysis (Baroni et al., 2018).

Ball and Bax (2002) carried out educational programmes (self-awareness and self-care interventions) on health behaviours to examine changes in individuals' health behaviours and depression levels. A total of 54 students filled out questionnaires that evaluated their sleep patterns and levels of depression at the beginning of the semester, during the mid-term, and at the end of the final exams. The participants were assigned to groups randomly. Around fifty per cent of the students received written comments about sleep and depression or took part in an educational discussion group during the mid-term period. The individuals obtained information regarding their results about established standards and peers, as well as any changes that occurred between the start and midpoint of the semester in the self-awareness group. The self-care intervention comprised a didactic presentation, written content on self-care practices, and a group discussion on self-care problems. The demographics of the students who volunteered for the study were not different from those of the rest of their class. Although interventions had an impact on certain sleep habits, the groups didn't show

any significant differences in general psychological adjustment. However, students who had a decline in positive health behaviours showed a higher level of depression during final exams.

Levenson et al. (2016) conducted an open trial of a sleep health promotion program for university students in the US. It lasted a month, and it included two components: individualised email feedback based on a daily sleep diary and a presentation about sleep health. Individualised feedback included a summary of daily sleep data such as sleep duration, sleep efficiency and the daily sleep data of other university students. The sleep education presentation on sleep health included the description of sleep, sleep health (e.g., factors affecting sleep health such as habits, stress, caffeine, alcohol), evidence from experimental studies of sleep loss (e.g., the effects on attention, learning and memory, emotional effects, and other health consequences such as blood pressure or weight), make suggestions on how to improve sleep. They compared groups that received the intervention with those that did not. The results indicated that participants reported improvement in sleep efficiency, with a small effect.

Mindfulness-Based Interventions

There were two mindfulness-based interventions in the current review. Both were randomised controlled trials lasting four weeks. They used the same sleep measures, although different instruments were used to assess depression and anxiety. Hall et al. (2018) conducted a mindfulness intervention programme to enhance the mental well-being and sleep quality of Chinese university students. The participants were assigned randomly to three intervention groups and a control group. The groups

had similar characteristics at baseline, apart from differences in degree and region of origin. The intervention groups attended in-person teacher-led mindfulness training sessions and engaged in self-guided practices weekly for 7 weeks. The students in the intervention groups had lower levels of anxiety and depression, as well as improved subjective sleep quality, in comparison to the control group, with large effect sizes. They concluded that mindfulness interventions with low intensity may prove to be a beneficial programme in academic settings. Lee and Jung (2020) conducted a randomised controlled study of DeStressify, a mental health app including mindfulness-based activities for anxiety, depression, and sleep, on Canadian university students. Audio, video, and text files covered exercises such as grounded imagery, gratitude, imagining the ideal life, and finding meaning. Participants reported outcomes of anxiety, depression and sleep quality at baseline and at 4 weeks follow up. They allocated students to the “DeStressify” experimental group ($N = 102$) and control group ($N = 104$). Between experimental and control groups, there were no differences in age, sex, ethnicity, academic program enrolment, or percentage with a mental health diagnosis. The app did not significantly improve state anxiety, depression or sleep quality; however, the intervention led to a slight decrease in trait anxiety, with a small effect size reported at week 4. No significant difference in state anxiety was found.

Combination of Various Interventions

Three studies in the review included a combination of various interventions. Effect sizes for sleep quality, depression, and anxiety in these interventions were either non-significant or very small. Two of the three studies included university students with sleep disorders, such as insomnia and nightmare disorder, as well as university students

recruited through medical practitioner or psychiatrist consultations. The remaining study included a general sample of first-year university students. All studies were randomised controlled trials. Two of them employed same measures for assessing depression and anxiety. The combination of interventions also differed (e.g., cognitive behavioural therapy and hypnotherapy; cognitive behavioural therapy and mindfulness). Interventions ranged in duration from 4 to 8 weeks.

Bruehlman-Senecal et al. (2020) conducted a randomised controlled trial to investigate the effects of a mobile app, Nod, incorporating positive psychology, mindfulness-based self-compassion, and cognitive behavioural skill-building exercises to address loneliness among first- year university students in the US. It included social challenge content focusing six core social skills and behaviours to strengthen social connections (e.g., performing act of kindness, expressing gratitude etc.), reflections content supporting the cognitive reconstruction of negative social experiences (e.g., self compassion) and appreciating positive social connections (e.g., gratitude), and growing mindset content including suggestions for challenges. They reported sleep, depression and anxiety outcomes in addition to loneliness in baseline, 2 and 4 weeks follow up. They allocated students to the “Nod” intervention group (N = 100) and a control group (N = 121) after students gave consent and completed a baseline survey. The study found no differences in sleep quality, depression and anxiety across groups at baseline. There were also no significant changes in sleep quality, depression and anxiety between intervention and control groups reported for the week 4 assessments (week 2 were not reported).

Raevuori et al. (2021) conducted a randomised controlled trial in Finland to

evaluate the effectiveness of the MERU Health Program, a smartphone-based, therapist-guided mental health intervention among university students receiving health services for clinically diagnosed depression. Participants were randomly assigned to either the intervention or control group, with stratification based on current antidepressant use. The 8-week program integrated multiple evidence-based therapeutic components, including Mindfulness-Based Stress Reduction, Mindfulness-Based Cognitive Behavioural Therapy, and Behavioural Activation Therapy. The intervention delivered a range of multimedia content such as text, videos, audio-guided mindfulness exercises, and visuals illustrating CBT principles, along with journal prompts. Participants engaged with daily materials for approximately 10 to 45 minutes. The program also provided access to anonymous peer support through facilitated group discussions and individualised guidance via chat from remote therapists who monitored participant engagement. Post-intervention assessments revealed no significant differences between the intervention and control groups in depression, anxiety, or sleep disturbances. Furthermore, contrary to initial assumptions, app-measured engagement with mindfulness practice did not predict changes in depression or anxiety outcomes.

Friedrich et al. (2018) conducted an intervention study to understand the effects of CBT and hypnotherapy (SWIS treatment) to improve the sleep and well-being of university students. The participants were randomly assigned to either the SWIS treatment group or the control group. There were no significant baseline differences between the groups in terms of gender and age. The results indicated a reduction in depression scores in both the intervention and control groups. The SWIS intervention led to a significant long-term decrease in anxiety. Nevertheless, mental health

outcomes showed notable enhancements after 3 months, but there were no immediate improvements following the treatment. It indicates that the implementation of techniques may require additional time to enhance the mental well-being of students. As a limitation of the Friedrich et al. (2018) study, only sleep quality is reported and other sleep related outcomes are unavailable.

Other Interventions

Two studies did not fit into any categories and were categorised in the other interventions category. Gellis et al. (2013) aimed to understand the effectiveness of cognitive refocusing treatment for insomnia and sleep hygiene (CRT-I+SH) treatment compared to only the sleep hygiene (SH) group to decrease insomnia severity. They also hypothesised that the cognitive refocusing group would have less cognitive arousal at post-treatment. They included university students having insomnia and insomnia symptoms, and excluded participants getting other treatments for sleep problems after beginning the intervention. They randomly allocated participants to groups. There was no baseline difference in gender, race, insomnia, or sleep hygiene. However, there was greater reported depression and anxiety severity in the SH group than in the CRT-I+SH group at baseline. In the CRT-I+SH group, the intervention emphasised the importance of shifting from physically and emotionally arousing to non-arousing thoughts at bedtime for better sleep, in addition to applying sleep hygiene tips. The provider helped participants choose three favourite topics (e.g., new recipes, favourite TV shows) that help maintain their attention. The average duration for the implementation of this intervention was around 30 minutes. The sleep hygiene treatment group delivered recommendations (avoiding caffeine after noon, having a dark bedroom before sleep,

avoiding exercise two hours before bedtime) to modify or reduce habits that are linked to insufficient sleep. The mean duration for this intervention was around 15 minutes.

Based on the findings, the CRT-I+SH group exhibited a greater degree of improvement over time than the SH condition in insomnia severity, with a large effect size. They reported that the between-group effect size for the CRT-I intervention was moderate when baseline differences were subtracted. Also, they indicated that the likelihood of a clinically significant response was higher in the CRT-I+SH group compared to the SH group. It is not known whether interventions decreased anxiety and depression symptoms or not. They did not report depression and anxiety outcomes; however, they controlled for them in their analysis.

Esmaeili and Ahmadi (2018) conducted a randomised controlled study designed to mitigate online social networking addiction among university students in Iran. The study also aimed to reduce depression and anxiety levels and enhance sleep quality by reducing excessive online social networking usage. Participants were randomly and equally allocated to the intervention and control groups. The two-week mobile application intervention was based on reality therapy, a therapeutic method grounded on choice theory, which posits that individuals are responsible for both their lives and actions. During this intervention, participants limited their online time and were directed by the app to substitute online networking usage with alternative activities. After the two-week intervention, decreases in depression and anxiety levels were reported, along with improvements in sleep quality. Effect sizes were small for sleep quality and large for depression and anxiety.

Table 5.4*Studies Included in the Systematic Review*

Author, Year	Design	Participants		Study Course (Semester)	Intervention/ mode of delivery/ number of sessions, duration, time frame versus control condition	Outcomes	<i>p</i>	Effect Sizes	Limitations
		Gender, female n %	M_{age} SD_{age} Range						
Hershner and O'Brien, 2018	RCT	316 females 57.6%	21.9 (4.1) No age range	All university students from freshmen to professional students (medicine, dentistry, PhD) / Winter Semester	Sleep education module: a sleep personality profile, two videos, information on healthy sleep behaviours /Online/1 session/20 min/8.week(p ost-intervention survey)	At 8 weeks, the intervention group had an improvement in sleep quality (PSQI) and depression (PHQ-9) scores.	Sleep Quality <i>p</i> < .001 Depression <i>p</i> = .03	Sleep Quality <i>d</i> = 0.28 Depression <i>d</i> = 0.20	The authors indicated that all students were included in the analysis, irrespective of whether they acknowledged their visit to the intervention site.

Baroni et al, 2018	RCT	119 females 82%	19.79 (1.25) No age range	Undergraduate students/Fall Semester	Sleep Course (Twice Weekly Didactic Lectures and Weekly Seminars)(Sleep regulation and sleep hygiene, cognitive behavioural strategies to address poor sleep) / Face to Face Lectures and Group Discussions / 2 months	No change in post-intervention. At 8 weeks follow-up, sleep course students had lower depression (CES-D) and anxiety (BAI) scores than the comparison group.	No significant change in sleep quality, depression and anxiety after 2 months	-	The intervention group had significantly higher eveningness preference. Students in comparisons group, dropping out, had more severe sleep problems. It is likely to decrease the magnitude of findings.
--------------------	-----	--------------------	---------------------------------	--------------------------------------	--	--	---	---	--

Ehrampoush et al., 2019	RCT	74 females (71.2%)	18.60 (0.79) 18-20 age	First-Year Medical Students/First Semester	Group 1 Perseverance-Willpower Workshop (Emotion and stress control, willpower strengthenin)/?/9 months Group 2 Sleep and Wakefulness Workshop/?/9 months Group 3 Control Group	No change in sleep quality (PSQI) in the first group. Significant decrease in depression (BDI) and anxiety (BAI) compared to control group. There is an improvement in sleep quality in the second group in within group analysis and decrease in anxiety and depression (Beck Depression Inventory) compared to control group.	Depression $p < .001$ Anxiety $p < .001$	Experiment Group 1 (Compared to Control Group) Depression $d = 0.19$ Anxiety $d = 0.04$ Experiment Group 2 Compared to Control Group Depression $d = 0.17$ Anxiety $d = 0.04$	They don't indicate online or face-to-face. They don't indicate the number of sessions and duration. Effect Sizes are very small even if there are differences for depression and anxiety in three groups.
-------------------------	-----	--------------------	---------------------------	--	--	--	---	--	--

Trockel et al., 2011	Comparison of Two Interventions	61 females 53%	18.45 (0.7) 18-22 years	First-year university students	Group 1 Refresh Programme Cognitive Behavioural Self-Help Programme to improve sleep, sleep quality and symptoms of depression)/online/8 weekly sessions/30 min each session Group 2 Breath Programme It was designed to improve mood and increase resilience to stress/online/ 8 weekly sessions/30 min each session	After 8 weeks, the poor sleep group had better sleep quality (PSQI) and a greater decrease in depression (CES-D) in the Refresh Programme compared to the Breath Programme. There was no significant difference in the intervention groups for participants with no sleep difficulties.	Refresh Programme (poor sleepers group) Sleep Quality $p = .03$ Depression $p = .03$	Sleep Quality $d = 1.33$ Depression $d = 0.57$	No control group.
----------------------	---------------------------------	-------------------	-------------------------------	--------------------------------	--	--	--	---	-------------------

Hall et al. (2018)	RCT	70 females 69.3%	22.30 (2.63) No age range	Undergraduate, Master and PhD Students	Group 1 Mindfulness Group 2 Mindfulness + Plain Text Group 3 Mindfulness + Enhanced text reminder with animal meme All groups are Face to Face Teacher Guided Training Sessions (2 weeks) + Audio-guided mindfulness/4 weeks Group 4 Control Group (Wait-List Control)	At 4 weeks, improvements in sleep quality (PSQI), depression and anxiety (DASS-21) in intervention groups compared to the control group. No significant difference between intervention groups.	Sleep Quality $p < .001$ Depression $p < .01$ Anxiety $p < .01$	Sleep Quality $d = 1.15$ Depression $d = 0.83$ Anxiety $d = 0.84$	-

Morris et al.(2016)	RCT	93 Females 67.4%	20.5 (1.95) 18-34 years	Undergraduate students experiencing stress. Inclusion criteria was interest and self referral.	Group 1 Anxiety Relief psychoeducation, self-monitoring and graded exposure, cognitive restructuring Group 2 Insomnia Relief psychoeducation, cognitive/guided imagery, relaxation techniques, sleep hygiene, stimulus control therapy, progressive muscle relaxation, additional material for information and tips	Better sleep quality (PSQI) in anxiety relief and insomnia relief groups compared to the control group. Lower anxiety (STAI-S) symptoms in the anxiety relief group compared to the control group.	Anxiety Relief Group Sleep Quality Insomnia Relief Group Sleep Quality	Anxiety Relief Group Sleep Quality Insomnia Relief Group Sleep Quality	Anxiety Relief Group Sleep Quality Insomnia Relief Group Sleep Quality	No follow-up Participants were paid, and intervention groups received more than control groups. There might be Hawthorne effects. Students know that these are programmes for managing stress.
---------------------	-----	---------------------	-------------------------------	--	--	---	---	---	---	---

					Group 3 Control Group Both groups are Online/ 6 weeks/ 20 min per week.				
Friedrich et al., 2018	Randomized Pilot Controlled Study	38 females 68%	25.84 (5.06) 19-50 ages	University students with an insomnia disorder, nightmare disorder, an irregular sleep-wake type and poor sleep quality (PSQI scores >5)	SWIS Treatment (Combination of cognitive-behavioral therapy and hypnotherapy for insomnia) Face-to-face (guided by two psychologists)/ 6 weeks/ 6 sessions, 100 min each	A significant decrease in depression (CES-D German Version) scores in both SWIS and WLC conditions at post-test. SWIS condition – less anxiety (PHQ-D) after the training WLC- more anxiety	They don't report between-groups p-values and effect sizes. It might be non-significant. SWIS Depression p = .03 (within group) WLC p = .02 (within group)	Between-group effect sizes (calculated based on available information) are so small . Depression d = 0.14 Anxiety d = 0.06 Within-group effect sizes SWIS Depression d = .32	No sleep-related measurements and outcomes even if intervention is to improve sleep. The sample size is small and uneven. It impacted the accuracy of statistical calculations.

Ball and Bax, 2002	Assessment of Two Health Habits Interventions	22 female 40.7%	24.02 (3.42) No age range	First-Year Medical Students/The Start of the Term	Group 1 Self-awareness intervention It aimed on enhancing pupils' self-perceptions of changes in their emotional adjustment. Individual written feedback on sleep and depression, and comparative result information relative to their peers./ They don't indicate duration and time frame.	Depression (BDI-II) scores did not differ from baseline to final assessment. Students getting feedback in mid-term had a greater decrease in sleepiness (Epworth Sleepiness Scale) from mid-term to final term compared to students not getting feedback.	Sleepiness $p = .01$	There are mean differences and SD for each group. Not enough information to calculate.	They do not mention group differences No effect sizes.
--------------------	---	--------------------	---------------------------------	---	---	--	-----------------------------	--	---

					recognition and management of depression and anxiety), and a group discussion of self-care issues.				
Freeman et al., 2017	RCT	2676 females 71.2%	24.7 (7.6) No age Range	University students with insomnia	Sleepio CBT for insomnia intervention. It included behavioural, cognitive, educational components/ Online 6 sessions/20 min each	Significant reduction in insomnia (ISI) at all time points compared to the control group. Improvements in depression (PHQ-9) and anxiety (GAD-7) in week 10. Improvements remained over time (week 22).	Insomnia, Depression and Anxiety $p < .0001$	Between groups effect sizes Insomnia at week 10 $d = 0.94$ Depression at week 10 $d = 0.48$ Anxiety at week 10 $d = 0.33$	High dropout rate in the treatment group.

Bruehlman-Senecal et al., 2020	Pilot Randomized Controlled Trial	131 females (59.3%)	18.68 (0.35) 18-20	First-Year University Students/ During the first year of university transition	Not self-guided mobile app. It included positive psychology, mindfulness-based self-compassion, and cognitive behavioural skill-building exercises to address loneliness/ Online (self-guided and self-paced)/4 weeks	No change in depression (PHQ-9), anxiety (GAD-7) and sleep quality (PSQI)	-	-	<p>It did not include daily session duration and number of sessions each week.</p> <p>No details of components (tips, specific challenges etc.) students viewed in the app.</p>

Lee and Jung, 2018	Pilot Randomized Controlled Trial	58 females (67%)	20.9 (SD is not reported) Age range is 16-47.	Full-time undergraduate students/ Winter Semester	DeStressify Mindfulness-Based mHealth App It provides mindfulness-based activities via audio, video, or text files. Example titles of these exercises are grounding visualization, gratitude, imagining the life you want, and finding meaning/Online /5 days a week, 4 weeks.	Less trait anxiety (STAI) in experimental group but no change in state anxiety. No significant difference in depression (QIDS-SR) and sleep quality (PSQI).	Trait anxiety ($p=.01$)	Trait anxiety $d = 0.28$	It is possible that some participants in the control condition downloaded DeStressify, a commercially available app. Some participants may have had prior mindfulness training, which could have influenced how they used the app, but the impact of this is unknown.
--------------------	-----------------------------------	------------------	--	--	---	--	---------------------------	--------------------------	--

Levenson et al., 2016	Open Trial	106 females 96.4%	18-22 years (n = 108; 98.2%) The maximum age is 50.5 years.	Full-Time Undergraduate Students and a Small Percentage of Part-Time Undergraduate Students/ Spring Semester	A 7 days of sleep diary and a sleep health presentation/In person (1 hour group education) and Online (Individualised Feedback via email)/ 1 week/No Control Group	Significant differences in sleep efficiency (the Pittsburgh Sleep Diary), depression and anxiety (PROMIS Scales)	Sleep Efficiency $p < .0001$ Depression $p = .05$	Sleep Efficiency $d = 0.37$ Depression $d = 0.19$ Anxiety $d = 0.19$	No follow up data and no control group Participants received a voucher (\$50) Participants were predominantly female. Study findings might not be generalized to male students.
Raevuori et al., 2021	RCT	90 females 72.6%	25.1 (4.5)	University Students recruited from general practitioners' (GPs, the majority) and psychiatrists' appointments	Meru Therapist Guided Health Programme including Mindfulness Based Stress Reduction and Cognitive Therapy, Behavioural Activation Therapy / Online/ 8 weeks, 10-45 min each day	No significant changes in sleep disturbances (ISI), anxiety (GAD-7) and depression (PHQ-9) at week 4 and 8.	-	-	Participants continued treatment as usual (e.g., appointment with mental health professionals) as well. Blinding of participants, therapists, or researchers regarding the participants' group position were impossible.

Esmaeili Rad and Ahmadi, 2018	RCT	127 females 63.5%	No information about the mean age/ age range is 18-28	University Students in Iran/Spring Semester (April-May)	Mobile App for social networking addiction/ Online/ 2 weeks	There was an improvement in sleep quality (PSQI), and depression (BDI). and a decrease in anxiety (BAI) in intervention group.	Sleep Quality $p = .02$ Depression $p < .001$ Anxiety $p < .001$	Sleep Quality $d = 0.49$ Depression $d = 0.85$ Anxiety $d = 0.97$	No follow-up for more than 2 weeks.
Gellis et al., 2013	RCT	33 females 64.7%	18 years or older but they don't mention mean age, SD and age range	University students with persistent sleep problems and insomnia	Cognitive refocusing treatment (Taking attention away from intrusive, negative thought content to emotionally/ physiologically non-arousing and engaging thought)/ In person/4 weeks	The students in the CRT+SH group exhibited a considerably higher likelihood of having a clinically significant result for insomnia severity (ISI).	Insomnia severity (after controlling baseline anxiety and nonsleep depression) CRT+SH $p = .04$	Insomnia severity CRT+SH $d = 1.57$ SH $d = 0.81$	They measured depression and anxiety, but no outcomes for them. They just controlled the effects of them. Greater baseline depression, non-sleep depression and anxiety severity in the SH group, but they controlled these effects.

Assessment of Reporting Bias

Sleep quality was evaluated in most of the studies included in this review. Four included studies by Ball and Bax (2002), Freeman et al.(2017), Levenson et al.(2016), and Gellis et al.(2016) reported sleepiness, insomnia and sleep efficiency outcomes. Baroni et al. (2018)'s study also investigated daytime sleepiness, the effects of excessive sleepiness, and sleep duration and wakefulness in addition to sleep quality. However, we only focused on sleep quality among all these outcomes. Friedrich et al.(2018) and Gellis et al.(2013) did not report findings on sleep and mental health outcomes, despite stating that these outcomes were assessed.

Discussion

This systematic review evaluated fifteen intervention studies reporting sleep and mental health outcomes for university students. Interventions included cognitive behavioural therapy- based interventions, psychoeducation (sleep education, self-awareness and self-care interventions), mindfulness-based interventions, and other interventions (e.g., reality therapy). In four studies that did not report between-group effect sizes, these were calculated using appropriate formulas based on the information provided. Interventions in the included studies had small to large effects on sleep-related outcomes, depression and anxiety. The included studies showed high heterogeneity, differing in intervention type and content, mode of delivery, participant demographics, and outcome measures.

This systematic review aimed to determine whether sleep interventions that address both sleep and mental health outcomes in university students incorporated factors such as subjective social status and social comparisons to enhance sleep and improve mental health outcomes. Search terms related to social factors were not included based on recommendations from the expert for the systematic review to obtain more comprehensive findings. The current systematic review revealed that the included intervention studies did

not explicitly address these social factors. The review included fifteen studies that reported on sleep and mental health intervention programs for university students and had outcomes for both sleep and mental health. The interventions employed various methods such as cognitive behavioural techniques (Friedrich et al., 2018), sleep education courses or workshops (Baroni et al. 2017; Ehrampoush et al., 2019), and mindfulness (Hall et al., 2018) to improve sleep and mental well-being. Some interventions had techniques such as self-monitoring of stressful events and associated thoughts, challenging automatic negative thoughts, finding solutions to interpersonal conflict, and belief restructuring, which might include mention of social factors, although this was not explicitly reported. For example, in the technique known as challenging automatic negative thoughts, participants might address negative thoughts related to social comparisons with peers. However, no specific instructions were provided in this regard, so it is not known whether participants focused their automatic thoughts on negative social comparisons. As a result of the systematic review, it can therefore be reported that interventions do not explicitly consider those social factors such as subjective social status and social comparisons that may also have significant effects on sleep and mental health outcomes during the university period. The effectiveness of sleep and mental health interventions on university students could potentially be increased by adding approaches that address thoughts related to social status and social comparisons with peers. Based on the results presented here, social factors should be addressed in future interventions. It is therefore the conclusion of this section that there is a need to develop and pilot a workshop on social factors as strategies to address. This could be a potentially helpful tool for use in future interventions.

Including factors about perceived social standing and social comparisons in interventions might provide further benefits to the sleep and mental well-being of university students. However, subjective social status includes various dimensions such as popularity,

academic, and social skills. Determining which aspect to prioritise can enhance the potential impact that might be accomplished. In this regard, exploratory analysis of the quantitative data collected in the cohorts of first-year university students in 2020 and 2021 provided insights into the connection between specific dimensions of social comparisons and mental health (Appendix F). Subjective social status perceptions on academic skills are a strong predictor of anxiety and depression outcomes based on the exploratory findings. The literature also provides few findings demonstrating the significance of academic social comparisons on the mental health of university students. For example, qualitative studies by Picton et al. (2022) and Anto et al. (2023) revealed themes related to adverse academic social comparisons having a negative effect on adaptation to university and mental health. Furthermore, in accordance with the Big- Fish-Little-Pond Effect (BFLPE), the shift towards a more competitive educational environment might negatively impact students' impression of their academic abilities. This can lead to less persistence and limited flexibility in educational decisions (Rosman et al., 2020). Although no evidence was found to support the big fish-little pond effect among psychology entrants in Rosman et al.(2020)'s four-wave longitudinal study, they proposed that future research should investigate the generalizability of these findings to other academic fields to Psychology, and it may be useful to compare different undergraduate courses depending on level of academic achievement needed for entry to the course. Some studies in the literature also offer methods connected to social comparisons to improve the sleep and mental health of adolescents and university students. Arigo and Smyth (2012) found that expressive writing on body image and appearance concerns may have a beneficial effect on the trajectory of future issues associated with sleep difficulties and decrease body-focused upward social comparisons. Krayer et.al (2008) suggested focusing on naturally occurring self-enhancement appraisals (e.g., he is good at math but I am good at art), which can act as a protective mechanism against the negative

consequences of social comparisons, based on the results of a semi-structured interview study with adolescents. They suggested employing methods such as comparing oneself to another attribute where one feels superior, and creating psychological distance from the comparison target might also be advantageous when confronted with idealised media images. They recommended considering self-enhancement appraisals when developing intervention programmes as well. These suggestions can be taken into consideration in future interventions.

Limitations

This systematic review has several limitations. Subjective measurements of sleep and other variables were used in the interventions, and they did not use objective measurements such as actigraphy or polysomnography. As another limitation, studies were selected by only one author and not by two authors, as recommended in Higgins and Green (2008). However, 10% of studies from databases were screened by a second reviewer (doctoral supervisor). Non-psychological interventions, indicated in the search process section, were excluded.

Another important limitation of this study is that due to heterogeneity in the studies selected, that has not allowed a meta-analysis or any advanced statistics to be performed. The studies in this review differ in intervention types, mental health outcome measurements and population characteristics. Combining studies with widely varied intervention approaches, such as cognitive-behavioural therapy (CBT), mindfulness-based programs, and sleep education, could negatively impact the validity and interpretability of a meta-analysis. These interventions aimed to promote sleep and mental health, but their mechanisms, duration, delivery methods and estimated benefits differed too greatly to permit a meta-analysis on the outcomes. Heterogeneity in methods and measures in the reported studies is therefore an additional limitation and should be addressed in future

research.

Conclusions

Sleep and mental health interventions have shown a signal of efficacy in enhancing sleep quality and mental health in university students. It is widely recognised that improving sleep can result in decreased depression and anxiety. Nonetheless, it is uncertain if integrating factors associated with students' perceived social standing and peer comparisons may improve the effectiveness of these treatments. Based on the results of exploratory analyses and considering existing research in the literature, social comparisons on the academic performance dimension predict mental health in university students better than other dimensions, such as popularity and physical appearance. Thus, organising a workshop for university students on the connection between academic social comparisons and academic burnout as a mental health outcome would be beneficial, because of their conceptual link and anxiety and depression are both associated with the Burnout phenomenon. That is, the specific emphasis is on burnout because it can manifest as a result of prolonged exposure to emotional or physical distress in university settings (Shankland et al., 2019) as well as prolonged employment in demanding positions (Maslach & Leiter, 2016). Therefore, burnout is quite relevant to academic social comparisons. Also, burnout is quite common among university students according to systematic reviews and meta-analyses (Kaggwa et al., 2021; Rosales-Ricardo et al., 2021). However, while burnout was explained by some important factors such as workload, assessment periods (Shankland et al., 2019), relationships with peers and inadequate support (Boudreau et al., 2004), the impact of academic social comparisons has not been specifically considered. Therefore, we decided to organise an academic social comparisons and burnout workshop as an initial phase of an intervention that may be further developed. The workshop will only address the connection between academic social comparisons and burnout, and sleep-related factors will

be excluded due to the planned one-hour time limitation of the workshop. This workshop will provide insights into the experiences and opinions of university students regarding academic social comparisons and mental health. The results of this workshop may offer a valuable understanding of mental health and sleep interventions that could potentially be developed for university students in the future. The next section will address the workshop on the link between academic social comparisons and burnout, designed and conducted with university students.

CHAPTER 6

WORKSHOP REPORT: EVALUATING AN ACADEMIC SOCIAL COMPARISONS AND
BURNOUT WORKSHOP USING THE KIRKPATRICK EVALUATION TOOL.

Abstract

Introduction: Prior qualitative research studies have demonstrated that university students engage in academic social comparisons with their peers. It is known that adverse academic social comparisons are associated with mental health outcomes. Also, the levels of burnout symptoms among students are increasing worldwide. Therefore, it is important to explore students' awareness of the connection between academic social comparisons and mental well-being, including burnout.

Aim: This study aims to develop and evaluate a workshop designed to enhance knowledge and awareness of academic social comparisons and their potential contribution to professional burnout among university students. The training also aims to equip participants with practical skills and strategies to manage the impact of these comparisons on their overall well-being and reduce the risk of developing burnout.

Methods: This study implemented a mixed methods approach to evaluate one-hour workshop aimed at exploring students' understanding of academic social comparisons and burnout. Workshop participants consisted of university students from various degree levels and departments at Lancaster University ($N = 45$). Participants were introduced to the concept of Burnout Syndrome, followed by information on academic social comparisons. Through guided discussion activities, participants were encouraged to explore the relationship between academic social comparisons and burnout. A validated post-workshop evaluation tool, based on the Kirkpatrick Evaluation Model, was used to assess the perceived benefits of the workshop. Participants rated the relevance, usefulness, learning, possible changes in their behaviours in the future, and the benefit of this workshop for prospective students. Participants were asked open-ended questions on the knowledge, skills and benefits of the workshop.

Results: The workshop was evaluated using quantitative and qualitative methods. The overall mean relevance score reported by participants was 86%. According to the qualitative feedback, the workshop was effective in raising awareness about burnout and symptoms, how to mitigate burnout, the connection between academic social comparisons and burnout, and to learn strategies to overcome adverse social comparisons and prevent burnout symptoms.

Conclusion: This workshop enhanced the understanding of burnout, social comparisons, and mental health, which may potentially influence future behaviours. Raising awareness of burnout symptoms and recognising academic social comparisons as a potential risk factor could be beneficial in future interventions. However, there is currently insufficient empirical evidence to suggest that such interventions effectively alleviate burnout or that individuals can effectively incorporate the recommended strategies into their daily lives.

Keywords: academic social comparisons, burnout, university students.

Evaluating an Academic Social Comparisons and Burnout Workshop Using the Kirkpatrick Evaluation Tool

University students frequently experience burnout, which can have a negative impact on their academic performance. According to the systematic review and meta-analysis of fifty- five articles by Kaggwa et al. (2021), approximately 33% of university students in low- and middle-income countries suffer from burnout. Another systematic review of twenty studies from different regions in the world including North America, Asia, Latin America and Europe investigated the prevalence of burnout symptoms. According to this review, 55.4% of students experienced emotional exhaustion and 30.9% experienced low academic efficacy (Rosales- Ricardo et al., 2021).

Studies have identified several factors that exacerbate academic burnout symptoms among university students. Shankland et al. (2019) reported risk factors as elevated levels of daily stressors, excessive workload, absence of purpose, and difficulty in handling tasks. Another study by Boudreau et al. (2004) indicated that the stressors of uncertainty regarding the future, lack of control, and relationships with peers, inadequate support from friends and reduced satisfaction with the ability to maintain a healthy equilibrium between their personal and professional lives were risk factors in medical students. In addition, the persistent sense of competitiveness (Muzafar et al., 2015) and regular assessments in a highly competitive environment (Shadid et al., 2020) were also indicated as risk factors among medical students. These factors are relevant to academic social comparisons. However, despite the conceptual overlap, they did not specifically indicate the potential involvement of academic social comparisons at university as a mechanism contributing to academic burnout. There is a need to increase awareness about academic social comparisons as a risk factor for burnout among university students.

An increase in awareness of burnout and learning about the possible effects of

academic social comparisons on burnout can help students recognise symptoms and risk factors, and it encourages them to engage in help-seeking behaviours. Studies on mental health literacy (identifying mental problems beforehand, and increasing help-seeking (Wei, et al., 2015)) clearly demonstrates that an increase in knowledge helps to identify symptoms, decrease the occurrence of symptoms and leads to a greater likelihood of seeking help. For example, Kim et al. (2015) found that individuals who can identify depression symptoms less (lower mental health literacy) tend to have a higher level of depression than individuals who can identify depression symptoms better (higher mental health literacy). Smith and Shochet (2011) also found that greater mental health literacy (measured as awareness about the necessity of help- seeking for mental illness, knowledge about the accessibility of existing interventions, and attitudinal beliefs about mental disorders) increased help-seeking behaviours in first-year psychology students. Therefore, a workshop about academic social comparisons and burnout might be beneficial for enhancing one's knowledge and awareness of negative academic social comparisons and burnout and promoting the act of seeking help afterwards.

Some studies have investigated the prevalence of social comparisons (even though it is not specifically on academic social comparisons and mental health) and explored its possible effects on mental health in students. Wheeler and Miyake (1992) recorded social comparisons of 94 US university students (84% were first-semester freshmen) during two weeks by using the Rochester Social Comparison Record (Wheeler & Miyake, 1992). Respondents were asked to record their social comparisons as they occurred. It included comparison dimensions (e.g., academic, physical appearance), their relationship to the comparison target, their similarity to this person on the comparison dimension, and their mood before and after the comparison. Results showed that the percentage of social comparisons with peers (57.69%) was higher than comparisons with others, such as family

members, famous persons, and strangers. Also, the percentage of social comparisons in the academic domain (26.31%) was the highest compared to other domains regardless of gender in the US university student population. Social comparisons about personality, physical appearance, lifestyle, abilities, social skills, wealth and opinions were lower than comparisons in academic skills. Additionally, upward comparisons (engaging in self-comparison with individuals who have better traits and attributes (Collins, 1996) were found to affect the subjective well-being of participants negatively.

Picton et al. (2022) conducted a qualitative study with fourteen first-year medical students to investigate the factors contributing to the difficulties in the first year of medical school. The study revealed some themes associated with academic social comparisons. The interviews in Picton et al. (2022)'s study were conducted by a professor in policy and public health and began with an unstructured section, where students had the opportunity to express their experiences and provide opinions. In the structured section, questions such as important events that affected the first academic year experience and interactions with friends were asked. The analysis of the interviews revealed distinct themes (e.g., being a medical student, being a doctor, slow starter) including notable sections associated with general social comparisons and academic social comparisons as one of the reasons for the struggles of first-year medical students. The educational culture within the cohort was often characterised as being marked by stress and competitiveness according to the results of analysis. Participants expressed their concerns regarding their general social comparisons and academic social comparisons with peers at university:

“[At school] it’s not hard to be top of the class, it’s not hard to be top of 30 people. Whereas in university, trying to be the top of 300 of the most elite students from across the country, that’s on a completely different level” (p.5)

“I’ve got friends who come from private schools, their whole family are doctors. Their

siblings are studying abroad and I was like “do I belong here?”

(p.6)

“The feeling that I was behind never really went away.” (p.8)

The findings of this qualitative study support the concept of the big fish-little pond effect. According to this phenomenon, the transition to a more competitive educational setting can have a detrimental effect on students' academic self-perception, thereby resulting in reduced perseverance and less adaptive educational choices (Rosman et al., 2020). In connection with this concept, students in Picton et al. (2022)'s qualitative study joined a large cohort of classmates who were all high-achieving students in an academic setting and it led to the associated challenges of social comparisons in a competitive environment. On the other hand, Rosman et al. (2020) conducted a four-wave longitudinal study and had findings in contrast to the assumptions of big fish-little pond effect. This study reported that psychology undergraduates demonstrate an ability to adjust well to the transfer to higher education, in terms of changes in their academic self-concept (i.e., self-perceptions of academic competence). The authors anticipated that given the transfer to higher education, comparing themselves to a more capable reference group there would be a decline in academic self-concept as time progressed (that is, the big fish little pond effect). They found however no evidence to support the existence of a big fish-little pond effect among the psychology entrants in their study. They suggested that subsequent studies should examine the extent to which these findings can be observed to differ across different academic disciplines (for example, arts versus natural sciences). In addition to these studies, Anto et al. (2023)'s qualitative study revealed the themes related to academic social comparisons as well. Anto et al. (2023) firstly conducted a systematic review including 23 studies, to explore the association between social media and anxiety. The review revealed that certain aspects and attributes of social media can influence the anxiety that goes above just the frequency

of usage. The systematic literature review also revealed a notable absence of qualitative studies in this research area, emphasizing the insufficient level of in-depth investigation on the topic. Therefore, recognizing the necessity for in-depth research on this topic, they performed a qualitative study to examine the impact of social media on the anxiety levels of university students.

In the qualitative study by Anto et al. (2023), following the systematic review, semi-structured interviews were conducted by two interviewers among twenty-nine undergraduate students from six different universities across the UK. The interview guide was intended to gather the participants' perspectives and emotions about their present use of social media, their overall attitudes towards social media, and their perceptions of how social media affects their anxiety levels. The application of thematic analysis yielded eight themes: three elements that reduce anxiety levels and six factors that elevate anxiety levels. Comparisons were identified as one of the factors that were believed to elevate levels of anxiety in students. The theme was further categorized into subthemes, which are extensively explained, including statements from participants about comparisons across different life domains (comparison of individuals' social lives, academic achievement, and other life successes, as well as their money and social standing) and comparison of body types. The results of the study showed that students ($n=22$) had significant anxiety due to the act of comparing their own lives with those of others such as people they know personally and famous people. The authors reported that the results of this study confirm the social comparison theory (Festinger, 1954), which posits that individuals build their own self-worth through self-evaluations based on comparisons with others. Students reported frequent instances of engaging in upward social comparisons via social media. It means that students evaluate themselves with those who are seen to be superior in specific areas, such as social life, academia, wealth, and social standing. In addition to the comparison of social lives,

financial wealth, social status and appearance, students expressed that they engaged in the act of comparing their academic achievements and other accomplishments with those of their peers. They reported feeling worried due to the fear of not meeting the same level of performance: “ ...just looking at the success of others and comparing it to my lack of success really heightened my anxiety and pushed me down further.” [Student 27]. Additionally, as a result of their main findings, Anto et al. (2023) noted that university students were particularly prone to engaging in academic comparison on social media, which subsequently resulted in heightened anxiety.

In summary, research in the literature demonstrates the widespread occurrence of academic social comparisons among university students and the associations between academic social comparisons and mental well-being. Also, some variables related to academic social comparisons such as the persistent sense of competitiveness (Muzafar et al., 2015) and a highly competitive environment (Shadid et al., 2020) are specifically connected to burnout at university. However, as stated in the previous section (Chapter 5), interventions to improve the mental health of university students have not explicitly included academic social comparisons. A pilot workshop will be the first step to developing future interventions. Therefore, it was decided to carry out this pilot workshop study to accomplish the following objectives:

- 1) To understand the relevance, usefulness and benefits of a workshop on social comparisons for university students and explore its usefulness for prospective students, and to inform on the development of an intervention in the future.
- 2) To increase knowledge and awareness of student participants about academic social comparisons and the connections between academic social comparisons and burnout.
- 3) To equip participants with some techniques to help them deal with the adverse

effects of academic social comparisons and potentially alleviate burnout.

The workshop may also prove useful for student support staff responsible for student well-being in universities. Therefore, the results of this study will be used to develop a toolkit to support the delivery of workshops on this topic.

Method

A workshop was chosen as an approach because it is aligned with the previously stated objectives such as determining the needs, increasing knowledge and awareness, and developing skills to be able to change approaches and behaviours in the future. Workshops provide an active and collaborative environment for engagement, where participants can share their experiences and opinions in an interactive setting with peers. They also offer opportunities for skill development through practical exercises (Tate, 2009; Platt et al., 2015). Several studies utilised the workshop approach to create an original intervention (Haslam et al., 2019), enhance awareness, to allow participants to practise strategies to cope with stressors (Platt et al., 2015), enhance knowledge and potentially modify behaviours (Bentham et al., 2013; Gratwick-Sarll & Bentley, 2014; Jones et al., 2011). Considering the stated objectives, the features of the workshops, and relevant literature studies, it was concluded that the workshop would be the most suitable approach.

Participants and Recruitment

The workshop included 45 participants in total. This study initially aimed to target first-year university students; however, due to insufficient participation, it was expanded to include all undergraduate and postgraduate students. Participants were recruited through advertisements circulated via emails and flyers, as well as snowballing to new students from prior participants.

Procedure

Participants read the online participant information sheet sent prior to the workshop and provided written consent when they attended the face-to-face workshop, and they had a chance to ask questions. The workshop outline and workshop aims were explained in detail at the beginning of the session. We designed a 1-hour workshop with the aim of asking university students about academic social comparisons and burnout, as well as providing participants with information about how to deal with adverse social comparisons and burnout. The workshop was comprised of two parts: the didactic and the activity parts; each part also contained sections. The didactic teaching part included two sections with information about the following: the burnout definition and the common symptoms, the prevalence of burnout in university students, risk factors for burnout (section 1:BBRF) academic social comparisons among university students, the connection between academic social comparisons and mental health, the connection between upward/downward comparisons and mental health, the definition of upward/downward comparisons (section 2: SCMH). The activity part included two sections: a question-response discussion, watching a video and talking about it, sharing and hearing the ideas of others (Section 1: AP), as well as activities drawn from published sources designed to decrease the adverse effects of social comparisons. These included tips and activities to decrease the harmful effects of academic social comparisons (Section 2: TAASC) (understanding thought-emotion connection, challenging thoughts, gratitude activity (writing academic strengths), appreciation activity (writing academic goals and progress to these goals), self-compassion activity, having a balanced routine, sharing academic challenges with peers, improving time management). We encouraged individuals to participate by turn-taking and asking questions to increase students' involvement with the content. Participants got a £15 voucher as compensation for their time and effort upon completion of the research. The full description

of the workshop programme is provided below (Figure 6.1).

The Development of the Workshop

The outline of the workshop was based on a previous unpublished workshop entitled “Burnout in Medical Students” which aimed to assess the efficacy of an educational intervention on burnout in helping medical students to comprehend the concept of burnout, their perceived biases, and their help-seeking behaviours. The workshop program, objectives, definition of burnout, and prevalent symptoms provided a framework for the development of this workshop with the prior researcher’s consent. The new content was developed by the primary researcher to address the topic of interest in the current workshop entitled “Academic Social Comparisons and Burnout”. The workshop was also reviewed and amended to take account of feedback from doctoral advisors throughout the development process. In the process of workshop development, several studies (Bentham et al., 2013; Haslam et al., 2019; Jones et al., 2011) were reviewed, and the researchers formulated questions aligned with the Kirkpatrick Assessment Tool, also considering previously published workshop research.

Prior to the workshop delivery for the purpose the thesis, a script (Appendix F), detailing the topics to be addressed in each segment was prepared and practised in a presentation to a pre-doctoral student group, as well as with the doctoral advisor present. In the development process, the workshop was initially organised for a total of 10 university students, and some changes were made to the workshop design and content based on feedback from the students.

The workshop was in two parts and each part covered one of two main topics: burnout and academic social comparisons, and each part comprised didactic and activity subsections. The burnout part of the workshop included didactic information, questions on the prevalence of burnout among university students, followed by the viewing of a short

animation on the topic. The animation video named “Burnout” was made by Pichaya Laphwilai and can be reached at the following link: “<https://www.youtube.com/watch?v=zMt1JAZZNR0>”. It was used in the “risk factors for burnout” part of the workshop. This video was selected for its clear and engaging animated presentation of burnout and related risk factors. The video provided the basis for subsequent discussion and analysis of these risk factors within the groups.

In the academic social comparisons part of the workshop, following the didactic part, the activity part was developed based on prior research and associated published resources in the literature. The development of each section and the activities are described in further detail below.

Activity 1. Social Comparison Stories

The activity about the social comparison stories was included to outline the thought-emotion-behaviour link used to modify cognitive patterns, which is a basic principle of cognitive behavioural interventions. One story in the activity reflected a negative perspective on social comparisons, while the other reflected a positive perspective. The stories presented in this section were generated by the researcher with the assistance of artificial intelligence ChatGPT with the prompt “Create two stories about negative and positive academic social comparisons”. Participants attempted to identify thoughts, emotions, and associated actions in stories. This activity was included to assist them in employing the same strategy to mitigate the adverse impacts of everyday social comparisons.

Activity 2. Be Grateful for Your Strong Sides

This part was created based on a study showing the importance of gratitude for the well-being of university students. The study by Emmons and McCullough (2003) showed that noting five positive experiences from the previous week enhanced the well-being of

undergraduate students relative to two other groups (noting hassles or noting neutral events in the previous week). In the workshop, participants were also requested to write down their academic strengths (e.g., effective time management, resilience, organisational abilities, etc.) relevant to the workshop topic.

Activity 3. Realize Your Unique Sides

Research conducted by Butzer and Kuiper (2006) indicated that higher clarity of self-concept is associated with a reduced frequency of both general and upward social comparisons. Depression and anxiety were also correlated with heightened general and upward comparisons.

Another study by Cartar and Vartanian (2022) showed that individuals with low self-concept clarity, or those who have a vague sense of identity, are more inclined to compare themselves to photos of thin models, resulting in heightened body dissatisfaction. Social comparison theory posits that individuals tend to compare themselves with others during times of uncertainty. In contrast, individuals with a clear self-concept experience less uncertainty. In connection with these studies, the “Reflect on Your Unique Qualities” activity was included in the present study to assist participants in clarifying their self-concept by enabling them to identify their distinct attributes, including abilities, interests, personal values, experiences, and other distinguishing qualities that make them who they are. The activity was created based on suggestions in a blog about improving self-concept (Pradeepa, 2023). The activity conducted in this workshop aimed to enhance self-concept clarity by encouraging participants' recognition of their unique features.

Activity 4. Appreciate Your Progress and Success

Appreciation promotes well-being and a sense of connectedness with one's possessions, experiences, and life itself (Adler & Fagley, 2005). In relation to this, the appreciation activity created for the workshop aimed to encourage participants to appreciate

their personal growth and progress instead of comparing themselves to others in academic performance.

Tips on Self-Compassion

Self-compassion was included as a tip because high self-compassion helps to have fewer negative feelings after social comparisons (Choi et al., 2014), so we mentioned the importance of self-compassion as a part of the workshop programme.

Tips on Social Comparison Concern

Tips about realizing the malleability of intelligence and sharing academic challenges with peers were derived from an intervention study about social-comparison concern in small learning groups by Micari and Pazos (2014).

Tips on How to Be Aware of Social Comparisons on Social Media

The suggestion was added based on the research conducted by Anto et al. (2023). This study indicated that university students evaluate their achievement against that of others on social media, which heightens their sense of anxiety.

Tips on How to Try to Improve Time Management

This recommendation was added because time management alleviates the connection between social comparisons and mental health, according to Rubin's (2020) study.

Figure 6.1*The Workshop Programme*

Academic Social Comparisons and Burnout

A workshop about the connections between social comparisons and burnout, and some tips to avoid unfavourable social comparisons



Gamze Koçelmir
Ph.D. student at Lancaster University Medical School

Date: November 27, 2023
g.kocelmir@lancaster.ac.uk

Pre-Workshop Questionnaire (2-3 min)

- Participant Information Form
- Consent Form
- A Short Demographic Information Section



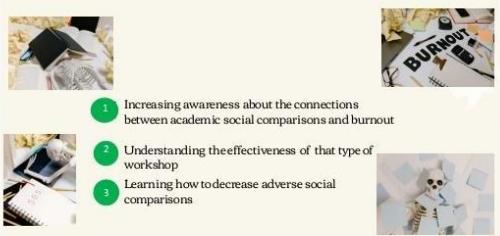
1
2

Workshop Programme

- Burnout definition and common signs
- The Prevalence of Burnout in University Students
- Risk Factors for Burnout
- Academic Social Comparisons in University Students
- Academic Social Comparisons and Burnout/Mental Health
- Tips to Decrease Harmful Effects of Academic Social Comparisons
- End of Workshop Questionnaire



Aims of workshop



- 1 Increasing awareness about the connections between academic social comparisons and burnout
- 2 Understanding the effectiveness of that type of workshop
- 3 Learning how to decrease adverse social comparisons

3
4

BURNOUT DEFINITION AND COMMON SIGNS



Burnout Definition and Common Signs



Burnout is a state of physical and emotional exhaustion. It can occur when you experience long-term stress in university work/your job or when you have worked in a physically or emotionally draining role for a long time.

5
6



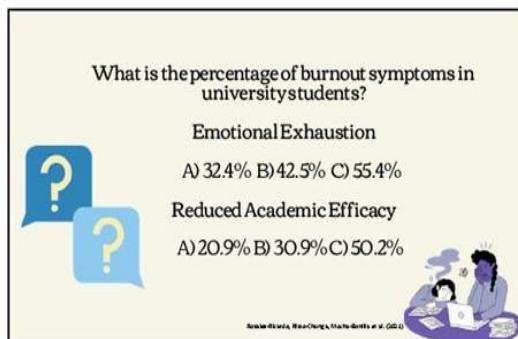
7



8



9



10



11



12



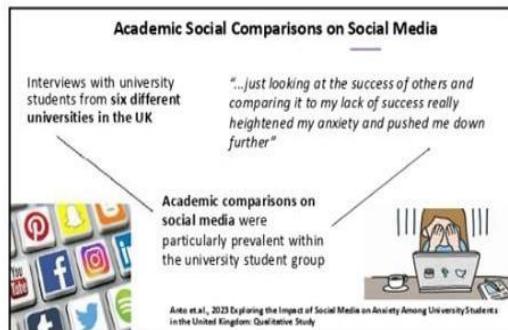
13



14



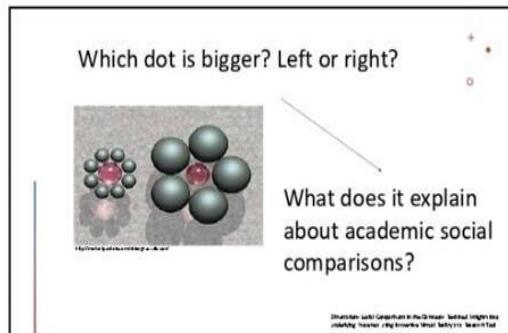
15



16



17



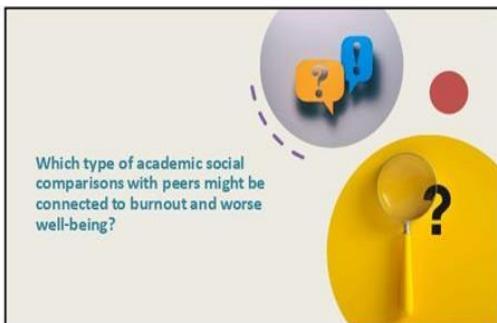
18



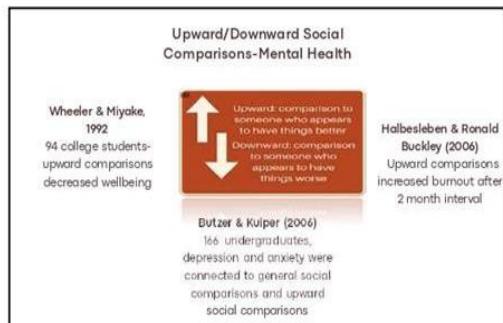
19



20



21



22



23



24

TIPS AND ACTIVITIES TO DECREASE HARMFUL EFFECTS OF ACADEMIC SOCIAL COMPARISONS



25

Always Challenge Your Thoughts

I will never be good enough. *never*

I don't belong to this school. *never*

I will work hard by considering my limits 

I can focus on things I need to improve instead of aiming to be the best. *never*

Feelings of inadequacy
Isolated
Disconnected

Motivation
Inspiration
Hope

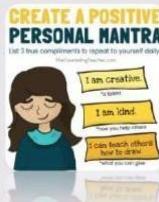
26

Be Grateful for Your Strong Sides

Please write the academic strengths you are grateful for
(e.g. Good time management, Resilience, Goal setting, Organizational skills, Research skills)

Also, Think about academic weaknesses to improve your weaknesses.

CREATE A POSITIVE PERSONAL MANTRA
List 3 times something to improve yourself daily.
www.theselfcentered.com

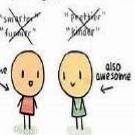


Emmons and McCullough, 2003

27

Realize Your Unique Sides

Reflect on Your Unique Qualities
(5-10 minutes)

stop comparing yourself to others. 

These can be:
*talents,
*hobbies,
*personal values,
*experiences, or
*any other characteristics that make you who you are.

Think about and write down at least five things you consider unique about yourself.

28

Appreciate Your Progress and Success

Change the comparison person from a person to a period

↓

Compare yourself now with more negative time of your life

G O A L S

G	O	A	L	S
Own a car	Make new friends	Have a healthy relationship	Go back to school	Get involved in your community
Gain self-control	Make it through the semester	Get your groove on	Get your diploma	Read a book
Want good for others	Find a significant other	Go for a walk	Learn how to剑桥	Learn something new
Call a friend	Gain confidence over your fears	Exercise more	Pick up a new hobby	Communicate with family members
Give up drinking	Join a team			Vote in an upcoming election

Adler and Fagley, 2005

29

Self-Compassion

High self compassion - Less negative feelings after social comparisons



BE KIND TO YOURSELF
BY EXCUSE ME

RESEARCH AND RESEARCH

SELF-KINDNESS

RECOGNIZING ONE'S HUMANITY

MINDFULNESS

Choi et.al., 2014

30

Realize Malleability of intelligence

Intelligence- changeable or stable?

Young children (Kamins and Dweck, 1999)
College students (Aronson et.al., 2002)
Adolescents (Good et.al., 2003)

Improvement in academic performance

Micari and Pazos, 2014 Worrying about what others think: A social-comparison concern intervention in small learning groups

31

Share academic challenges with your peers

Being open when things don't go our way helps **normalise the failure** we all have to endure.

Micari and Pazos, 2014

32

Be Aware of Academic Social Comparisons on Social Media

Anto et.al., 2023

33

Try to Improve Time Management

Time management alleviates the connection between **social comparisons** and **mental health**.

34

THE END OF WORKSHOP...

Thank you for your attention ☺

35

The End of Workshop: Qualtrics Survey

36

The workshop was delivered thirteen times to groups of students with group sizes that varied from 2 to 6. They subsequently filled out the end-of-workshop evaluation questionnaire. We used the Kirkpatrick Evaluation Tool (Kirkpatrick, 1996) to assess the effectiveness of the workshop in the end-of-workshop questionnaire. The Kirkpatrick Evaluation Tool is used in workshop assessments, and it offers a framework for assessing the validity of a training programme. It can be employed to determine if a training programme is capable of meeting the needs and expectations of participants (Smidt et al., 2009).

Alsalamah and Callinan (2022) conducted a study that involved a bibliometric analysis of books, articles and other publications of the Kirkpatrick Tool since it started to be used in 1959 until 2020. They aimed to review the model, its usefulness, and its efficacy in assessing training activities, and to clarify the reason for protecting its value despite the existence of more recent models. They indicated that it may be easily adjusted to various training settings and consistently provide excellent results in assessing training. The Kirkpatrick tool has therefore been chosen to evaluate the current workshop programme due to its efficacy in assessing educational programmes. The authors of the paper formulated questions for evaluation of workshops based on the Kirkpatrick Evaluation Tool's four levels by taking into account a relevant workshop study by Jones et al. (2011).

The Kirkpatrick approach defines four components: Reaction, Learning, Behaviour and Results. Participants were asked to assess different aspects of the workshop; overall relevance and usefulness (Reaction) learning (Learning), possible changes in their behaviours in the future (Behaviour). We also asked about the benefit of this workshop for prospective students and for their suggestions on how to improve the workshop (Results). There was one quantitative scale in agreement with the statement that the workshop was relevant using a scale ranging from 1 to 8 and the remaining 6 questions asked for qualitative

comments about the remaining three components of Learning, Behaviour and Results. The qualitative comments were classified according to the section of the workshop respondents referred to. For example, a response to the question ‘What specific knowledge or skills did you acquire during the workshop?’ (Question 3) was “I learnt different techniques such as gratitude to help me improve my mindset and to stop different types of comparisons” and this would have been classified under the content section ‘Tips to decrease adverse effects of social comparisons’.

Results

The demographic information collected is presented in Table 6.1. Approximately half of the sample were female, white undergraduate first-year students. There was a wider ethnic diversity in participating students than the University's general population of 80% white students. The largest subsample of students was studying degrees related to Health and Medicine.

Table 6.1*Sociodemographic Characteristics of Participants (N = 45)*

	n	%
Gender		
Female	25	55.5
Male	19	42.2
Other/Not Indicated	1	2.2
Ethnicity		
White	26	56.8
Asian	14	31.8
Mixed/Other	5	11.3
Faculty		
Health and Medicine	22	48.9
Science and Technology	13	28.9
Arts and Social Sciences	7	15.6
Management School	3	6.6
Year of Study		
First-Year	29	64.4
Other Undergraduate Years	12	26.6
Unknown	4	8.9

The four levels of the Kirkpatrick Evaluation Tool (Reaction, Learning, Behaviour, Result) (Figure 6.2) were assessed using quantitative and qualitative items. Items addressed the objectives of this workshop. They were classified according to the objectives of the workshop, and presented in Table 6.2 below.

Figure 6.2

The Four Levels of Kirkpatrick Evaluation Tool

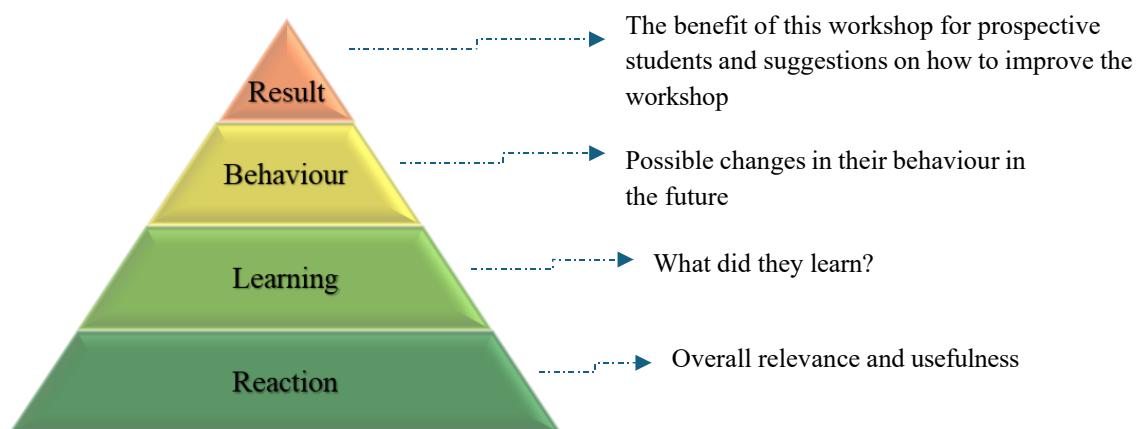


Table 6.2

Objectives of the Workshop and Related Items in the Kirkpatrick Evaluation Tool of the Workshop

Objectives of the Workshop	Items Related to This Aim
<p>1. To understand the relevance, usefulness and benefits of a workshop on social comparisons for university students and explore its usefulness for prospective students and to inform on the development of an intervention in the future.</p>	<ul style="list-style-type: none"> • The content of the workshop was relevant to me (They assessed relevance on a scale) (Reaction Level Item 1) • What did you find the most valuable about the workshop? (Reaction Level Item 2) • Do you think the workshop will benefit university students? If yes, how can it contribute? (Results Level Item 1) • Do you think there are any suggestions to improve the workshop? (Results Level Item 2)
<p>2. To increase knowledge and awareness of student participants about academic social comparisons and the connections between academic social comparisons and burnout.</p>	<ul style="list-style-type: none"> • What specific knowledge or skills did you acquire during the workshop? (Learning Level Item 1)
<p>3. To equip participants with some techniques to help them deal with the adverse effects of academic social comparisons and potentially alleviate burnout.</p>	<ul style="list-style-type: none"> • Did the workshop provide practical tools and strategies that you will use? (Learning Level Item 2) • Do you think the workshop will influence your future behaviours? Explain how? (Behaviour Level)

1.Reaction Level of Kirkpatrick Evaluation Tool

1.1. The content of the workshop was relevant to me

The overall workshop relevance mean score for participants was 85.75%.

All participants reported that the workshop was relevant with providing scores of slightly agree (n = 6) to moderately agree (n = 10) with the remaining indicating they strongly agree (n = 29) that the workshop was relevant.

1.2. What did you find the most valuable about the workshop?

There were 45 written responses that were further categorized into 4 groups according to the subtitles of the sections in the workshop (Figure 6.3). A response could be categorized into more than one group depending on the content. A total of 21 responses indicated that the tips and activities to decrease the harmful effects of adverse academic social comparisons (TAASC) were reported as the most valuable part. Some example comments showing the value of this part: “Reflecting on my own weaknesses in light of signs shown in the workshop so that improvements can be made.”(p.12). “The tips on how to improve and writing my goals in the table”(p.27).

There were also 16 responses that indicated learning about burnout definition, the common symptoms and risk factors for burnout, and the prevalence of burnout for university students (BBRF) were valuable. An example feedback (This feedback was in both TAASC and BBRF category):

“Knowing ways to decrease burnout and signs to look for so you are able to look after yourself. It was also useful to see a positive way of improving yourself academically; instead of having negative feelings for someone that excels you academically.”(p.30)

There were 7 responses that indicated that learning about the connection between academic social comparisons and mental health, the definition of upward and downward

comparisons, the connection between upward comparisons and mental health, academic social comparisons among university students, (SCMH) were also valuable. Some example feedbacks by two participants:

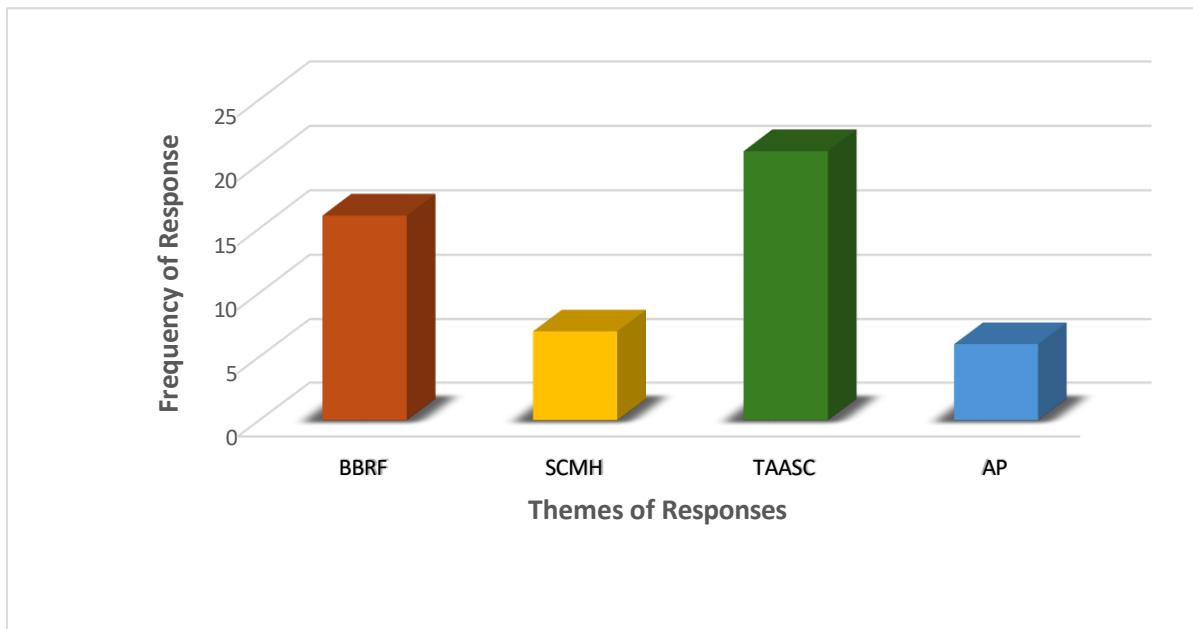
“Helped me realise how comparisons with others can be either damaging or motivating. Also how much our subconscious thoughts impact our behaviour and could potentially lead to burnout.” (p.19)

“I found the section on social comparisons useful. It highlighted that I shouldn’t compare myself to other people as much as I do.” (p.32)

The Activity part including a question and response discussion, watching a video and talking about it, sharing and hearing the ideas of others. (AP) were the most valuable according to 6 responses (Figure 1). Some example feedback: “I liked the questions and how they made me reflect on my thoughts and feelings about burnout.” (p.4). “Hearing that other med students feel similarly about our workload to me.”(p.6)

Figure 6.3

A graph to show the frequency of responses as to what part of the workshop participants found valuable.



Note. BBRF: learning about the burnout definition, the common symptoms and risk factors for burnout, the prevalence of burnout for university students; SCMH: learning about the connection between academic social comparisons and mental health, the definition of upward downward comparisons, the connection between upward comparisons and mental health, academic social comparisons among university students; TAASC: the tips and activities to decrease the harmful effects of adverse academic social comparisons; AP: a question and response discussion, watching a video and talking about it, sharing and hearing the ideas of others.

2. Learning Level of Kirkpatrick Evaluation Tool

2.1. What specific knowledge or skills did you acquire during the workshop?

A total of 45 written responses were classified into three categories based on the subtitles of the sections in the workshop (Table 6.4). There were 26 responses who indicated that they had learned knowledge and skills about the tips and activities to decrease the harmful

effects of adverse academic social comparisons (TAASC). They indicated this by referring to concepts including gratitude, appreciation, self-compassion, the thought-emotion connection, as well as asking for advice from others. Some example quotations showing the knowledge and skills participants gained:

“It's useful to ask others around you for advice and comparison can be beneficial if you have a positive attitude.”(p.10)

“Taking others success as an opportunity as to how you can do better instead of that you are not good enough. It's about how you approach not doing so well and changing your mindset.”(p.37)

“Goal planning, self-compassion, framing comparisons more positively, specific studies on the rates of burnout and other symptoms, my own strengths and weaknesses academically and how to improve them.”(p. 35)

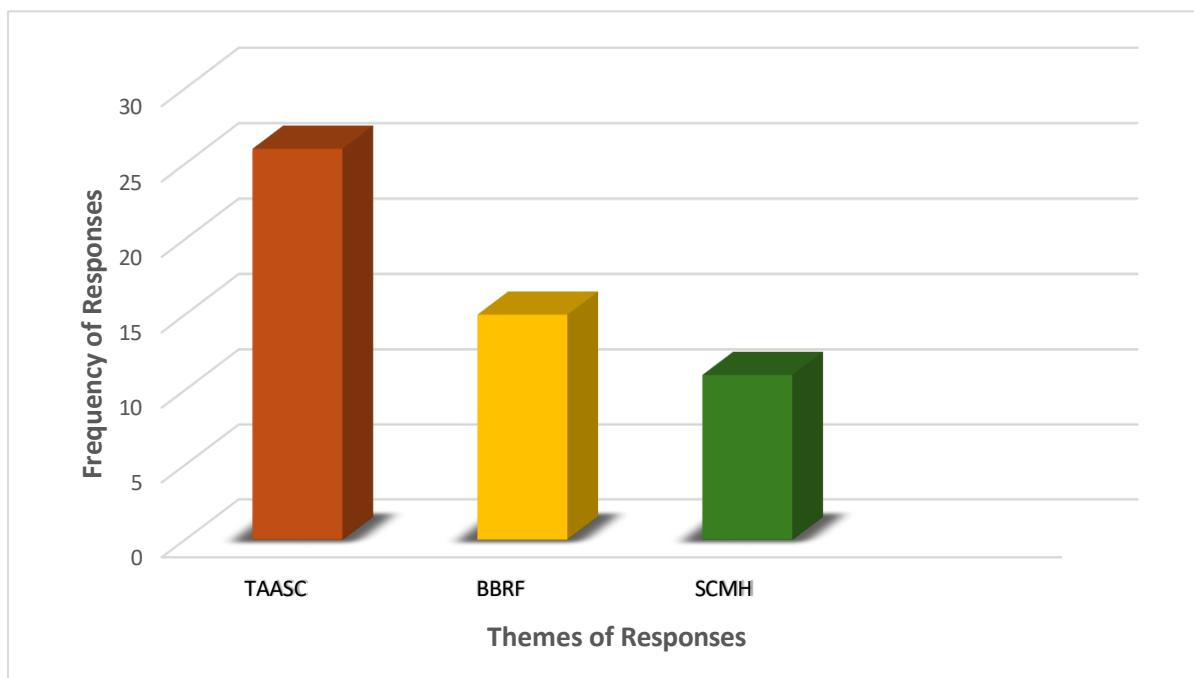
There were 15 responses where participants reported that they had gained knowledge about the burnout definition, the common symptoms and risk factors for burnout, and the prevalence of burnout for university students (BBRF). Following are a few comments provided by participants regarding this section: “I learnt that there are contributing factors to burning out other than workload.”(p.25) “Causes or risk factors for burnout, skills to deal with and reduce burnout as well as the effects of social comparison on burnout.”(p.21)

A further 11 responses indicated that they acquired knowledge or skills about the connection between academic social comparisons and mental health, the definition of upward downward comparisons, the connection between upward comparisons and mental health, academic social comparisons among university students (SCMH) (Figure 6.4). An example comment from a participant is provided below:

“The widespread experience of social comparisons between individuals in my year group and the different responses that each member of my group had to how they compared themselves to others. It was interesting to hear how each person individually compared themselves to others and how they learnt from their experiences.”(p.28)

Figure 6.4

A graph to show the frequency of responses as to what specific knowledge or skills participants acquired during the workshop



Note. BBRF: learning about the burnout definition, the common symptoms and risk factors for burnout, the prevalence of burnout for university students; SCMH: learning about the connection between academic social comparisons and mental health, the definition of upward downward comparisons, the connection between upward comparisons and mental health, academic social comparisons among university students; TAASC: the tips and activities to decrease the harmful effects of adverse academic social comparisons.

2.2. Did the workshop provide practical tools and strategies that you will use?

Participants responded to this question as yes except for one student responding as no. A total of 18 participants gave a response as “yes” without mentioning specific tools and strategies. We categorized the responses of participants giving detailed feedback. A total of 27 responses indicated the practical tools and strategies that participants will use.

The Gratitude activity (being grateful for academic strengths and thinking about improving academic weaknesses) was the most useful according to 8 responses. An example comment by a participant: “Learning to be more grateful and highlight some of my strengths”(p.6). Appreciation (writing academic goals and progress in academic goals) were the most useful in 7 responses. A comment by a participant: “Focusing on your own goals rather than looking at other people”(p.36). Having a balanced routine was indicated in 4 responses. The feedback from a participant: “When using other people as motivation, have a balance of chilling and working as otherwise, that could lead to burnout.” Self-compassion, challenging thoughts in academic social comparisons, asking others for help were indicated by 6 responses. An example quoted by a participant: “Yes, such as using self-compassion to reduce stress related to social comparison.”(p.21)

3. Behaviour Level of Kirkpatrick Evaluation Tool

3.1. Do you think the workshop will influence your future behaviours? Explain how?

All participants apart from one participant responded that the workshop will influence their future behaviours. A total of 40 written responses, (in addition to simple n= 1 yes and n = 1 no responses as well as unclear responses n = 3), were categorised into four groups based on the titles of the sections in the workshop (Figure 6.5). Participants gave detailed responses. According to responses, increasing awareness about academic social comparison and being aware of approaches towards academic social comparisons (thought-emotion connections)(n = 24) will help to improve participants’ future behaviours. Some

feedback by participants:

“I will be less hard on myself when comparing myself with other people as I struggled with doing that when I started medicine.”(p.17)

“Yes, I will be more aware of how I feel when I compare myself to others”(p.36)

“I will be more mindful on how I view myself in front of my high achieving peers.”(p.16)

“Definitely - I’m going to make a conscious effort to respond positively to upwards comparison (like Mark in the first story). We can’t help comparing ourselves with other people but we can choose how we respond. I will use future comparisons as inspiration/motivation to work harder and improve myself.”(p.26)

According to participants’ responses, being aware of burnout and burnout symptoms (n = 9) will also help to improve future behaviours. Some examples are below:

“Yes, I will be more conscious of burnout and use the work-life balance ideas to prevent it. I will also be cautious of how I compare myself to others.”(p.33)

“Yes, I will be able to identify my burnout.”(p.12)

In addition to them, things they learnt in the workshop such as mental health strategies in general (n = 6), the appreciation exercise (n = 5), the gratitude exercise (focusing on academic strengths and improving academic weaknesses) (n = 4), the importance of improving time- management (n = 5), understanding the importance of a balanced work-life routine (n =3), sharing challenges with peers and learning about study strategies of peers (n = 2) might change participants’ future behaviours. Some responses from students are below:

“Yes as I know how to improve myself.”(p.1)

“Yes - As I have now learnt the use of gratitude and comparing yourself to your past

self with helps eliminate the perceived competition in medical school.”(p.9)

“I feel like an important factor I’ve learnt today is time management and timetables.

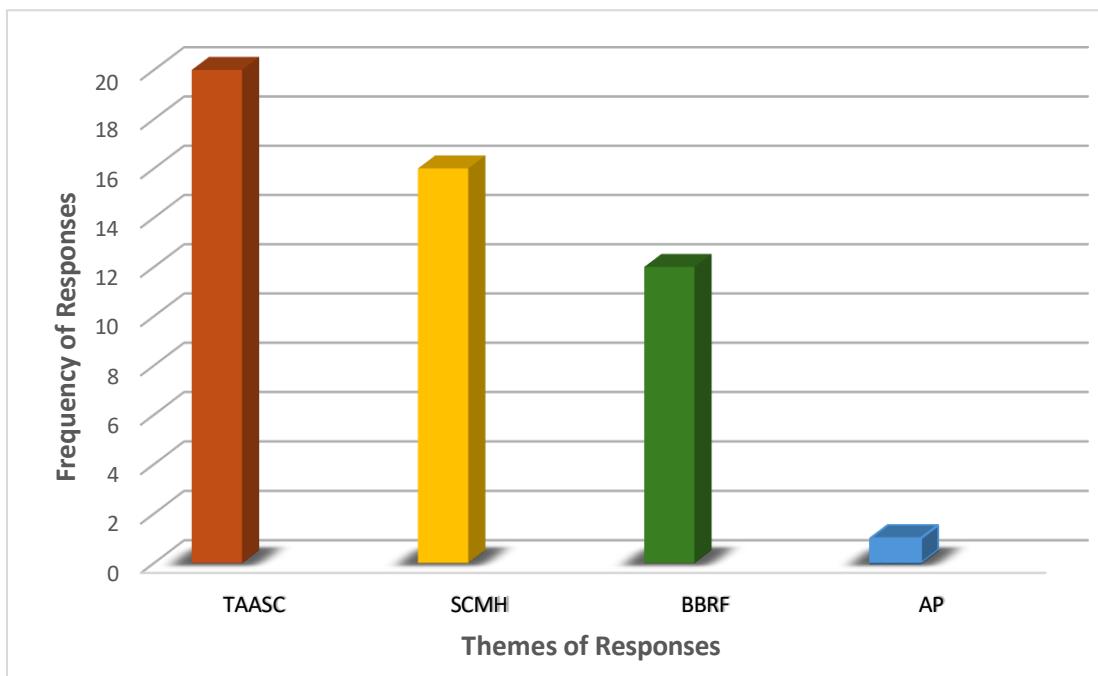
I normally set myself timetables which are unrealistic and have too many things to do. I have now learnt that I should be smarter while making timetables and not just dump everything I can think of into them.”(p.24)

“Yes, I will try to be more open to what others do in terms of studying and try

to employ their strategies in my own learning.”(p.10)

Figure 6.5

A graph to show the frequency of responses as to how the workshop will influence participants's future behaviours



Note. BBRF: learning about the burnout definition, the common symptoms and risk factors for burnout, and the prevalence of burnout for university students; SCMH: learning about the connection between academic social comparisons and mental health, the definition of upward downward comparisons, the connection between upward comparisons and mental health, academic social comparisons among university students; TAASC: the tips and activities to decrease the harmful effects of adverse academic social comparisons.; AP: Activity Part (a question-response discussion part, watching a video and talking about it, sharing and hearing the ideas of others)

4. Results Level of Kirkpatrick Evaluation Tool

4.1 Do you think the workshop will benefit university students? If yes, how can it contribute?

The majority of participants (apart from one participant) thought that the workshop would benefit university students. One participant (Participant 8) suggested more substance on how exactly comparison can impact mental health to make the workshop beneficial for university students. We categorised 43 participants' responses based on the titles in the workshop. There were 26 responses indicating that university students can benefit from learning about burnout definition, the common symptoms and risk factors for burnout, and the prevalence of burnout for university students.

“Yes, being aware of burnout will help to prevent it.”(p.11)

“Yes, making them aware of risk factors of burnout and how to combat it.”(p.16)

A total of 15 responses indicated that the workshop can change their approach to academic social comparisons and it can increase awareness about social comparisons.

“yes as it can show them ways to cope and give them an awareness of academic social comparisons.”(p.14)

“yes - makes them aware that this is a very common phenomenon and they aren't on their own. the student confessions related to academic social comparisons from previous medical students especially was very enlightening.”(p.17)

A total of 8 responses indicated that the workshop can help university students learn about tips and activities to decrease the harmful effects of academic social comparisons. Some examples from responses:

“Yes, it is highly relevant to students and can help to improve academic performance

through self-awareness, goal setting, and understanding of burnout, especially burnout caused by social comparisons.”(p.35)

“Yes. It can allow students to actively understand themselves better and become better learners in general. Not enough time is spent on students and how they can improve themselves. Especially in active workshops as opposed to lectures.”(p.27)

4.2. Do you think are there any suggestions to improve the workshop?

They had some useful suggestions such as increasing the length of the workshop, more time for self-reflective interactions, discussions, activities and to share their ideas.

Some of the responses are below:

“I really liked the self-reflective interactive moments where we were asked to speak as a group. More of that would be great but not necessary.”(p.28)

“No I thought it was very well organised and i enjoyed having both the presentation and the interactive sections.”(p.31)

“Very good workshop, nothing really needed in my opinion that would improve it.”(p.27)

“Longer workshop duration to cover more and have more group discussions.”(p.15)

“Include more on the short-term and long-term effects of academic social comparisons”(p.13)

“More examples of how to stop burnout before it starts.”(p.43)

“More workshops. It is amazing!”(p.44)

Discussion

This pilot workshop was an initial stage in the development of future interventions to improve sleep and mental health of university students, which can involve social

comparisons and related factors. It helped to gain an understanding of the value and benefits of a workshop, including academic social comparisons according to university students and determine the necessity of it for prospective students. It also enhanced knowledge and awareness concerning academic social comparisons as a potential contributor to burnout among participants, as well as providing participants with strategies to cope with negative academic social comparisons and be able to avoid burnout in the future.

The results are further discussed about the four levels of the Kirkpatrick Evaluation Tool (Kirkpatrick, 1996), and we have designed a toolkit to share with colleagues who work to support student well-being (Appendix G). The toolkit can be used by anyone to enhance the psychological well-being of university students (e.g., mental health support services, researchers, lecturers). It includes guidelines to deliver this workshop to university students. There are a variety of recommendations from planning the workshop (e.g., recruiting the participants for the workshop, the number of students in a group) to conducting the workshop (e.g., conducting didactic and activity parts).

Reaction Level of the Kirkpatrick Tool

The relevance score of the workshop for participants was quite high. More than half of the participants found it highly relevant to them. According to qualitative feedback in the reaction level of Kirkpatrick Tool, the most valuable part was the tips to decrease adverse social comparisons. This clearly aligns with the workshop's second objective. A minority of the participants (15.5%) expressed they found value in the sections addressing social comparisons more directly. There were only a small number of participants who stated that they do not commonly engage in academic social comparisons. These few students felt that the content was not relevant to them, and it had no impact on their levels of burnout, based on their comments through the workshop. This reveals that the effects of academic social comparisons are subject to individual variations such as personality (Olson & Evans, 1999;

Giordano et al., 2000), and the significance of the social comparison component to an individual (Thwaites & Dagnan, 2004). However, it remains an important factor for the majority of students like it was indicated in previous studies (Wheeler Miyake, 1992; Anto et al., 2023).

Learning Level of Kirkpatrick Tool

More than half of the participants (57.7%) indicated that they learned strategies to decrease the adverse effects of academic social comparisons and to decrease burnout. The most useful strategies were gratitude (writing academic strengths), appreciation (writing goals and their progress towards goals) and having a balanced routine respectively. Future workshops can take into account these strategies to help students to overcome the adverse effects of academic social comparisons on burnout. As a limitation of this level, we could not assess the learning through pre-workshop and follow-up questionnaires. Also, we could not include more comprehensive strategies and activities because of the short length of the workshop. Increasing the length of the workshop and including self-compassion (Choi et al., 2014) and time management activities (Pulford et al., 2018) to alleviate the negative effects of academic social comparisons might be useful in future workshops.

Behaviour Level of Kirkpatrick Tool

The majority of the participants thought that the workshop could influence their future behaviours because it helped to increase their awareness of academic social comparisons and made them aware of approaches towards academic social comparisons. Over half of the participants (53%) provided comprehensive and detailed responses. The feedback in this section aligns with the primary objective of the programme, which is to enhance awareness regarding academic social comparisons and burnout. Furthermore, this feedback is in line with the existing body of knowledge on mental health literacy. Enhancing one's knowledge contributes to the recognition of symptoms, reduces the frequency of

symptoms, and increases the probability of seeking support (Wei, et al., 2015). Participants can change their behaviours in the future by utilising the knowledge as well as techniques provided during the workshop. However, as a limitation, the question in this section could be open-ended to get more detailed responses from all participants. Some participants provided brief responses like “Yes” to the question at this level: “Do you think the workshop will influence your future behaviours? Explain how?” As another limitation, follow-up data is lacking to provide evidence showing specific changes in the behaviours of participants in the future. Future studies might consider these limitations.

Results Level of Kirkpatrick Tool

All students, except for one student, thought that the workshop would be beneficial for future university students. A majority of the students (60.46%) stated their opinion that prospective students would benefit from gaining knowledge about burnout definition, the common symptoms and risk factors, and the prevalence of burnout among university students. A small proportion of participants (18.6%) expressed that the workshop could alter prospective students’ attitudes to academic social comparisons, and it can increase awareness about social comparisons. In addition, various insightful suggestions were provided to enhance the workshop. It focused primarily on extending the workshop so that more people could express their views and hear those of their peers.

General Limitations

One key limitation of this workshop study was the absence of pre-workshop and follow-up assessments measuring academic social comparisons and burnout. The use of a control group design along with pre- and post-tests would have enhanced the ability to evaluate the workshop's effectiveness and strengthened the reliability of the findings. The current design limited evaluation to the behavioural level of the Kirkpatrick Evaluation Tool,

focusing only on the expected and possible behavioural changes, rather than objectively measuring outcomes.

A further constraint was the variability in group size across the sessions, as these were arranged based on the students' schedules. For example, in sessions with more than three participants, time constraints made it difficult to deliver the full content without compressing the material. As a result, not all participants had the opportunity to share their thoughts and experiences. In the future, extending the duration of the workshop could allow for a more comprehensive delivery, which might include the addition of sleep-related recommendations. Further limitations included the potential that the content of the workshops was not fully understood, as the workshops were designed and conducted by a non-native speaker. It could also be important in any future workshop to include a measure of participants' comprehension of the workshop content and evaluation questions at the end of the workshop. In addition, the presence of the researcher during the completion of the final questionnaire may have introduced social desirability bias, potentially pressuring participants to provide expected or favourable responses, despite the anonymity of the survey. These limitations should be addressed in future iterations of the workshop. Finally, it is important to acknowledge that the relationship between academic social comparisons and student burnout may vary according to several factors related to the individual (e.g., Olson & Evans, 1999; Giordano et al., 2000), the personal relevance of social comparison (Thwaites & Dagnan, 2004), and the competitiveness of the academic programme (Picton et al., 2022). These variables should be taken into account in future research on burnout.

In conclusion, the workshop was successful in increasing awareness around burnout, academic social comparisons, and mental health. This increased awareness may contribute to positive behavioural changes, such as identifying early symptoms of burnout and recognising social comparisons as a potential risk factor. However, there is currently a lack

of empirical evidence demonstrating whether this knowledge leads to a reduction in burnout symptoms or whether participants are able to apply the strategies discussed in their everyday lives.

CHAPTER 7**GENERAL DISCUSSION AND CONCLUSION**

General Discussion and Conclusion

This discussion section contextualises the findings within the current research and perspectives on sleep, social development, and mental health during the transition to university. In addition, the strengths and limitations are presented, and methods are outlined to expand the understanding of the subject. Finally, it provides original contributions to the understanding of student mental health and outlines directions for future research.

Overall, this research indicates the importance of taking into account school-based subjective social status and social comparisons with peers and related factors to improve the sleep and mental health of students at the point of transition to university. To the best of our knowledge, the study in Chapter 3 is the first to investigate the changes both in school-based subjective social status and sleep in the transition to university, and the connection such change has with mental health. The systematic review and the pilot workshop reported in Chapters 5 and 6, respectively, support the inclusion of the mentioned social factors in programmes and interventions aimed at addressing sleep and mental health issues among university students. The findings are discussed in relation to the literature reviewed in previous chapters and the theoretical frameworks previously introduced.

Study 1: Subjective Social Status, Sleep and Mental Health in the First Six Months of University

The results of the study, as presented in Chapter 3 were broadly consistent with the initial hypothesis. Our initial hypothesis proposed that a decrease in subjective social status in the transition to university, disruption in sleep and a greater eveningness profile would predict higher levels of anxiety and depression. The findings align with previous studies on adolescents and university students, which also observed a relationship between lower subjective social status and poorer sleep quality (Goodin et al., 2010), as well as worse

mental health outcomes (Rubin et al., 2016; Loeb & Hurd, 2019). The social rank theory and the social competition theory of depression posit that depression arises from the perception of oneself as having a lower social status than others or lacking control over one's social standing (Price et al., 1994). The current findings of this connection between lower subjective social status and poorer mental health are therefore consistent with these models.

The literature also provides substantial evidence supporting the link between sleep quality, chronotype, and mental health. Several studies have addressed the connection between poorer sleep quality and worse mental health in university students. These include a systematic review of university students in six countries (Dinis & Bragança, 2018), a longitudinal and interview study (Orzech et al., 2011) and a quantitative study (Milojevich & Lukowski, 2016), all of which were previously described in Chapter 1. A recent longitudinal study by Zou et al. (2020), discussed in Chapter 1, also investigated the relationship between sleep quality in university students and the development of depression and anxiety. The findings revealed that lower sleep quality was associated with a higher likelihood of experiencing depression and anxiety one year later. Furthermore, results showed that students who initially reported no mental health issues experienced poor sleep quality, exhibited elevated levels of anxiety after one year. The connection between eveningness and mental health is also supported by Au and Reece (2017) and Van Den Berg et al. (2018). They stated that individuals who prefer evening activities are more likely to develop more severe mood disorders. Au and Reece (2017) further suggested that chronobiological techniques may be effective in the prevention and management of depressive disorders.

A significant aspect of this study is its comparative analysis of changes in perceived social status, sleep quality, chronotype, and mental health among university students during and after the pandemic. The outbreak of the pandemic made the transition to university

exceptional for first-year university students due to social distancing rules and restrictions on social gatherings, which adversely impacted their social lives. Fruehwirth et al. (2021) noted that social isolation and distance learning exacerbated depression and anxiety among university students. In line with this, the levels of anxiety and depression among first-year university students increased during the pandemic in the current study. This may be attributed to a rise in eveningness over the first six months at university and the poor quality of sleep reported at the start of university. Following the pandemic, the initially high levels of anxiety and depression decreased, sleep quality remained relatively stable, and eveningness did not rise as markedly as it had during the pandemic.

Although the increase in magnitude of change in perceived social status was greater during the pandemic period compared to the post-pandemic period, low sleep quality at the beginning of university, and increased eveningness during the pandemic, emerged as significant predictors of heightened levels of depression and anxiety. Mediation analyses further demonstrated that sleep quality mediated the relationship between perceived social status and mental health outcomes. Nevertheless, an important limitation of the current study is the omission of social isolation and loneliness, factors identified by Fruehwirth et al. (2021) and Evans et al. (2021) as critical influences on mental health during the pandemic, which were not assessed in this study. Higher levels of loneliness and insufficient social connection may have significantly weakened individuals' perception of their social status and may also have been associated with sleep difficulties. Thus, the mediating effect of sleep quality on the relationship between perceived social status and mental health may be partially explained by the unexplored impact of social isolation and loneliness. Furthermore, this may explain the variation in PSQI reliability scores during the lockdown time.

Furthermore, although data were collected regarding whether students lived in shared housing during the pandemic, it remains unclear whether students were residing with family

members or peers at the second measurement point during the pandemic period, given the disruptions caused by school closures, lockdowns, and the transition to online education. Future research should therefore consider including such variables as a change to online teaching to more comprehensively elucidate the complex interplay between sleep, perceived social status, depression, and anxiety. It is plausible that social isolation from an increase in blended learning in teaching may impair sleep quality, diminish subjective social status, and consequently exacerbate symptoms of depression and anxiety.

In this study several other important variables were measured, although some were assessed only during the post-pandemic period. These included alcohol consumption, objective indicators of social status (e.g., receipt of low-income grants or scholarships, eligibility for widening participation activities), and whether students began living with peers for the first time, all of which may have significant implications for sleep, perceived social status, and mental health. Main analyses revealed no differences between students who received low-income grants and those eligible or ineligible for widening participation based on objective socioeconomic status markers. However, a comparison of alcohol consumption, ethnic groups, faculties and departments as well as the variable about living with peers for the first time was not possible due to the small number of participants in groups.

Study 2: A Systematic Review of Sleep and Mental Health Interventions

This systematic review showed that programs aimed at improving sleep and mental health in university students do not explicitly consider factors such as perceived subjective social status among peers and social comparisons, despite their implications for mental health during adolescence. This finding aligns with existing literature, which highlights a lack of research addressing psychological processes related to social status in university students. For example, Lansu and Cillessen (2012) noted that while considerable research has examined peer status in childhood and adolescence, there is limited information on social

status within peer groups in emerging adulthood (ages 18–25). Although the definition of popularity, which is a domain of the broader construct of subjective social status, and how it is characterised may change from high school to university (O'Mealey & Mayeux, 2022), it continues to be highly valued by university students. Many studies have demonstrated links between perceived social status and sleep, even after accounting for objective social status (Jarrin et al., 2014; Huynh & Chiang, 2016), as well as with mental health outcomes (Russell & Odgers, 2020; Van der Aar et al., 2018). Given the connections between perceived social status, sleep, and mental health, integrating strategies related to subjective social status into interventions could help improve their effectiveness. Therefore, this systematic review makes an important contribution by evaluating whether interventions designed for university students address perceived social status and social comparisons.

However, it is important to acknowledge several limitations that may have influenced the scope of the findings presented in this review. As part of the inclusion criteria, this systematic review only included studies in English and did not involve databases such as grey literature. In addition, it focused on studies that included both sleep and mental health outcomes, thereby excluding those that assessed only one of these outcomes. However, two articles that initially stated they measured sleep (Friedrich et al., 2018), depression and anxiety (Gellis et al., 2013) were included, even though they ultimately did not report the relevant results. Comprehensive reporting of results is important for reducing the risk of reporting bias associated with publishing only significant findings. In addition, the included studies were not suitable for quantitative evaluation due to insufficient homogeneity in intervention type and content, participant groups, and measurement methods. As a strength of this review, backward (reference checking) and forward citation searching (in Google Scholar) were conducted, in addition to screening 515 studies included in a systematic review on university students and sleep. Also, a second reviewer independently reviewed 10% of

the articles retrieved from the databases. This enhanced the reliability of the systematic review reported here.

Study 3: Workshop on Academic Social Comparisons and Burnout

The pilot workshop conducted within the scope of this thesis revealed that incorporating academic social comparison and related factors into mental health interventions would be beneficial. Participants found the academic social comparisons and burnout workshop relevant to themselves and their university life experiences. More than half of the participants stated that they learned tips and activities to avoid the negative effects of academic social comparison, and this was reported as the most valuable part for most of the participants. In addition, the majority of the participants stated that awareness of academic social comparisons would help them change their behaviour in the future. All of this feedback emphasises the need to take academic social comparisons and their links to mental health into account among university students. This is consistent with the first hypothesis, defined based on the exploratory analysis of the data (Appendix E), as well as previous studies showing links between academic social comparisons and mental health in university students (Wheeler & Miyake, 1992; Anto et al., 2023).

However, to determine whether the academic social comparison workshop leads to subsequent changes in cognition and behaviour, follow-up data from a feasibility study are required. The inclusion of a control group would also be necessary to enhance the reliability of the findings. A clearer understanding of the workshop's effectiveness could be gained by comparing the intervention group that received the workshop training with a control group. Additionally, experimental studies could provide a more robust understanding of the impact of strategies aimed at reducing social comparison cognitions, for example, by investigating their effects on affect, sleep, and overall well-being because self-report measures may not have accurately captured the full scope of the workshop's benefits. Participants may have

provided biased responses to the evaluation questions provided at the end of the workshop, influenced by the presence of the researcher in the room or a perceived expectation to give socially desirable responses. It may also be beneficial to formally evaluate the quality of the workshop presentation and its questions to ensure clarity and comprehension, or to involve a second observer in assessing the workshop. In addition, the workshop was conducted multiple times to accommodate students' schedules. Although the content of the workshop remained consistent across sessions, factors such as the group size in each session and the delivery of the presentation may also have effected the evaluation of the workshop. For instance, students in smaller groups may have had more opportunities to engage actively in the sessions, potentially enhancing their experience and benefits from the workshop. Additionally, participants were informed during recruitment that they would receive a £15 Amazon voucher as compensation for their time upon completing the workshop, which may have influenced their decision to participate. Monetary incentives are known to have an impact on participation decisions (Abdelazeem et al., 2022; Bentley & Thacker, 2004), however, it is not known to what extent they impacted responses to evaluation questions at the end of the workshop.

In summary, although the workshop had some limitations, it was valuable for raising awareness about the connections between academic social comparisons and mental health and helping students develop strategies to cope with negative social comparisons. Incorporating social comparison and related factors into future sleep and mental health interventions for university students may enhance effectiveness. In addition, any future workshop developed as an intervention can be structured as a series of sessions. It can address the links between sleep and social comparisons in more detail. Also, more time can be allocated to the existing strategies, and homework assignments could be included to support their implementation.

Strengths of Studies in this Thesis

The inclusion of students from various faculties in both the first study about subjective social status, sleep and mental health and the pilot workshop study enhanced the generalizability of the findings to university students across different faculties, as opposed to the results only being relevant to a particular subgroup or subject discipline. Employing several data-gathering techniques, such as surveys (main study), and qualitative data (workshop report) improved the credibility of the findings by providing an exhaustive perspective and verifying the data through cross-validation. Utilising two cohorts in the first study reduced the influence of situational elements (e.g., COVID-19) that could distort outcomes if only a single cohort were considered. In summary, the study's methodological strengths enabled it to provide a detailed understanding of the relationships between variables, offering valuable knowledge to the area. Another strength was to measure subjective social status by using a school-based subjective social status scale (Sweeting et al., 2011). As indicated in Chapter 1, peers gain greater importance in adolescence, so it is important to understand subjective social status compared to peers instead of society.

Limitations of Studies in this Thesis

Although the included studies have various notable strengths, they are not exempt from limitations, as with all previous studies. In this section, we will address the limitations that we recognise. An important limitation concerns the recruitment of participants. In both the main study and the workshop study, we used a non-probability sampling method that included sending email invitations, distributing flyers, using advertisement boards, and employing snowball sampling. Specific features may exist among students more inclined to accept this particular invitation than the wider student population. A potential limitation of the snowballing method is the inclusion of participants with similar characteristics. Nevertheless, the use of diverse non-probability sampling techniques (not just snowballing)

can be considered a strength of the study.

Also, we offered participants an Amazon voucher as compensation for their time. There is a possibility that this incentive may have motivated their participation. Another limitation is the data collection method. The questionnaire data were gathered using the web platform Qualtrics in both studies, with participants independently completing the surveys. Although surveys in online platforms have some advantages, they have challenges, again related to the characteristics of those who do or do not respond (Nayak & Narayan, 2019), and in terms of providing meaningful responses to questions (Douglas et al., 2023). However, online surveys offer several advantages, including easier access to participants, the ability to reach larger sample sizes, reduced costs, more timely data collection, improved data reliability, and enhanced participant anonymity (Rice et al., 2017). It is also important to note that the measures rely on individuals' subjective assessments; however, measures with high reliability and validity, which are frequently used in studies involving university students, were employed. It is recommended to use experimental data with objective measurements (e.g., actigraphy) to have a deeper understanding of this topic, and qualitative research to investigate actual life experiences. As another point regarding measurement, although the PSQI is a highly reliable and widely used measurement, its reliability scores were low in the first study (Chapter 3). This finding may be related to students reporting varied and atypical sleep patterns during the pandemic.

Another important limitation is that we did not control some significant confounding variables that might affect mental health in the first study. For example, preparedness, flexibility to cope with the challenges of transitioning into higher education, and engagement with academic and educational activities were some factors impacting the mental well-being of university students according to the recent systematic review regarding the factors impacting the mental well-being of university students in the UK (Campbell et al., 2022).

Some other studies reported that social support (Hefner & Eisenberg, 2010), academic demands and examination period (Lund et al., 2010; Garett et al., 2017; Brown, 2017) were connected to the mental health of university students. In addition to that, in Lund et al.(2010)'s study on a large population of university students, the majority of students expressed that both emotional and academic stress had a detrimental effect on their sleep. These important possible confounding variables on the sleep and mental health of university students should be considered in future studies. Due to the absence of measurements or questions relating to these variables in our investigation, we were unable to account for them in the analysis. Future research should consider these variables to conduct a more in-depth investigation of this hypothesis.

We conducted both studies only at Lancaster University, where approximately 80% of students as White ethnicity. Results, therefore, might not be applicable across universities characterised by greater ethnic and socioeconomic diversity, given that social status outcomes have been shown to vary across different ethnic groups. Undertaking future study in different institutions with higher levels of diversity would be beneficial for comprehending changes in perceived social status, sleep patterns, and mental well-being among minority populations and to understand the needs to develop interventions regarding this.

Finally, the main study was completed during the COVID-19 pandemic, where social restrictions created a highly unusual social environment for students. Although it is worth noting that the results were broadly consistent with prior research on the link between social status, sleep and mental health, it was clear that there were some anomalous findings potentially linked to the imposing and lifting of restrictions. This raises questions about what factors related to the types of social interactions (e.g., proximity, frequency, duration) are predictors of social status-related phenomena.

Theoretical Perspectives

The studies conducted as a part of the thesis are grounded in social comparison theory and social rank theory to explain depression and anxiety experienced by university students. As described in Chapter 1, according to social comparison theory, people have a natural tendency to assess their worth by engaging in comparisons with others. Self-comparison to someone considered superior in certain aspects can result in both inspiration and aspiration, as well as emotions of inferiority and discontentment. Individuals engage with social comparison as a way to decrease uncertainty regarding their own beliefs, skills, and feelings, and to enhance their self-assessment (Festinger, 1954). Social comparison theory is aligned with Cognitive Behavioural Theory, which explains anxiety and depression in terms of negative thought patterns and inadequate coping mechanisms. Social rank theory, which is driven by an evolutionary approach, highlights the significance of social hierarchies and rank in both human and animal behaviour. People are responsive to their social hierarchy and position within a group, which impacts their psychological well-being and behaviour. According to this theory, there is a connection between having a lower social status and experiencing increased levels of stress, anxiety, and depression. Depression and anxiety are explained by various theories such as biological theory, cognitive behavioural theory and psychoanalytic theory, apart from social comparison theory and social rank theory. Social comparison theory and social rank theory do not consider however the effects of genes, hormones and neurotransmitters as in biological theories. They are limited in this regard. It is clear, therefore, that a modified biobehavioural theory should be proposed that incorporates current understanding from developmental social neuroscience to explain social comparison processes in later adolescence and early adulthood, and how they might relate to the risk of burnout and psychopathology.

Conclusion

The research conducted in this thesis has provided a novel insight by uncovering a connection between changes in perceived social status throughout the transition to university and both sleep and mental health. Additionally, the findings of the systematic review suggest that interventions should incorporate elements related to social status and social comparison in order to reduce the risk of poor mental health among university students. The pilot workshop report was an important first step towards considering perceived social status, particularly academic social comparisons, in future interventions for university students. Further research should be conducted to potentially develop targeted interventions that equip students with strategies to reduce their involvement in adverse social comparisons and improve their mental health from the start of their training. The development of novel interventions is not required but some interventions such as cognitive behavioural therapy, and self-compassion therapy for students might be beneficial. Furthermore, additional investigations could explore the potential impact of training programmes that consider subjective social status and social comparisons on university students' sleep quality and mental well-being while providing them with techniques to mitigate negative social comparisons. The results could also provide valuable insights for mental health support services, researchers, charities, as well as other interested parties.

Some practical implications can be recommended to support student mental health and well-being according to the findings in this thesis. University student support services can organise educational events at the transition to university to help students understand perceived social standing, social comparisons and their connection with sleep and mental health. The practices implemented in the workshop study would be beneficial to instruct them to challenge their thoughts to mitigate negative social comparisons, to help recognise strengths and unique qualities, to cultivate gratitude for these attributes, and to encourage

appreciation of their progress while promoting self-compassion. In addition, social determinants of health, as indicated in the comprehensive studies by Marmot and Wilkinson (2005), should be considered in the context of social comparisons. Future studies can further explore the effects of relative deprivation and income inequality on social comparisons in the university environment.

References

Abdelazeem, B., Abbas, K. S., Amin, M. A., El-Shahat, N. A., Malik, B., Kalantary, A., & Eltobgy, M. (2022). The effectiveness of incentives for research participation: A systematic review and meta-analysis of randomised controlled trials. *PloS One*, 17(4), e0267534.

Adams, K. L., Saunders, K. E., Keown-Stoneman, C. D. G., & Duffy, A. C. (2021). Mental health trajectories in undergraduate students over the first year of university: A longitudinal cohort study. *BMJ Open*, 11(12), e047393.

Adams, S. K., Murdock, K. K., Daly-Cano, M., & Rose, M. (2020). Sleep in the social world of college students: Bridging interpersonal stress and fear of missing out with mental health. *Behavioral Sciences*, 10(2), 54.

Adams, S. K., Williford, D. N., Vaccaro, A., Kisler, T. S., Francis, A., & Newman, B. The young and the restless: Socializing trumps sleep, fear of missing out, and technological distractions in first-year college students. *International Journal of Adolescence and Youth*, 22(3), 337-348.

<https://doi.org/10.1080/02673843.2016.1181557>.

Adan, A., Archer, S. N., Hidalgo, M. P., Di Milia, L., Natale, V., & Randler, C. (2012). Circadian typology: a comprehensive review. *Chronobiology International*, 29(9), 1153-1175.

Adler, N. E., Epel, E. S., Castellazzo, G., & Ickovics, J. R. (2000). Relationship of subjective and objective social status with psychological and physiological functioning: Preliminary data in healthy, White women. *Health*, 19(6), 586.

Adler, M. G., & Fagley, N. S. (2005). Appreciation: Individual differences in finding value and meaning as a unique predictor of subjective well-being. *Journal of Personality*, 73(1), 79-114.

Ahmad, N., Alias, F. A., Hamat, M., & Mohamed, S. A. (2024). Reliability Analysis: Application of Cronbach's Alpha in Research Instruments. *Pioneering the Future: Delving Into E-Learning's Landscape*, 114-119.

Akram, U., Irvine, K., Gardani, M., Allen, S., Akram, A., & Stevenson, J. C. (2023). Prevalence of anxiety, depression, mania, insomnia, stress, suicidal ideation, psychotic experiences, & loneliness in UK university students. *Scientific Data*, 10(1), 621.

Allan, G. (2011). Commentary: Friendships and emotions. *Sociological Research Online*, 16(1), 95-99.

Alsalamah, A., & Callinan, C. (2022). The Kirkpatrick model for training evaluation: bibliometric analysis after 60 years (1959–2020). *Industrial and Commercial Training*, 54(1), 36-63.

Altikulaç, S., Bos, M. G., Foulkes, L., Crone, E. A., & Van Hoorn, J. (2019). Age and gender effects in sensitivity to social rewards in adolescents and young adults. *Frontiers in Behavioral Neuroscience*, 13, 171.

Anto, A., Asif, R. O., Basu, A., Kanapathipillai, D., Salam, H., Selim, R., Zaman, J., & Eisingerich, A. B. (2023). Exploring the impact of social media on anxiety among university students in the United Kingdom: qualitative study. *JMIR Formative Research*, 7(1), e43037.

Arigo, D., & Smyth, J. M. (2012). The benefits of expressive writing on sleep difficulty and appearance concerns for college women. *Psychology & Health*, 27(2), 210-226.

Arnett, J. J. (2015). *The Oxford handbook of emerging adulthood*. Oxford University Press.

Ashbrook, L. H., Krystal, A. D., Fu, Y. H., & Ptáček, L. J. (2020). Genetics of the human circadian clock and sleep homeostat. *Neuropsychopharmacology*, 45(1), 45-54.

Au, J., & Reece, J. (2017). The relationship between chronotype and depressive symptoms:

a meta-analysis. *Journal of Affective Disorders*, 218, 93-104.

Avinun, R., Nevo, A., Knodt, A. R., Elliott, M. L., Radtke, S. R., Brigidi, B. D., & Hariri, A. R. (2017). Reward-related ventral striatum activity buffers against the experience of depressive symptoms associated with sleep disturbances. *Journal of Neuroscience*, 37(40), 9724-9729.

Bakker, A. B., Schaufeli, W. B., Demerouti, E., Janssen, P. P., Van Der Hulst, R., & Brouwer, J. (2000). Using equity theory to examine the difference between burnout and depression.

Ball, S., & Bax, A. (2002). Self-care in Medical Education: Effectiveness of health-habits interventions for first-year medical students. *Academic Medicine*, 77(9), 911-917. <https://doi.org/10.1097/00001888-200209000-00023>

Baroni, A., Bruzzese, J.-M., Di Bartolo, C. A., Ciarleglio, A., & Shatkin, J. P. (2018). Impact of a sleep course on sleep, mood and anxiety symptoms in college students: A pilot study. *Journal of American College Health*, 66(1), 41-50. <https://doi.org/10.1080/07448481.2017.1369091>

Becker, S. P., Jarrett, M. A., Luebbe, A. M., Garner, A. A., Burns, G. L., & Kofler, M. J. (2018). Sleep in a large, multi-university sample of college students: sleep problem prevalence, sex differences, and mental health correlates. *Sleep Health*, 4(2), 174-181.

Bentham, C., Daunt, A., Taylor, S., & Simmons, M. (2013). Mental health workshops delivered by medical students in Cambridge secondary schools: an evaluation of learning. *Psychiatria Danubina*, 25(suppl 2), 224-230.

Bentley, J. P., & Thacker, P. G. (2004). The influence of risk and monetary payment on the research participation decision-making process. *Journal of Medical Ethics*, 30(3), 293- 298.

Bergman, T. J., Beehner, J. C., Cheney, D. L., & Seyfarth, R. M. (2003). Hierarchical classification by rank and kinship in baboons. *Science*, 302(5648), 1234-1236.

Bewick, B., Koutsopoulou, G., Miles, J., Slaa, E., & Barkham, M. (2010). Changes in undergraduate students' psychological well-being as they progress through university. *Studies in Higher Education*, 35(6), 633-645.

Bjørnnes, A. K., TorbjørnSEN, A., Valeberg, B. T., Sparboe-Nilsen, B. B., Sandbekken, I. H., Almendingen, K., ... & Grov, E. K. (2021). What is known about students and sleep: systematic review and evidence map. *Sage Open*, 11(3).

Blakemore, S.-J. (2008). The social brain in adolescence. *Nature Reviews Neuroscience*, 9(4), 267-277.

Blakemore, S. J., & Mills, K. L. (2014). Is adolescence a sensitive period for sociocultural processing? *Annual Review of Psychology*, 65, 187-207.
<https://doi.org/10.1146/annurev-psych-010213-115202>

Boissicat, N., Pansu, P., & Bouffard, T. (2020). Does classroom social comparison bias students' evaluation of their own competence? *Social Psychology of Education*, 23(5), 1303- 1326.

Borenstein, M., Hedges, L. V., Higgins, J. P., & Rothstein, H. R. (2021). Converting Among Effect Sizes. In *Introduction to Meta-Analysis*. (pp 43-47). John Wiley & Sons.

Boudreau, D., Santen, S., Hemphill, R., & Dobson, J. (2004). Burnout in medical students: Examining the prevalence and predisposing factors during the four years of medical school. *Annals of Emergency Medicine*, 44(4), S75-S76.

Brandy, J. M., Penckofer, S., Solari-Twadell, P. A., & Velsor-Friedrich, B. (2015). Factors predictive of depression in first-year college students. *Journal of Psychosocial Nursing and Mental Health Services*, 53(2), 38-44.

Brown, J. S. (2018). Student mental health: some answers and more questions. *Journal of Mental Health, 27*(3), 193-196.

Brown, C. A., Qin, P., & Esmail, S. (2017). "Sleep? Maybe Later..." A Cross-Campus Survey of University Students and Sleep Practices. *Education Sciences, 7*(3), 66. <https://www.mdpi.com/2227-7102/7/3/66>

Buboltz, W. C., Loveland, J., Jenkins, S. M., Brown, F., Soper, B., & Hodges, J. (2006). College Student Sleep: Relationship to Health and Academic Performance. In M. V. Landow (Ed.), *College students: Mental Health and coping strategies*. (pp. 1-39). Nova Science Publishers.

Burnell, K. P. (2020). *Adolescents' Social Comparison on Instagram: An Eye-Tracking Study*. The University of Texas at Dallas.

Buunk, B. P., Ybema, J. F., Gibbons, F. X., & Ipenburg, M. (2001). The affective consequences of social comparison as related to professional burnout and social comparison orientation. *European Journal of Social Psychology, 31*(4), 337-351.

Butzer, B., & Kuiper, N. A. (2006). Relationships between the frequency of social comparisons and self-concept clarity, intolerance of uncertainty, anxiety, and depression. *Personality and Individual Differences, 41*(1), 167-176.

Buysse, D. J., Reynolds III, C. F., Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989). The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatry Research, 28*(2), 193-213.

Byrne, J. E., Tremain, H., Leitan, N. D., Keating, C., Johnson, S. L., & Murray, G. (2019). Circadian modulation of human reward function: Is there an evidentiary signal in existing neuroimaging studies? *Neuroscience & Biobehavioral Reviews, 99*, 251-274.

Cage, E., Jones, E., Ryan, G., Hughes, G., & Spanner, L. (2021). Student mental health and

transitions into, through and out of university: student and staff perspectives. *Journal of Further and Higher Education*, 45(8), 1076-1089.

Campbell, F., Blank, L., Cantrell, A., Baxter, S., Blackmore, C., Dixon, J., & Goyder, E. (2022). Factors that influence mental health of university and college students in the UK: a systematic review. *BMC Public Health*, 22(1), 1778.

Carney, C. E., Edinger, J. D., Meyer, B., Lindman, L., & Istre, T. (2006). Daily activities and sleep quality in college students. *Chronobiology International*, 23(3), 623-637.

Carter, J. J., & Vartanian, L. R. (2022). Self-concept clarity and appearance-based social comparison to idealized bodies. *Body Image*, 40, 124-130.

Casey, B. J., Getz, S., & Galvan, A. (2008). The adolescent brain. *Developmental Review*, 28(1), 62-77.

Choi, Y. M., Lee, D.-g., & Lee, H.-K. (2014). The effect of self-compassion on emotions when experiencing a sense of inferiority across comparison situations. *Procedia-Social and Behavioral Sciences*, 114, 949-953.

Choueiry, N., Salamoun, T., Jabbour, H., El Osta, N., Hajj, A., & Khabbaz, L. R. (2016). Insomnia and relationship with anxiety in university students: A cross-sectional designed study. *PloS One*, 11(2). <https://doi.org/10.1371/journal.pone.0149643>

Cohen, J. (2013). *Statistical power analysis for the behavioral sciences*. Routledge.

Collins, R. L. (1996). For better or worse: The impact of upward social comparison on self- evaluations. *Psychological Bulletin*, 119(1), 51.

Collins, R. L. (2000). Among the better ones: Upward assimilation in social comparison. *Handbook of Social Comparison: Theory and Research*, 159-171.

Colrain, I. M., & Baker, F. C. (2011). Changes in sleep as a function of adolescent development. *Neuropsychology Review*, 21(1), 5-21. <https://doi.org/10.1007/s11065-010-9155-5>

Costello, E. J., Copeland, W., & Angold, A. (2011). Trends in psychopathology across the adolescent years: what changes when children become adolescents, and when adolescents become adults? *Journal of Child Psychology and Psychiatry*, 52(10), 1015- 1025.

Crowley, S. J., Acebo, C., & Carskadon, M. A. (2007). Sleep, circadian rhythms, and delayed phase in adolescence. *Sleep*, 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.

Davis, J. A. (1956). Status symbols and the measurement of status perception. *Sociometry*, 19(3), 154-165.

De Coninck, D., Matthijs, K., & Luyten, P. (2021). Depression in Belgian first-year university students: A longitudinal study of self-definition, interpersonal relatedness, mentalizing, and integration. *Journal of Clinical Psychology*, 77(7), 1715-1731.

Deeks, J. J., Higgins, J. P. T., Altman, D. G., McKenzie, J. E., & Veroniki, A. A. (2024). Chapter 10: Analysing data and undertaking meta-analyses. In J. P. T. Higgins, J. Thomas, J. Chandler, M. Cumpston, T. Li, M. J. Page, & V. A. Welch (Eds.), *Cochrane handbook for systematic reviews of interventions* (Version 6.5, updated February 2024). Cochrane. <https://training.cochrane.org/handbook/current>

Dietrich, J. R., Taylor, D. J., Sethi, K., Kelly, K., Bramoweth, A. D., & Roane, B. M. (2016). Psychometric evaluation of the PSQI in US college students. *Journal of Clinical Sleep Medicine*, 12(8), 1121-1129.

Digdon, N. L., & Howell, A. J. (2008). College students who have an eveningness preference report lower self-control and greater procrastination. *Chronobiology International*, 25(6), 1029-1046.

Dinis, J., & Bragança, M. (2018). Quality of sleep and depression in college students: a systematic review. *Sleep Science, 11*(4), 290.

Dodd, R. H., Dadaczynski, K., Okan, O., McCaffery, K. J., & Pickles, K. (2021). Psychological well-being and academic experience of university students in Australia during COVID-19. *International Journal of Research and Health, 18*(3), 866.

Douglas, B. D., Ewell, P. J., & Brauer, M. (2023). Data quality in online human-subjects research: Comparisons between MTurk, Prolific, CloudResearch, Qualtrics, and SONA. *Plos One, 18*(3), e0279720.

Duffy, A., Keown-Stoneman, C., Goolday, S., Horrocks, J., Lowe, M., King, N., Pickett, W., McNevin, S. H., Cunningham, S., & Rivera, D. (2020). Predictors of mental health and academic outcomes in first-year university students: Identifying prevention and early- intervention targets. *BJPsych Open, 6*(3).

Ehlers, C. L., Frank, E., & Kupfer, D. J. (1988). Social zeitgebers and biological rhythms: a unified approach to understanding the etiology of depression. *Archives of Psychiatry, 45*(10), 948-952.

Ehrampoush, M. H., Tabei, S. Z., Mahmoodabad, S. S. M., Fallahzadeh, H., Nami, M., Khayer, E., Ghaemi, S. Z., Matin, M., & Sedighe, F. (2019). A study of comparing two cognitive- behavioral workshop for college students: Sleep, wakefulness program and perseverance program. *Journal of Family Medicine and Primary Care, 8*(3), 1222.

Emmons, R. A., & McCullough, M. E. (2003). Counting blessings versus burdens: an experimental investigation of gratitude and subjective well-being in daily life. *Journal of Personality and Social Psychology, 84*(2), 377.

Evans, S., Alkan, E., Bhangoo, J. K., Tenenbaum, H., & Ng-Knight, T. (2021). Effects of

the COVID-19 lockdown on mental health, well-being, sleep, and alcohol use in a UK student sample. *Psychiatry Research*, 298, 113819.

Fang, J., Huang, X., Zhang, M., Huang, F., Li, Z., & Yuan, Q. (2018). The big-fish-little-pond effect on academic self-concept: A meta-analysis. *Frontiers in Psychology*, 9, 1569.

Festinger, L. (1954). A theory of social comparison processes. *Human relations*, 7(2), 117-140.

Field, A. P., & Gillett, R. (2010). How to do a meta-analysis. *British Journal of Mathematical and Statistical Psychology*, 63(3), 665-694.

Foulkes, L., & Blakemore, S. J. (2016). Is there heightened sensitivity to social reward in adolescence? *Current Opinion in Neurobiology*, 40, 81-85.

Foulkes, L., McMillan, D., & Gregory, A. M. (2019). A bad night's sleep on campus: an interview study of first-year university students with poor sleep quality. *Sleep Health*, 5(3), 280-287. <https://doi.org/10.1016/j.sleh.2019.01.003>

Foulkes, L., Reddy, A., Westbrook, J., Newbronner, E., & McMillan, D. (2021). Social relationships within university undergraduate accommodation: a qualitative study. *Journal of Further and Higher Education*, 45(10), 1469-1482.

Freeman, D., Sheaves, B., Goodwin, G. M., Yu, L.-M., Harrison, P. J., Emsley, R., Bostock, S., Foster, R. G., Wadekar, V., Hinds, C., & Espie, C. A. (2015). Effects of cognitive behavioural therapy for insomnia on the mental health of university students: study protocol for a randomized controlled trial. *Trials*, 16(1), 236-236. <https://doi.org/10.1186/s13063-015-0756-4>

Freeman, D., Sheaves, B., Goodwin, G. M., Yu, L.-M., Nickless, A., Harrison, P. J., Emsley, R., Luik, A. I., Foster, R. G., Wadekar, V., Hinds, C., Gumley, A., Jones, R., Lightman, S., Jones, S., Bentall, R., Kinderman, P., Rowse, G., Brugha, T., Blagrove, M., Gregory, A. M., Fleming, L., Walklet, E., Glazebrook, C., Davies, E. B., Hollis,

C., Haddock, G., John, B., Coulson, M., Fowler, D., Pugh, K., Cape, J., Moseley, P., Brown, G., Hughes, C., Obonsawin, M., Coker, S., Watkins, E., Schwannauer, M., MacMahon, K., Siriwardena, A. N., & 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](https://doi.org/10.1016/S2215-0366(17)30328-0)

Friedrich, A., Claßen, M., & Schlarb, A. A. (2018). Sleep better, feel better? Effects of a CBT-I and HT-I sleep training on mental health, quality of life and stress coping in university students: a randomized pilot controlled trial. *BMC Psychiatry*, 18(1), 268. <https://doi.org/10.1186/s12888-018-1860-2>

Friedrich, A., & Schlarb, A. A. (2018). Let's talk about sleep: A systematic review of psychological interventions to improve sleep in college students. *Journal of Sleep Research*, 27(1), 4-22. <https://doi.org/10.1111/jsr.12568>

Fruehwirth, J. C., Biswas, S., & Perreira, K. M. (2021). The Covid-19 pandemic and mental health of first-year college students: Examining the effect of Covid-19 stressors using longitudinal data. *PLoS One*, 16(3), e0247999.

Galambos, N. L., Dalton, A. L., & Maggs, J. L. (2009). Losing sleep over it: Daily variation in sleep quantity and quality in Canadian students' first semester of university. *Journal of Research on Adolescence*, 19(4), 741-761.

Galambos, N. L., Howard, A. L., & Maggs, J. L. (2011). Rise and fall of sleep quantity and quality with student experiences across the first year of university. *Journal of Research on Adolescence*, 21(2), 342-349.

Galambos, N. L., Vargas Lascano, D. I., Howard, A. L., & Maggs, J. L. (2013). Who sleeps best? Longitudinal patterns and covariates of change in sleep quantity, quality, and timing across four university years. *Behavioral Sleep Medicine*, 11(1), 8-22.

Gangwisch, J. E., Babiss, L. A., Malaspina, D., Turner, B. J., Zammit, G. K., & Posner, K. (2010). Earlier parental set bedtimes as a protective factor against depression and suicidal ideation. *Sleep, 33*(1), 97-106.

Garett, R., Liu, S., & Young, S. D. (2017). A longitudinal analysis of stress among incoming college freshmen. *Journal of American College Health, 65*(5), 331-338.

Gaur, U., Majumder, M. A. A., Sa, B., Sarkar, S., Williams, A., & Singh, K. (2020). Challenges and opportunities of preclinical medical education: COVID-19 crisis and beyond. *SN Comprehensive Clinical Medicine, 2*(11), 1992-1997.

Gerber, J., Wheeler, L., & Suls, J. (2018). A social comparison theory meta-analysis 60+ years on. *Psychological Bulletin, 144*(2), 177.

Gibbons, F. X., & Buunk, B. P. (1999). Individual differences in social comparison: development of a scale of social comparison orientation. *Journal of Personality and Social Psychology, 76*(1), 129.

Gilbert, P. (2000). The relationship of shame, social anxiety and depression: The role of the evaluation of social rank. *Clinical Psychology & Psychotherapy: An International Journal of Theory & Practice, 7*(3), 174-189.

Gilbert, P. (2016). *Depression: The Evolution of Powerlessness*. Routledge.

Gilbert, P., Price, J., & Allan, S. (1995). Social comparison, social attractiveness and evolution: How might they be related? *New Ideas in Psychology, 13*(2), 149-165.

Giordano, C., Wood, J. V., & Michela, J. L. (2000). Depressive personality styles, dysphoria, and social comparisons in everyday life. *Journal of Personality and Social Psychology, 79*(3), 438.

Goldstone, A., Javitz, H. S., Claudatos, S. A., Buysse, D. J., Hasler, B. P., de Zambotti, M., Clark, D. B., Franzen, P. L., Prouty, D. E., & Colrain, I. M. (2020). Sleep disturbance predicts depression symptoms in early adolescence: initial findings from the

adolescent brain cognitive development study. *Journal of Adolescent Health, 66*(5), 567-574.

Goodin, B. R., McGuire, L., & Smith, M. T. (2010). Ethnicity moderates the influence of perceived social status on subjective sleep quality. *Behavioral Sleep Medicine, 8*(4), 194-206.

Goodman, E., Adler, N. E., Kawachi, I., Frazier, A. L., Huang, B., & Colditz, G. A. (2001). Adolescents' perceptions of social status: development and evaluation of a new indicator. *Pediatrics, 108*(2), e31-e31.

Goodman, E., Maxwell, S., Malspeis, S., & Adler, N. (2015). Developmental trajectories of subjective social status. *Pediatrics, 136*(3), e633-e640.

Gordon, A. M., Mendes, W. B., & Prather, A. A. (2017). The social side of sleep: Elucidating the links between sleep and social processes. *Current Directions in Psychological Science, 26*(5), 470-475.

Goulet-Pelletier, J. C., & Cousineau, D. (2018). A review of effect sizes and their confidence intervals, Part I: The Cohen's d family. *The Quantitative Methods for Psychology, 14*(4), 242-265.

Government of Canada. (2020, June 22). *About mental health*. Public Health Agency of Canada. <https://www.canada.ca/en/public-health/services/about-mental-health.html>.

Gratwick-Sarll, K., & Bentley, C. (2014). Improving eating disorders mental health literacy: A preliminary evaluation of the "Should I Say Something?" workshop. *Eating Disorders, 22*(5), 405-419.

Gregory, A. M., Caspi, A., Eley, T. C., Moffitt, T. E., O'Connor, T. G., & Poulton, R. (2005). Prospective longitudinal associations between persistent sleep problems in childhood and anxiety and depression disorders in adulthood. *Journal of Abnormal Child Psychology, 33*(2), 157-163.

Gusman, M. S., Grimm, K. J., Cohen, A. B., & Doane, L. D. (2021). Stress and sleep across the onset of the novel coronavirus disease 2019 pandemic: Impact of distance learning on US college students' health trajectories. *Sleep*, 44(12).

Hagenauer, M. H., & Lee, T. M. (2012). The neuroendocrine control of the circadian system: adolescent chronotype. *Frontiers Neuroendocrinology*, 33(3), 211-229. <https://doi.org/10.1016/j.yfrne.2012.04.003>.

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>.

Hall, B. J., Xiong, P., Guo, X., Sou, E. K. L., Chou, U. I., & Shen, Z. (2018). An evaluation of a low intensity mHealth enhanced mindfulness intervention for Chinese university students: A randomized controlled trial. *Psychiatry*, 270, 394-403.

Harter, S. (1990). Processes underlying adolescent self-concept formation.

Harvey, A. G. (2011). Sleep and circadian functioning: critical mechanisms in the mood disorders? *Annual Review of Psychology*, 7, 297-319.

Halbesleben, J. R., & Ronald Buckley, M. (2006). Social comparison and burnout: The role of relative burnout and received social support. *Anxiety, stress, and coping*, 19(3), 259-278.

Haslam, S., Parsons, A., Omylinska-Thurston, J., Nair, K., Harlow, J., Lewis, J., Thurston, S., Griffin, J., Dubrow-Marshall, L., & Karkou, V. (2019). Arts for the Blues—a new creative psychological therapy for depression: a pilot workshop report. *Perspectives in Public Health*, 139(3), 137-146.

Hasler, B. P., Casement, M. D., Sitnick, S. L., Shaw, D. S., & Forbes, E. E. (2017). Eveningness among late adolescent males predicts neural reactivity to reward and alcohol dependence 2 years later. *Behavioral Brain Research*, 327, 112-120.

[https://doi.org/10.1016/j.bbr.2017.02.024.](https://doi.org/10.1016/j.bbr.2017.02.024)

Hasler, B. P., & Clark, D. B. (2013). Circadian misalignment, reward-related brain function, and adolescent alcohol involvement. *Alcoholism: Clinical and Experimental Research*, 37(4), 558-565.

Hasler, B. P., Franzen, P. L., de Zambotti, M., Prouty, D., Brown, S. A., Tapert, S. F., Pfefferbaum, A., Pohl, K. M., Sullivan, E. V., & De Bellis, M. D. (2017). Eveningness and later sleep timing are associated with greater risk for alcohol and marijuana use in adolescence: initial findings from the national consortium on alcohol and neurodevelopment in adolescence study. *Alcoholism: Clinical and Experimental Research*, 41(6), 1154-1165.

Hefner, J. and Eisenberg, D. (2009). 'Social Support and mental health among college students.' *American Journal of Orthopsychiatry*, 79(4), pp. 491-499. doi:10.1037/a0016918.

Hershner, S. D., & Chervin, R. D. (2014). Causes and consequences of sleepiness among college students. *Nature and Science of Sleep*, 6, 73.

Hershner, S., & O'Brien, L. M. (2018). The impact of a randomized sleep education intervention for college students. *Journal of Clinical Sleep Medicine*, 14(3), 337-347.

Higgins, E. T. (1987). Self-discrepancy: a theory relating self and affect. *Psychological Review*, 94(3), 319.

Higgins, J., & Altman, D. G. (2008). Assessing risk of bias in included studies. *Cochrane handbook for systematic reviews of interventions: Cochrane book series*, 187-241.

Higgins, J. P., Altman, D. G., Gøtzsche, P. C., Jüni, P., Moher, D., Oxman, A. D., Savović, J., Schulz, K. F., Weeks, L., & Sterne, J. A. (2011). The Cochrane Collaboration's tool for assessing risk of bias in randomised trials. *BMJ*, 343.

Higgins, J. P., & Green, S. (2008). Cochrane handbook for systematic reviews of

interventions. The Cochrane Colloboration.

Hitti, A., Mulvey, K. L., & Killen, M. (2016). Social exclusion in adolescence. *Encyclopedia of Adolescence*, 1-14.

Holm, S. M., Forbes, E. E., Ryan, N. D., Phillips, M. L., Tarr, J. A., & Dahl, R. E. (2009). Reward-related brain function and sleep in pre/early pubertal and mid/late pubertal adolescents. *Journal of Adolescent Health*, 45(4), 326-334.

Horn, S. S. (2006). Group status, group bias, and adolescents' reasoning about the treatment of others in school contexts. *International Journal of Behavioral Development*, 30(3), 208- 218.

Horne, J. A., & Östberg, O. (1976). A self-assessment questionnaire to determine morningness- eveningness in human circadian rhythms. *International Journal of Chronobiology*, 4(2), 97-110.

Huynh, V. W., & Chiang, J. J. (2016). Subjective Social Status and Adolescent Health. *Youth & Society*, 50(7), 926-946. <https://doi.org/10.1177/0044118x16646028>

Institute for Government Analysis. "Timeline of UK government coronavirus lockdowns and restrictions." December 9, 2022. <https://www.instituteforgovernment.org.uk/data-visualisation/timeline-coronavirus-lockdowns>.

Jane Costello, E., Erkanli, A., & Angold, A. (2006). Is there an epidemic of child or adolescent depression? *Journal of Child Psychology and Psychiatry*, 47(12), 1263-1271.

Jarrin, D. C., McGrath, J. J., & Quon, E. C. (2014). Objective and subjective socioeconomic gradients exist for sleep in children and adolescents. *Health Psychology*, 33(3), 301.

Jenni, O. G., & Carskadon, M. A. (2004). Spectral analysis of the sleep

electroencephalogram during adolescence. *Sleep*, 27(4), 774-783.

Jones, S., Sinha, K., Swinton, M., Millar, C., Rayment, D., & Simmons, M. (2011). Openminds: creating a mental health workshop for teenagers to tackle stigma and raise awareness. *Psychiatria Danubina*, 23(suppl 1), 69-72.

Kaggwa, M. M., Kajjimu, J., Sserunkuma, J., Najjuka, S. M., Atim, L. M., Olum, R., Tagg, A., & Bongomin, F. (2021). Prevalence of burnout among university students in low- and middle-income countries: A systematic review and meta-analysis. *PloS One*, 16(8), e0256402.

Kalmbach, D. A., Schneider, L. D., Cheung, J., Bertrand, S. J., Kariharan, T., Pack, A. I., & Gehrman, P. R. (2017). Genetic basis of chronotype in humans: Insights from three landmark GWAS. *Sleep*, 40 (2).

Kauffman, B. Y., Bakhshai, J., Manning, K., Rogers, A. H., Shepherd, J. M., & Zvolensky, M.J. (2020). The role of emotion dysregulation in the association between subjective social status and eating expectancies among college students. *Journal of American College Health*, 68(1), 97-103.

Keil, L. J., McClintonck, C. G., Kramer, R., & Platow, M. J. (1990). Children's use of social comparison standards in judging performance and their effects on self-evaluation. *Contemporary Educational Psychology*, 15(1), 75-91.

Keup, J. R. (2007). Great expectations and the ultimate reality check: Voices of students during the transition from high school to college. *Journal of Student Affairs Research and Practice*, 44(1), 3-31.

Kim, J. E., Saw, A., & Zane, N. (2015). The influence of psychological symptoms on mental health literacy of college students. *American Journal of Orthopsychiatry*, 85(6), 620.

Kirkpatrick, D. (1996). Great ideas revisited. *Training & Development*, 50(1), 54-60.

Knutson, K. L., Spiegel, K., Penev, P., & Van Cauter, E. (2007). The metabolic

consequences of sleep deprivation. *Sleep Medicine Reviews*, 11(3), 163-178.

Kodsi, A., Bullock, B., Kennedy, G. A., & Tirlea, L. (2021). Psychological interventions to improve sleep in young adults: A systematic review and meta-analysis of randomized controlled trials. *Behavioral Sleep Medicine*, 20(1), 125-142.

Koski, J. E., Xie, H., & Olson, I. R. (2015). Understanding social hierarchies: The neural and psychological foundations of status perception. *Social Neuroscience*, 10(5), 527-550.

Krayer, A., Ingledew, D. K., & Iphofen, R. (2008). Social comparison and body image in adolescence: A grounded theory approach. *Health Education Research*, 23(5), 892-903.

Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ-9: validity of a brief depression severity measure. *Journal of General Internal Medicine*, 16(9), 606-613.

Kurzban, R., & Leary, M. R. (2001). Evolutionary origins of stigmatization: the functions of social exclusion. *Psychological Bulletin*, 127(2), 187.

Kwon, M., Park, E., & Dickerson, S. S. (2019). Adolescent substance use and its association to sleep disturbances: A systematic review. *Sleep Health*, 5(4), 382-394.

Kwong, A. S. F., Manley, D., Timpson, N. J., Pearson, R. M., Heron, J., Sallis, H., Stergiakouli, E., Davis, O. S. P., & Leckie, G. (2019). Identifying Critical Points of Trajectories of Depressive Symptoms from Childhood to Young Adulthood. *Journal of Youth and Adolescence*, 48(4), 815–827. <https://doi.org/10.1007/s10964-018-0976-5>

LaFontana, K. M., & Cillessen, A. H. (2010). Developmental changes in the priority of perceived status in childhood and adolescence. *Social Development*, 19(1), 130-147.

Lange, M. K., Just-Nørregaard, V., & Winding, T. N. (2023). How does subjective social status at school at the age of 15 affect the risk of depressive symptoms at the ages of

18, 21, and 28? A longitudinal study. *PloS One*, 18(12), e0296349.

Lansu, T. A., & Cillessen, A. H. (2012). Peer status in emerging adulthood: Associations of popularity and preference with social roles and behavior. *Journal of Adolescent Research*, 27(1), 132-150.

Lease, A. M., Musgrove, K. T., & Axelrod, J. L. (2002). Dimensions of social status in preadolescent peer groups: Likability, perceived popularity, and social dominance. *Social Development*, 11(4), 508-533.

Lee, R. A., & Jung, M. E. (2018). Evaluation of an mhealth app (destressify) on university students' mental health: pilot trial. *JMIR Mental Health*, 5(1), e8324.

Leocadio-Miguel, M. A., Ruiz, F. S., Ahmed, S. S., Taporoski, T. P., Horimoto, A. R., Beijamini, F., Pedrazzoli, M., Knutson, K. L., Pereira, A. C., & von Schantz, M. (2021). Compared heritability of chronotype instruments in a single population sample. *Journal of Biological Rhythms*, 36(5), 483-490.

LeMoult, J., & Gotlib, I. H. (2019). Depression: A cognitive perspective. *Clinical Psychology Review*, 69, 51-66.

Levenson, J. C., Miller, E., Hafer, B. L., Reidell, M. F., Buysse, D. J., & Franzen, P. L. (2016). Pilot study of a sleep health promotion program for college students. *Sleep Health*, 2(2), 167-174.

Li, P. J. (2025). Subjective social status, depressive symptoms, and suicidal ideation in US college students: A cross-sectional examination on race and gender. *Journal of American College Health*, 1-10.

Li, Y., & Wright, M. F. (2014). Adolescents' social status goals: Relationships to social status insecurity, aggression, and prosocial behavior. *Journal of Youth and Adolescence*, 43, 146-160.

Loeb, E., & Hurd, N. M. (2019). Subjective social status, perceived academic competence,

and academic achievement among underrepresented students. *Journal of College Student Retention: Research, Theory & Practice*, 21(2), 150-165.

Lund, H. G., Reider, B. D., Whiting, A. B., & Prichard, J. R. (2010). Sleep patterns and predictors of disturbed sleep in a large population of college students. *Journal of Adolescent Health*, 46(2), 124-132.

Lunn, J., Wilcockson, T., Donovan, T., Dondelinger, F., Perez Algorta, G., & Monaghan, P. (2021). The role of chronotype and reward processing in understanding social hierarchies in adolescence. *Brain and Behaviour*, 11(5), e02090. <https://doi.org/10.1002/brb3.2090>

Manwell, L. A., Barbic, S. P., Roberts, K., Durisko, Z., Lee, C., Ware, E., & McKenzie, K. (2015). What is mental health? Evidence towards a new definition from a mixed methods multidisciplinary international survey. *BMJ open*, 5(6), e007079.

Marmot, M., & Wilkinson, R. (Eds.). (2005). *Social determinants of health*. Oup Oxford.

Marsh, H. W. (1987). The big-fish-little-pond effect on academic self-concept. *Journal of Educational Psychology*, 79(3), 280.

Martin, J. L., & Hakim, A. D. (2011). Wrist actigraphy. *Chest*, 139(6), 1514-1527.

Martiniuk, A. L., Senserrick, T., Lo, S., Williamson, A., Du, W., Grunstein, R. R., Woodward, M., Glozier, N., Stevenson, M., & Norton, R. (2013). Sleep-deprived young drivers and the risk for crash: the DRIVE prospective cohort study. *JAMA Pediatrics*, 167(7), 647- 655.

Marvel-Coen, J., Nickels, N., & Maestripieri, D. (2018). The relationship between morningness-eveningness, psychosocial variables, and cortisol reactivity to stress from a life history perspective. *Evolutionary Behavioral Sciences*, 12(2), 71.

Maslach, C., Schaufeli, W. B., & Leiter, M. P. (2001). Job burnout. *Annual Review of Psychology*, 52(2001), 397-422.

Maslach, C., & Leiter, M. P. (2016). Burnout. In *Stress: Concepts, cognition, emotion, and behavior* (pp. 351-357). Academic Press.

Matyjek, M., Meliss, S., Dziobek, I., & Murayama, K. (2020). A multidimensional view on social and non-social rewards. *Frontiers in Psychiatry*, 11, 818.

McCloud, T., Kamenov, S., Callender, C., Lewis, G., & Lewis, G. (2023). The association between higher education attendance and common mental health problems among young people in England: evidence from two population-based cohorts. *The Lancet Public Health*, 8(10), e811-e819.

McGuffog, R., Rubin, M., Boyes, M., Caltabiano, M. L., Collison, J., Lovell, G. P., Muldoon, O., & Paolini, S. (2023). Sleep as a mediator of the relationship between social class and health in higher education students. *British Journal of Psychology*, 114(3), 710-730.

McLaughlin, K. A., Costello, E. J., Leblanc, W., Sampson, N. A., & Kessler, R. C. (2012). Socioeconomic status and adolescent mental disorders. *American Journal of Public Health*, 102(9), 1742-1750.

Medic, G., Wille, M., & Hemels, M. E. (2017). Short-and long-term health consequences of sleep disruption. *Nature and Science of Sleep*, 9, 151.

Mendlowicz, M. V., & Stein, M. B. (2000). Quality of life in individuals with anxiety disorders. *American Journal of Psychiatry*, 157(5), 669-682.

Micari, M., & Pazos, P. (2014). Worrying about what others think: A social-comparison concern intervention in small learning groups. *Active Learning in Higher Education*, 15(3), 249-262.

Milojevich, H. M., & Lukowski, A. F. (2016). Sleep and mental health in undergraduate students with generally healthy sleep habits. *PloS One*, 11(6). <https://doi.org/10.1371/journal.pone.0156372>

Mireku, M. O. (2021). Waking Activities and Sleep: Analysis of United Kingdom Adolescents' Daily Time-Use Diaries. *Journal of Adolescent Health, 68*(2), 385-393.

Mishra, J., Panigrahi, A., Samanta, P., Dash, K., Mahapatra, P., & Behera, M. R. (2022). Sleep quality and associated factors among undergraduate medical students during Covid-19 confinement. *Clinical Epidemiology and Global Health, 15*, 101004.

Mistlberger, R. E., & Skene, D. J. (2004). Social influences on mammalian circadian rhythms: animal and human studies. *Biological Reviews, 79*(3), 533-556.

Mitchell, M. D., Gehrman, P., Perlis, M., & Umscheid, C. A. (2012). Comparative effectiveness of cognitive behavioral therapy for insomnia: a systematic review. *BMC Family Practice, 13*(1), 1-11.

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & Group*, P. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *Annals of Internal Medicine, 151*(4), 264-269.

Montaruli, A., Castelli, L., Mulè, A., Scurati, R., Esposito, F., Galasso, L., & Roveda, E. (2021). Biological rhythm and chronotype: new perspectives in health. *Biomolecules, 11*(4), 487.

Montgomery, P., & Dennis, J. (2004). A systematic review of non-pharmacological therapies for sleep problems in later life. *Sleep Medicine Reviews, 8*(1), 47-62.

Moore, T. R. (2020). *Circadian Rhythms and the Embodiment of Social Zeitgebers: Linking the Bio and Social*. University of South Florida.

Morales, E. E. (2014). Learning from success: How original research on academic resilience informs what college faculty can do to increase the retention of low socioeconomic status students. *International Journal of Higher Education, 3*(3), 92-102.

Mori, A., Okamoto, Y., Okada, G., Takagaki, K., Jinnin, R., Takamura, M., ... & Yamawaki, S. (2016). Behavioral activation can normalize neural hypoactivation in subthreshold

depression during a monetary incentive delay task. *Journal of Affective Disorders*, 189, 254-262.

Morris, J., Firkins, A., Millings, A., Mohr, C., Redford, P., & Rowe, A. (2016). Internet-delivered cognitive behavior therapy for anxiety and insomnia in a higher education context. *Anxiety, Stress & Coping*, 29(4), 415-431.

Mussweiler, T. (2003). Comparison processes in social judgment: mechanisms and consequences. *Psychological Review*, 110(3), 472.

Mussweiler, T., & Strack, F. (2000). Consequences of social comparison: Selective accessibility, assimilation, and contrast. In *Handbook of Social Comparison: Theory and Research* (pp. 253-270). Springer.

Muzafar, Y., Khan, H. H., Ashraf, H., Hussain, W., Sajid, H., Tahir, M., Rehman, A., Sohail, A., Waqas, A., & Ahmad, W. (2015). Burnout and its associated factors in medical students of Lahore, Pakistan. *Cureus*, 7(11).

National Sleep Foundation (2006). *Summary of Findings*.
https://www.thensf.org/wp-content/uploads/2021/03/2007-SIA-Summary_Of_Findings.pdf

Nayak, M. S. D. P., & Narayan, K. A. (2019). Strengths and weaknesses of online surveys. *Technology*, 6(7), 0837-2405053138.

Noble, G. K. (1939). The role of dominance in the social life of birds. *The Auk*, 263-273.

Norris, L. A., Rabner, J. C., Mennies, R. J., Olino, T. M., & Kendall, P. C. (2021). Increased self-reported reward responsiveness predicts better response to cognitive behavioral therapy for youth with anxiety. *Journal of Anxiety Disorders*, 80, 102402.

O'Mealey, M., & Mayeux, L. (2022). Similarities and Differences in Popular Peers in Adolescence and Emerging Adulthood. *The Journal of Genetic Psychology*, 183(2), 152-168.

Olino, T. M., McMakin, D. L., Morgan, J. K., Silk, J. S., Birmaher, B., Axelson, D. A., Williamson, D. E., Dahl, R. E., Ryan, N. D., & Forbes, E. E. (2014). Reduced reward anticipation in youth at high-risk for unipolar depression: a preliminary study. *Developmental Cognitive Neuroscience, 8*, 55-64.

Olson, B. D., & Evans, D. L. (1999). The role of the Big Five personality dimensions in the direction and affective consequences of everyday social comparisons. *Personality and Social Psychology Bulletin, 25*(12), 1498-1508.

Orchard, F., Gregory, A. M., Gradisar, M., & Reynolds, S. (2020). Self-reported sleep patterns and quality amongst adolescents: cross-sectional and prospective associations with anxiety and depression. *Journal of Child Psychology and Psychiatry, 61*(10), 1126- 1137.

Orzech, K. M., Salafsky, D. B., & Hamilton, L. A. (2011). The state of sleep among college students at a large public university. *Journal of American College Health, 59*(7), 612-619. <https://doi.org/10.1080/07448481.2010.520051>.

Parker, C., Scott, S., & Geddes, A. (2019). Snowball sampling. *SAGE Research Methods Foundations*.

Paul, E. L., & Brier, S. (2001). Friendsickness in the transition to college: Precollege predictors and college adjustment correlates. *Journal of Counseling & Development, 79*(1), 77-89.

Picton, A., Greenfield, S., & Parry, J. (2022). Why do students struggle in their first year of medical school? A qualitative study of student voices. *BMC Medical Education, 22*(1), 100.

Platt, D., Chinn, J., Scallan, S., & Lyon-Maris, J. (2015). Fostering resilience with GPs: a workshop approach. *Education for Primary Care, 26*(5), 328-331.

Pradeepa, S. (2023, May 31). Self-Concept Examples: 8 Examples That Shape Your

Identity https://www.believeinmind.com/know_thyself/self-concept-examples/.

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research methods, Instruments, & Computers*, 36, 717-731.

Price, B. (2009). Body image in adolescents: insights and implications. *Nursing Children and Young People*, 21(5).

Price, J., Sloman, L., Gardner, R., Gilbert, P., & Rohde, P. (1994). The social competition hypothesis of depression. *The British Journal of Psychiatry*, 164(3), 309-315.

Pine, D. S., Cohen, P., Gurley, D., Brook, J., & Ma, Y. (1998). The risk for early-adulthood anxiety and depressive disorders in adolescents with anxiety and depressive disorders. *Archives of General Psychiatry*, 55(1), 56-64.

Posselt, J. R., & Lipson, S. K. (2016). Competition, anxiety, and depression in the college classroom: Variations by student identity and field of study. *Journal of College Student Development*, 57(8), 973-989.

Pulford, B. D., Woodward, B., & Taylor, E. (2018). Do social comparisons in academic settings relate to gender and academic self-confidence? *Social Psychology of Education*, 21, 677-690.

Qin, P., & Brown, C. A. (2017). Sleep practices of university students living in residence. *International Journal of Higher Education*, 6(5), 14-25.

Rahal, D., Huynh, V., Cole, S., Seeman, T., & Fuligni, A. (2020a). Subjective social status and health during high school and young adulthood. *Developmental Psychology*, 56(6), 1220.

Rahal, D., Chiang, J. J., Fales, M., Fuligni, A. J., Haselton, M. G., Slavich, G. M., & Robles, T.F. (2020b). Early life stress, subjective social status, and health during late adolescence. *Psychology & Health*, 35(12), 1531-1549.

Rice, S., Winter, S. R., Doherty, S., & Milner, M. (2017). Advantages and disadvantages of using internet-based survey methods in aviation-related research. *Journal of Aviation Technology and Engineering*, 7(1), 5.

Richardson, T., Elliott, P., Roberts, R., & Jansen, M. (2017). A longitudinal study of financial difficulties and mental health in a national sample of British undergraduate students. *Community*, 53, 344-352.

Rivenbark, J., Arseneault, L., Caspi, A., Danese, A., Fisher, H. L., Moffitt, T. E., Rasmussen, L. J., Russell, M. A., & Odgers, C. L. (2020). Adolescents' perceptions of family social status correlate with health and life chances: A twin difference longitudinal cohort study. *Proceedings of the National Academy of Sciences*, 117(38), 23323-23328.

Roenneberg, T., Kuehnle, T., Pramstaller, P. P., Ricken, J., Havel, M., Guth, A., & Merrow, M. (2004). A marker for the end of adolescence. *Current Biology*, 14(24), R1038-1039. <https://doi.org/10.1016/j.cub.2004.11.039>

Romeo R. D. (2013). The Teenage Brain: The Stress Response and the Adolescent Brain. *Current Directions in Psychological Science*, 22(2), 140–145. <https://doi.org/10.1177/0963721413475445>

Rosales-Ricardo, Y., Rizzo-Chunga, F., Mocha-Bonilla, J., & Ferreira, J. P. (2021). Prevalence of burnout syndrome in university students: A systematic review. *Salud Mental*, 44(2), 91-102.

Rosman, T., Mayer, A.-K., Leichner, N., & Krampen, G. (2020). Putting big fish into a bigger pond: self-concept changes in psychology undergraduate entrants. *Journal of Further and Higher Education*, 44(1), 14-28. Rubin, M. (2020). Explaining the association between subjective social status and mental health among university students using an impact ratings approach. *SN Social Sciences*, 1(1), 1-21.

Rubin, M., Evans, O., & Wilkinson, R. B. (2016). A longitudinal study of the relations among university students' subjective social status, social contact with university friends, and mental health and well-being. *Journal of Social and Clinical Psychology*, 35(9), 722- 737.

Ruble, D. N., Boggiano, A. K., Feldman, N. S., & Loebl, J. H. (1980). Developmental analysis of the role of social comparison in self-evaluation. *Developmental Psychology*, 16(2), 105.

Rundo, J. V., & Downey III, R. (2019). Polysomnography. *Handbook of Clinical Neurology*, 160, 381-392. <https://doi.org/10.1016/b978-0-444-64032-1.00025-4>

Russell, M. A., & Odgers, C. L. (2020). Adolescents' subjective social status predicts day-to- day mental health and future substance use. *Journal of Research on Adolescence*, 30, 532-544.

Sandstrom, M. J., & Cillessen, A. H. (2010). Life after high school: Adjustment of popular teens in emerging adulthood. *Merrill-Palmer Quarterly* (1982-), 474-499.

Sankar, A., Yttredahl, A. A., Fourcade, E. W., Mickey, B. J., Love, T. M., Langenecker, S. A., & Hsu, D. T. (2019). Dissociable neural responses to monetary and social gain and loss in women with major depressive disorder. *Frontiers in Behavioral Neuroscience*, 13, 149.

Santor, D. A., & Walker, J. (1999). Garnering the interest of others: Mediating the effects among physical attractiveness, self-worth and dominance. *British Journal of Social Psychology*, 38(4), 461-477.

Saruhanjan, K., Zarski, A. C., Bauer, T., Baumeister, H., Cuijpers, P., Spiegelhalder, K., Auerbach, R. P., Kessler, R. C., Bruffaerts, R., & Karyotaki, E. (2021). Psychological interventions to improve sleep in college students: A meta-analysis of randomized controlled trials. *Journal of Sleep Research*, 30(1), e13097.

Schneider, J., Fárová, E., & Bakštein, E. (2022). Human chronotype: Comparison of questionnaires and wrist-worn actigraphy. *Chronobiology International*, 1-16.

Schonfeld, I. S., & Bianchi, R. (2016). Burnout and depression: two entities or one? *Journal of Clinical Psychology*, 72(1), 22-37.

Schwartz, K. T. G., Kryza-Lacombe, M., Liuzzi, M. T., Weersing, V. R., & Wiggins, J. L. (2019). Social and Non-social Reward: A Preliminary Examination of Clinical Improvement and Neural Reactivity in Adolescents Treated With Behavioral Therapy for Anxiety and Depression. *Frontiers in Behavioral Neuroscience*, 13, 177. <https://doi.org/10.3389/fnbeh.2019.00177>

Schwarz, K., Moessnang, C., Schweiger, J. I., Baumeister, S., Plichta, M. M., Brandeis, D., Banaschewski, T., Wackerhagen, C., Erk, S., & Walter, H. (2020). Transdiagnostic prediction of affective, cognitive, and social function through brain reward anticipation in schizophrenia, bipolar disorder, major depression, and autism spectrum diagnoses. *Schizophrenia Bulletin*, 46(3), 592-602.

Schultz, W. (2015). Neuronal reward and decision signals: from theories to data. *Physiological Reviews*, 95(3), 853-951.

Shadid, A. M., Aldosari, B. M., Algarni, A. M., Dahmash, A. B., Altalhab, S., & Alharithy, R. (2022). Burnout syndrome in dermatology residents: a cross-sectional study. *Journal of Dermatology and Dermatologic Surgery*, 26(1), 31-37.

Shankland, R., Kotsou, I., Vallet, F., Bouteyre, E., Dantzer, C., & Leys, C. (2019). Burnout in university students: The mediating role of sense of coherence on the relationship between daily hassles and burnout. *Higher Education*, 78, 91-113.

Short, M. A., 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.

Smidt, A., Balandin, S., Sigafoos, J., & Reed, V. A. (2009). The Kirkpatrick model: A useful tool for evaluating training outcomes. *Journal of Intellectual and Developmental Disability, 34*(3), 266-274.

Smith, C. L., & Shochet, I. M. (2011). The impact of mental health literacy on help-seeking intentions: Results of a pilot study with first year psychology students. *International Journal of Mental Health Promotion, 13*(2), 14-20.

Somerville, L. H. (2013). The teenage brain: Sensitivity to social evaluation. *Current Directions in Psychological Science, 22*(2), 121-127.

Spitzer, R. L., Kroenke, K., Williams, J. B., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: the GAD-7. *Archives of Internal Medicine, 166*(10), 1092- 1097.

Steinberg, L. (2005). Cognitive and affective development in adolescence. *Trends in Cognitive Sciences, 9*(2), 69–74. <https://doi.org/10.1016/j.tics.2004.12.005>

Sterne, J. A., Hernán, M. A., Reeves, B. C., Savović, J., Berkman, N. D., Viswanathan, M., ... & Higgins, J. P. (2016). ROBINS-I: a tool for assessing risk of bias in non-randomised studies of interventions. *BMJ, 355*.

Stewart, S. M., Betson, C., Lam, T., Marshall, I., Lee, P., & Wong, C. (1997). Predicting stress in first year medical students: a longitudinal study. *Medical Education, 31*(3), 163-168.

Stores, R., Linceviciute, S., Pilkington, K., & Ridge, D. (2023). Sleep disturbance, mental health, well-being and educational impact in UK university students: a mixed methods study. *Journal of Further and Higher Education, 47*(8), 995-1008.

Straub, J., Plener, P. L., Sproeber, N., Sprenger, L., Koelch, M. G., Groen, G., & Abler, B. (2015). Neural correlates of successful psychotherapy of depression in adolescents. *Journal of Affective Disorders, 183*, 239-246.

Stringaris, A., Vidal-Ribas Belil, P., Artiges, E., Lemaitre, H., Gollier-Briant, F., Wolke, S., Vulser, H., Miranda, R., Penttilä, J., & Struve, M. (2015). The brain's response to reward anticipation and depression in adolescence: dimensionality, specificity, and longitudinal predictions in a community-based sample. *American Journal of Psychiatry, 172*(12), 1215-1223.

Sweeting, H., & Hunt, K. (2014). Adolescent socio-economic and school-based social status, health and well-being. *Social Science & Medicine, 121*, 39-47.

Sweeting, H., West, P., Young, R., & Kelly, S. (2011). Dimensions of adolescent subjective social status within the school community: Description and correlates. *Journal of Adolescence, 34*(3), 493-504.

Suls, J., Martin, R., & Wheeler, L. (2002). Social comparison: Why, with whom, and with what effect? *Current Directions in Psychological Science, 11*(5), 159-163.

Swallow, S. R., & Kuiper, N. A. (1988). Social comparison and negative self-evaluations: An application to depression. *Clinical Psychology Review, 8*(1), 55-76.

Szuba, M. P., Yager, A., Guze, B. H., Allen, E. M., & Baxter Jr, L. R. (1992). Disruption of social circadian rhythms in major depression: a preliminary report. *Psychiatry Research, 42*(3), 221-230.

Tate, M. L. (2009). Workshops. *The Learning Professional, 30*(1), 44.

Tesser, A. (1988). Toward a self-evaluation maintenance model of social behavior. In *Advances in Experimental Social Psychology* (Vol. 21, pp. 181-227). Academic Press.

Thornton, D. A., & Arrowood, A. J. (1966). Self-evaluation, self-enhancement, and the locus of social comparison. *Journal of Experimental Social Psychology, 1*, 40-48.

Thwaites, R., & Dagnan, D. (2004). Moderating variables in the relationship between social comparison and depression: An evolutionary perspective. *Psychology and*

Psychotherapy: Theory, Research and Practice, 77(3), 309-323.

Tomoda, A., Mori, K., Kimura, M., Takahashi, T., & Kitamura, T. (2000). One-year prevalence and incidence of depression among first-year university students in Japan: A preliminary study. *Psychiatry and Clinical Neurosciences*, 54(5), 583-588.

Trockel, M., Manber, R., Chang, V., Thurston, A., & Tailor, C. B. (2011). An e-mail delivered CBT for sleep-health program for college students: effects on sleep quality and depression symptoms. *Journal of Clinical Sleep Medicine*, 7(3), 276-281.

Trower, P., & Gilbert, P. (1989). New theoretical conceptions of social anxiety and social phobia. *Clinical Psychology Review*, 9(1), 19-35.

Uhrich, J. (1938). The social hierarchy in albino mice. *Journal of Comparative Psychology*, 25(2), 373.

Urnér, M., Tornic, J., & Bloch, K. E. (2009). Sleep patterns in high school and university students: a longitudinal study. *Chronobiology International*, 26(6), 1222-1234.

Van den Berg, J. F., Kivelä, L., & Antypa, N. (2018). Chronotype and depressive symptoms in students: An investigation of possible mechanisms. *Chronobiology International*, 35(9), 1248-1261.

Van der Aar, L. P. E., Peters, S., & Crone, E. A. (2018). The development of self-views across adolescence: Investigating self-descriptions with and without social comparison using a novel experimental paradigm. *Cognitive Development*, 48, 256-270.

Van der Linden, D., Scholte, R. H., Cillessen, A. H., te Nijenhuis, J., & Segers, E. (2010). Classroom ratings of likeability and popularity are related to the Big Five and the general factor of personality. *Journal of Research in Personality*, 44(5), 669-672.

Van Lange, P. A., Schippers, M., & Balliet, D. (2011). Who volunteers in psychology experiments? An empirical review of prosocial motivation in volunteering.

Personality and Individual Differences, 51(3), 279-284.

Van Tienoven, T. P., Minnen, J., Daniels, S., Weenas, D., Raaijmakers, A., & Glorieux, I. (2014). Calculating the Social Rhythm Metric (SRM) and Examining Its Use in Interpersonal Social Rhythm Therapy (IPSRT) in a Healthy Population Study. *Behavioral Sciences*, 4(3), 265-277. <https://www.mdpi.com/2076-328X/4/3/265>

Vidal, C., & Wissow, L. S. (2023). Adolescents' Social Comparisons, Subjective Social Status, and Coping to Maintain Well-Being: A Qualitative Study. *Journal of Applied Social Science*, 17(2), 291-301.

Vidal, C. (2024). *Status and Social Comparisons Among Adolescents: Popularity in the Age of Social Media*. Taylor & Francis.

Walker, M. (2017). *Why we sleep: The new science of sleep and dreams*. Penguin UK.

Wei, Y., McGrath, P. J., Hayden, J., & Kutcher, S. (2015). Mental health literacy measures evaluating knowledge, attitudes and help-seeking: a scoping review. *BMC Psychiatry*, 15(1), 1-20.

Wetherall, K., Robb, K. A., & O'Connor, R. C. (2019). Social rank theory of depression: A systematic review of self-perceptions of social rank and their relationship with depressive symptoms and suicide risk. *Journal of Affective Disorders*, 246, 300-319.

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>

Wheeler, L. (1966). Motivation as a determinant of upward comparison. *Journal of Experimental Social Psychology*, 1, 27-31.

Wheeler, L., & Miyake, K. (1992). Social comparison in everyday life. *Journal of Personality and Social Psychology*, 62(5), 760.

Wilcox, P., Winn, S., & Fyvie-Gauld, M. (2005). 'It was nothing to do with the university,

it was just the people': the role of social support in the first-year experience of higher education. *Studies in Higher Education*, 30(6), 707-722.

Wills, T. A. (1981). Downward comparison principles in social psychology. *Psychological Bulletin*, 90(2), 245.

Wilson, E. O. (1980). *Sociobiology: The abridged edition*. Belknap Press of Harvard University Press.

Wrzus, C., Hänel, M., Wagner, J., & Neyer, F. J. (2013). Social network changes and life events across the life span: a meta-analysis. *Psychological Bulletin*, 139(1), 53.

Wu, R., Bao, J., Zhang, C., Deng, J., & Long, C. (2006). Comparison of sleep condition and sleep-related psychological activity after cognitive-behavior and pharmacological therapy for chronic insomnia. *Psychotherapy and Psychosomatics*, 75(4), 220-228.

Wyatt, T. J., Oswalt, S. B., & Ochoa, Y. (2017). Mental Health and Academic Performance of First-Year College Students. *International Journal of Higher Education*, 6(3), 178-187.

Zajenkowski, M., Jankowski, K. S., & Stolarski, M. (2019). Why do evening people consider themselves more intelligent than morning individuals? The role of big five, narcissism, and objective cognitive ability. *Chronobiology International*, 36(12), 1741-1751.

Zettergren, P., Bergman, L. R., & Wångby, M. (2006). Girls' stable peer status and their adulthood adjustment: A longitudinal study from age 10 to age 43. *International Journal of Behavioral Development*, 30(4), 315-325.

Zhou, J., Hsiao, F.-C., Shi, X., Yang, J., Huang, Y., Jiang, Y., Zhang, B., & Ma, N. (2021). Chronotype and depressive symptoms: A moderated mediation model of sleep quality and resilience in the 1st-year college students. *Journal of Clinical Psychology*, 77(1), 340-355. <https://doi.org/10.1002/jclp.23037>

Zell, E., & Alicke, M. D. (2010). The local dominance effect in self-evaluation: Evidence and explanations. *Personality and Social Psychology Review, 14*(4), 368-384.

Zou, P., Wang, X., Sun, L., Liu, K., Hou, G., Yang, W., Liu, C., Yang, H., Zhou, N., & Zhang, G. (2020). Poorer sleep quality correlated with mental health problems in College students: A longitudinal observational study among 686 males. *Journal of Psychosomatic Research, 136*, 110177.

Zvolensky, M. J., Paulus, D. J., Bakhshaie, J., Viana, A. G., Garza, M., Manning, K., ... & Lemaire, C. (2017). Subjective social status and anxiety and depressive symptoms and disorders among low income latinos in primary care: the role of emotion dysregulation. *Cognitive Therapy and Research, 41*, 686-698.

APPENDIX A

Ethical Documents

Faculty of Health and Medicine Research Ethics Committee (FHMREC) Lancaster University

Application for Ethical Approval for Research

for additional advice on completing this form, hover cursor over 'guidance'.

Guidance on completing this form is also available as a word document

Title of Project: The effects of chronotype and social reward needs on the mental health of first year university students

Name of applicant/researcher: Gamze Kocdemir

ACP ID number (if applicable)*:

Funding source (if applicable)

Grant code (if applicable):

***If your project has *not* been costed on ACP, you will also need to complete the Governance Checklist [\[link\]](#).**

Type of study

Involves existing documents/data only, or the evaluation of an existing project with no direct contact with human participants. **Complete sections one, two and four of this form**

Includes *direct* involvement by human subjects. **Complete sections one, three and four of this form**



SECTION ONE

1. Appointment/position held by applicant and Division within FHM PhD student, Medical School

2. Contact information for applicant:

E-mail: g.kocdemir1@lancaster.ac.uk **Telephone:** 07840203078 (please give a number on which you can be contacted at short notice)

Address: Health Innovation Campus

3. Names and appointments of all members of the research team (including degree where applicable)

Dr Judith Lunn (First Supervisor). Lecturer, Lancaster Medical School (LMS).

3. If this is a student project, please indicate what type of project by marking the relevant box/deleting as appropriate: (please note that UG and taught masters projects should complete **FHMREC form UG-tPG**, following the procedures set out on the [FHMREC website](#)

PG Diploma Masters by research PhD Thesis PhD Pall. Care

PhD Pub. Health PhD Org. Health & Well Being PhD Mental Health MD

DClinPsy SRP [if SRP Service Evaluation, please also indicate here:] DClinPsy Thesis

4. Project supervisor(s), if different from applicant: Dr Judith Lunn

5. Appointment held by supervisor(s) and institution(s) where based (if applicable): lecturer, LMS.

SECTION TWO

Complete this section if your project involves existing documents/data only, or the evaluation of an existing project with no direct contact with human participants

1. Anticipated project dates (month and year)

Start date: _____ End date: _____

2. Please state the aims and objectives of the project (no more than 150 words, in lay-person's language):

Data Management

For additional guidance on data management, please go to [Research Data Management](#) webpage, or email the RDM support email: rdm@lancaster.ac.uk

3. Please describe briefly the data or records to be studied, or the evaluation to be undertaken.

4a. How will any data or records be obtained?

Qualtrics Survey Software.

4b. Will you be gathering data from websites, discussion forums and on-line 'chat-rooms'? no

4c. If yes, where relevant has permission / agreement been secured from the website moderator? no

4d. If you are only using those sites that are open access and do not require registration, have you made your intentions clear to other site users? no

4e. If no, please give your reasons

5. What plans are in place for the storage, back-up, security and documentation of data (electronic, digital, paper, etc)? Note who will be responsible for deleting the data at the end of the storage period. Please ensure that your plans comply with General Data Protection Regulation (GDPR) and the (UK) Data Protection Act 2018.

6a. Is the secondary data you will be using in the public domain? no

6b. If NO, please indicate the original purpose for which the data was collected, and comment on whether consent was gathered for additional later use of the data.

Please answer the following question *only* if you have not completed a Data Management Plan for an external funder

7a. How will you share and preserve the data underpinning your publications for at least 10 years e.g. PURE?

7b. Are there any restrictions on sharing your data?

8. Confidentiality and Anonymity

a. Will you take the necessary steps to assure the anonymity of subjects, including in subsequent publications? yes

b. How will the confidentiality and anonymity of participants who provided the original data be maintained?

9. What are the plans for dissemination of findings from the research?

10. What other ethical considerations (if any), not previously noted on this application, do you think there are in the proposed study? How will these issues be addressed?

SECTION THREE

Complete this section if your project includes *direct* involvement by human subjects

1. Summary of research protocol in lay terms (indicative maximum length 150 words):

The aim of this research study is to investigate the links between chronotype (a chronotype is a person's daily rhythms or body clock, it is the natural tendency when a person prefers to sleep and when they feel the most energetic during the day), participants' social reward needs (i.e. how much social interactions are considered as a source of reward by a person) and social status amongst peers in order to predict mental health outcomes (i.e. anxiety, depression) in first year university students. We will use self-report questionnaires available as one survey on Qualtrics measured with the researcher present via Team at two time points; in October and again in April in order to understand change across the first year at university. This is the first investigation into chronotype, sleep patterns, social rewards and mental health in this population and the results will contribute to the award of PhD.

2. **Anticipated project dates (month and year only)**

Start date: 15/09/2020 End date 15/09/2022

Data Collection and Management

For additional guidance on data management, please go to [Research Data Management](#) webpage, or email the RDM support email: rdm@lancaster.ac.uk

3. Please describe the sample of participants to be studied (including maximum & minimum number, age, gender):

Participants will be Undergraduate First Year Students at Lancaster University living in campus accommodation, because there are no studies addressing how chronotype and social reward needs are related to the mental health of 1st year university students. We are interested in this population because starting university is an important transitional time, both in terms of change to sleep patterns and for social and emotional development. We aim to recruit a minimum 100 and a maximum number of 300 first year students who are living in shared university accommodation. Based on the typical age range of students who choose to enter shared accommodation as first years, we predict participants would be 18 to 25 years old. There are no exclusion criteria based on age, gender, ethnicity or other demographic factors. The questionnaires are provided in English and students studying in English will be sufficiently proficient to complete the survey. The researcher will be present to answer any questions participants may have whilst completing the surveys. The study is interested in social factors and also aims to attempt to recruit several participants from the same household, this would allow analysis at the level of household group, as well as at the individual level. This is a secondary aim however, and a single individual from one household can participate. As we are looking at student accommodation the sample characteristics are based on the distribution in the houses, although we know they will be first years as students are housed by year of study.

There are two data collection points and the time difference between Time 1 and Time 2 is 6 months (October 2020

- April 2021). This 6-month timeframe is due to the risk of attrition from the study because of the exam periods later in the academic year, we also would predict the most effects would be seen within the first 6 months, as well as the time limitations imposed by the research PhD programme.

4. How will participants be recruited and from where? Be as specific as possible. Ensure that you provide the *full versions* of all recruitment materials you intend to use with this application (eg adverts, flyers, posters).

Participants will be recruited from Lancaster University campus accommodation via emailed adverts. We will work closely with the accommodation officers who have agreed to circulate the e-mail advert to the college residents as a grouped email and they will not be providing us with the individual emails of students. The advert will contain a link to information about the study and the contact information of the researcher. Lancaster University First Year Medical school students will also be informed about the study in Freshers Week or Week 1, dependent on timetabling. Students recruited to the study will be asked to attend a Teams meeting with the researcher to complete the survey. We will also ask participants if they are happy to invite other members of their household to the Teams meeting, and if they are happy to, share the link to the information about the study with their housemates before the arranged time of the Teams meeting. This is not a requirement to participate and this will be clearly explained to the participant. Once a time has been agreed, the researcher will initiate the Teams meeting and explain the study and ensure the all participants have an opportunity to ask questions before completing the survey. The researcher will remain on Teams until all participants have completed the survey. Participants are free to complete the study at a different time should they find they are unable to complete it during the scheduled teams meeting, if necessary. Participants will be provided with a debrief sheet after the questionnaires are completed. Participants will be asked to provide the last 4 digits of their student ID in order to be able to locate their data should they wish to withdraw at any point before 31st MAY 2020. After this date the data will be grouped for analysis.

Participants are asked at the end of the online survey if they are happy to be contacted again at Time 2, six months later, by submitting their email and telephone number. This personal data will be stored separately from their questionnaire responses, and all data will be encrypted and stored in separate folders on OneDrive, the University approved secure cloud storage.

5. Briefly describe your data collection and analysis methods, and the rationale for their use.

Data will be collected through the use of online survey software, Qualtrics (<https://www.qualtrics.com/uk/>) Data will be collected during October 2020 (Time 1) and during April 2021 (Time 2). Participants will be able to access the survey via a link sent in the Teams messages function during a scheduled Teams meeting with the researcher. On the survey, participants will first be required to read the participant information sheet and to confirm their consent to participate in the study. If the participant agrees to participate, they will indicate this on the online consent form, and they will then be able to proceed to complete the full survey. Participants will be asked to complete blocks of questions on the following domains; demographics, chronotype, sleep patterns, social reward needs, subjective social status, and anxiety and depression. Students will be invited to complete the survey on their own devices within the planned Teams meeting if they are happy to do so. The questions are expected to take no longer than 20 minutes. The Teams meeting is expected to take no longer than 30 minutes in total. Participants will be thanked for their participation with a £5 gift card for Amazon or high street stores that can be emailed to them, or they can be provided with a gift card that can be collected in person or posted to them. Path analysis (in SPSS) will be used to investigate correlational connections between variables and outcomes on the (Time 1 data) and the causal predictions on mental health outcomes at Time 2 (Time 1 and Time 2 data). Missing value analyses will be performed to assess systematic differences in demographics of participants who continued or did not continue to Time 2.

6. What plan is in place for the storage, back-up, security and documentation of data (electronic, digital, paper, etc.)? Note who will be responsible for deleting the data at the end of the storage period. Please ensure that your plans comply with General Data Protection Regulation (GDPR) and the (UK) Data Protection Act 2018.

All data will be only stored electronically. All survey data collected or managed on Qualtrics will be exported to encrypted files and will only be analyzed using password protected desktop and laptop computers. Data stewardship will be undertaken by Gamze Kocdemir and overseen by Dr. Judith Lunn. The dataset will be named clearly and accurately using a meaningful file name and the correct version number. The raw data will be anonymized and stored on One Drive. Datasets of anonymized raw data will be made available when required to do so to support publications, and in a format required by the publisher. We will also make datasets available on University data repository Pure. E-mail addresses, phone numbers and house numbers will be stored separately from the research data on an encrypted file

and not shared outside of the research team. Personal data will be deleted in June 2020 after the end of the study testing phases.

7. Will audio or video recording take place? no audio video

a. Please confirm that portable devices (laptop, USB drive etc) will be encrypted where they are used for identifiable data. If it is not possible to encrypt your portable devices, please comment on the steps you will take to protect the data. All data will be encrypted and only used on devices that are password protected and can handle encrypted data.

b. What arrangements have been made for audio/video data storage? At what point in the research will tapes/digital recordings/files be destroyed?

N/A

Please answer the following questions *only* if you have not completed a Data Management Plan for an external funder

8a. How will you share and preserve the data underpinning your publications for at least 10 years e.g. PURE? Yes, in Pure, or another secure repository if required by the publisher.

8b. Are there any restrictions on sharing your data?

Due to the small sample size, even after full anonymization there is a small risk that participants can be identified. Therefore, supporting data will only be shared on request. Access will be granted on a case by case basis by the Faculty of Health and Medicine.

9. Consent

a. Will you take all necessary steps to obtain the voluntary and informed consent of the prospective participant(s) or, in the case of individual(s) not capable of giving informed consent, the permission of a legally authorised representative in accordance with applicable law? yes

b. Detail the procedure you will use for obtaining consent?

Participants will be introduced to the researcher via a Teams meeting and have an opportunity to ask questions about the study before providing consent and completing the survey.

10. What discomfort (including psychological eg distressing or sensitive topics), inconvenience or danger could be caused by participation in the project? Please indicate plans to address these potential risks. State the timescales within which participants may withdraw from the study, noting your reasons.

This is a low risk study, since this study consists of online questionnaires and data collection procedure. However, students may have concerns about their sleep hygiene after reporting sleep pattern, or about their mental health. The survey will also provide them with sleep and mental health resources in the debrief sheet. There will be website links to NHS and Lancaster University Student Counselling and Mental Health Services in the debrief sheet

11. What potential risks may exist for the researcher(s)? Please indicate plans to address such risks (for example, noting the support available to you; counselling considerations arising from the sensitive or distressing nature of the research/topic; details of the lone worker plan you will follow, and the steps you will take).

There are no known risks to the researcher in conducting this online study. However, the supervisor Dr Lunn will be informed of Teams meetings through the shared Teams group for this research study and will ensure the researcher is properly supported in terms of health and wellbeing needs.

12. Whilst we do not generally expect direct benefits to participants as a result of this research, please state here any that result from completion of the study.

It is not expected that there will be a direct benefit to participants. However participants may find their involvement to be a positive experience. The aim is to inform on sleep patterns and mental health in this population in order to share the findings and raise awareness of sleep needs of students, and how it may be related to social functioning and mental health. Universities can also use this information to help support new students in what can be a challenging transition for some young people.

13. Details of any incentives/payments (including out-of-pocket expenses) made to participants:

£5 Amazon or high street voucher for participation at Time 1 and Time 2.

14. Confidentiality and Anonymity

a. Will you take the necessary steps to assure the anonymity of subjects, including in subsequent publications? yes

b. Please include details of how the confidentiality and anonymity of participants will be ensured, and the limits to confidentiality.

The data collection is anonymised responses to questions about sleep, social factors, and mental health. No names will be recorded in the survey data and we are not able to identify individuals from their responses without their explicit request, as we would need the last 4 digits of their student ID number. Data of participants will be recorded along with the participant number in an encrypted file on One Drive only accessible by the researcher and her supervisor. Participant number will be participants' student number (the last 4 digits) If they want to withdraw, they can e-mail the researcher with their student numbers up to 31st May 2020. After this time the data will be combined into datasets and will be analysed. As mentioned previously, the contact details for continued participation at Time 2 will be kept in a separate encrypted file and only accessible by the researcher and supervisor. This personal data will also be deleted at the end of the Time 2 testing phase (31st MAY 2020).

There is no more risk to participant confidentiality of survey answers using Teams online meeting forum to complete the survey questionnaires than face to face. We are also confident that Teams is a secure means of communication. We will not use other means of communication (e.g. zoom, skype) without explaining that secure communication can only be guaranteed with Teams.

15. If relevant, describe the involvement of your target participant group in the *design and conduct* of your research.

The supervisor has previously conducted studies with first year students on sleep and has received supportive feedback on the importance of this research. Previous participants thought this was an important and worthwhile research agenda and agreed that the survey data collection method was appropriate and reasonable. Several students also offered to communicate awareness of the research with their cohort and one provided very insightful suggestions for future research projects.

16. What are the plans for dissemination of findings from the research? If you are a student, include here your thesis.

The results will be disseminated in summary form to staff and students of Lancaster University. It will be communicated more widely in the form of a presentation or summary, and for the PhD thesis. Results of the research may be submitted for publication in an academic/professional journal. This has been explained in the information given to participants.

17. What particular ethical considerations, not previously noted on this application, do you think there are in the proposed study? Are there any matters about which you wish to seek guidance from the FHMREC?

There may be ethical issues surrounding the researchers' duty of care for student wellbeing, where students are reporting particularly problematic sleep or mental health problems. The purpose of the study is to assess sleep at the group level and is not an appropriate method for screening for sleep or mental health disorders in individual students. To ensure students' confidentiality and anonymity is never violated in this study, we will encourage those who have concerns about their sleep or any other aspects of their wellbeing to contact the Lancaster's Student Support service and supply the web and email addresses on the debrief sheet.

SECTION FOUR: signature

Applicant electronic signature:



Date 18/08/2020

Student applicants: please tick to confirm that your supervisor has reviewed your application, and that they are happy for the application to proceed to ethical review

Project Supervisor name (if applicable): Edith Lunn

Date application discussed 19/08/2020

Submission Guidance

1. Submit your FHMREC application by email to Becky Case (fhmresearchsupport@lancaster.ac.uk) as two separate documents:
 - i. **FHMREC application form.**
Before submitting, ensure all guidance comments are hidden by going into 'Review' in the menu above then choosing *show markup>balloons>show all revisions in line*.
 - ii. **Supporting materials.**
Collate the following materials for your study, if relevant, into a single word document:
 - a. Your full research proposal (background, literature review, methodology/methods, ethical considerations).
 - b. Advertising materials (posters, e-mails)
 - c. Letters/emails of invitation to participate
 - d. Participant information sheets
 - e. Consent forms
 - f. Questionnaires, surveys, demographic sheets
 - g. Interview schedules, interview question guides, focus group scripts
 - h. Debriefing sheets, resource lists

Please note that you DO NOT need to submit pre-existing measures or handbooks which support your work, but which cannot be amended following ethical review. These should simply be referred to in your application form.

2. Submission deadlines:
 - i. Projects including direct involvement of human subjects **[section 3 of the form was completed]**. The *electronic* version of your application should be submitted to [Becky Case](#) **by the committee deadline date**. Committee meeting dates and application submission dates are listed on the [FHMREC website](#). Prior to the FHMREC meeting you may be contacted by the lead reviewer for further clarification of your application. Please ensure you are available to attend the committee meeting (either in person or via telephone) on the day that your application is considered, if required to do so.
 - ii. The following projects will normally be dealt with via chair's action, and may be submitted at any time. **[Section 3 of the form has *not* been completed, and is not required]**. Those involving:
 - a. existing documents/data only;
 - b. the evaluation of an existing project with no direct contact with human participants;
 - c. service evaluations.
3. **You must submit this application from your Lancaster University email address, and copy your supervisor in to the email in which you submit this application**

‘Dear First Year Students,

I am sure you are all aware of the importance of good sleep and mental health and well being. At present there is limited research data available on UK university students' sleep and mental wellbeing when they first arrive at University.

We hope you are willing to join a sleep research project taking about 30 minutes in total. Are you willing to participate in a questionnaire that will take 20 minutes to fill out? If yes, you will receive a £5 gift voucher as a thank you.

You can find out more about the study in the attached Participant Information Sheet or you can contact the researcher Gamze Kocdemir for more information.

Contact details of the researcher:

e-mail: g.kocdemir1@lancaster.ac.uk



*Lancaster University Research
Project*

Sleep Research

Sleep and Mental Health

need your help!

Would you like to take part in this research?

- Are you living in a shared campus accommodation?
- Would you like to take part in a project that aims to inform and improve the sleep and mental health of students?

If so, we would like to hear from you!

What would be involved?

- Filling online questionnaires about sleep, social interactions and mental health.

When and where will the study take place?

The study will be online and you will fill questionnaires from your own computer in an online meeting.

If you would like to participate in the study and for more details please complete and contact the researcher by email or phone:

Gamze Kocdemir g.kocdemir1@lancaster.ac.uk

**Participation will be rewarded with £5 gift voucher
(Amazon or high street stores)**



Participant Information Sheet

Participant Information Sheet

The effects of chronotype and social reward needs on the mental health of 1st-year students

My name is Gamze Kocdemir and I am conducting this research as a PhD student in the Medical School at Lancaster University, Lancaster, United Kingdom.

What is the study about?

Leaving the home environment and starting university brings about a lot of changes, including different social interactions and different sleep patterns. The aim of our study is to analyze how such changes affect you in regard to your biological clock (chronotype), quality of sleep, productivity and mental health. To do so, we will ask you questions about your sleep, social interactions and how you feel.

Why have I been approached?

You have been approached because the study requires information from people who are in the first year of university.

University is a new social environment that might have an impact on sleep, social reward needs (social interactions are a source of rewards) and the mental health of first-year university students.

Do I have to take part?

It's completely up to you to decide whether or not you take part in the study.

What will I be asked to do if I take part?

If you decide you would like to take part, you will be asked to complete an online form asking demographic information, a morning-evening preference, a sleep quality, a social status and a general mental health questionnaire.

Will my data be identifiable?

Research data will be anonymised, personal data will be kept confidential. Data will be stored on an One Drive file (university-approved secure cloud storage). You can withdraw from the study at any time up to 31st of May 2021 as this is the end of the data collection period. If you withdraw before this date, your data will be permanently deleted and not used in the study. The data collected for this study will be stored securely and only the researchers conducting this study will have access to this data. The files on the computer will be encrypted (that is no-one other than the researcher will be able to access them) and the computer itself password protected. All your personal data will be confidential and will be kept separately from your survey responses.

What will happen to the results?

The results will be summarised and reported in a PhD thesis and may be submitted for publication in an academic or professional journal.

Are there any risks?

There are no risks anticipated with participating in this study. However, if you experience any distress following participation you are encouraged to inform the researcher and contact the resources provided at the end of this sheet.

Are there any benefits to taking part?

Although you may find participating interesting, there are no direct benefits in taking part.

Who has reviewed the project?

This study has been reviewed and approved by the Faculty of Health and Medicine Research Ethics Committee at Lancaster University.

Where can I obtain further information about the study if I need it?

If you have any questions about the study, please contact the main researcher:

Gamze Kocdemir

g.kocdemir1@lancaster.ac.u

k. Dr Judith

Lunn(supervisor)

j.lunn1@lancaster.ac.uk.

Complaints

If you wish to make a complaint or raise concerns about any aspect of this study and do not want to speak to the researcher, you can contact:

Dr Gill Vince

+44 (0)1524 593733

g.vince@lancaster.ac.uk

Division

Lancaster University

Lancaster

LA1 4YW

If you wish to speak to someone outside of the Medical School Doctorate Programme, you may also contact:

Prof. Roger Pickup

Chair of FHM REC Email: r.pickup@lancaster.ac.uk

Faculty of Health and Medicine

(Lancaster Medical School)

Lancaster University

Lancaster

LA1 4YG

Thank you for taking the time to read this information sheet.

Resources in the event of distress

Should you feel distressed either as a result of taking part or in the future, the following resources may be of assistance:

<https://www.nhs.uk/live-well/sleep-and-tiredness/how-to-get-to-sleep/>

<https://www.lancaster.ac.uk/student-and-education-services/counselling-and-mental-health-service/>

<https://www.nhs.uk/conditions/stress-anxiety-depression/>

Consent Form

The effects of chronotype and social reward needs on the mental health of 1st-year students

We are asking if you would like to take part in a research project about the biological clock, sleep, the social

reward needs, mental health.

Before you consent to participate in the study, we ask that you read the participant information sheet and consent if you agree. If you have any questions or queries before signing the consent form, please speak to the principal investigator, Gamze Kocdemir.

Please provide your consent for participation in this study if you agree with every statement below and by clicking on

the button at the bottom of the page.

- You have read the information sheet and understand what is expected of you within this study.
- You consent that you have had the opportunity to ask any questions and to have them answered.
- You consent that your participation is voluntary and that you are free to withdraw at any time without giving any reason, without your medical care or legal rights being affected.
- You consent that once your data have been anonymised and incorporated into themes it might not be possible for it to be withdrawn, though every attempt will be made to extract your data, up to the point of publication.
- You consent for the information you provide to be discussed with my supervisor at Lancaster University.
- You consent that any information you give will remain confidential and anonymous unless it is thought that there is a risk of harm to yourself or others, in which case the principal investigator will/may need to share this information with their research supervisor.
- You consent to Lancaster University keeping the data for 10 years after the study has finished.

By clicking on this button, you consent to taking part in the current study.

Demographics

What is your year of birth?

What is your gender?

Male

Female

Did you have a gap year?

Yes

No

What is your college name and house number(e.g.Bowland College, 100) in campus accomodation?

MEQ

Understanding your body clock will help you to understand what times of the day you are more productive and what times are the best for you to sleep. This section includes 19 questions.

Instructions

- A.** Read each question carefully
- B.** Answer each question as honestly as possible. Do not go back and check your answers. Your first response is usually the most accurate
- C.** Please answer ALL questions.

What time would you get up if you were entirely free to plan your day?

- 5:00 – 6:29 am
- 6:30 – 7:44 am
- 7:45 – 9:44 am
- 9:45 – 10:59 am
- 11:00 – 11:59 am
- Midday – 5:00 am

What time would you go to bed if you were entirely free to plan your evening?

- 8:00 – 8:59 pm
- 9:00 – 10:14 pm
- 10:15 pm – 12:29 am
- 12:30 – 1:44 am
- 1:45 – 2:59 am
- 3:00 am – 8:00 pm

If there is a specific time at which you have to get up in the morning, to what extent do you depend on being woken up by an alarm clock?

Not at all dependent

Slightly dependent Fairly
dependent

Very dependent

How easy do you find it to get up in the morning (when you are not woken up unexpectedly)?

Not at all easy

Not very easy

Fairly easy

Very easy

How alert do you feel during the first half hour after you wake up in the morning?

Not at all alert

Slightly alert

Fairly alert

Very alert

How hungry do you feel during the first half-hour after you wake up in the morning?

Not at all hungry

Slightly hungry Fairly hungry

Very hungry

During the first half-hour after you wake up in the morning, how tired do you feel?

Very tired

Fairly tired

Fairly refreshed

Very refreshed

If you have no commitment the next day, what time would you go to bed compared to your usual bedtime?

Seldom or never later Less

than one hour later 1-2 hours

later

More than two hours later

You have decided to engage in some physical exercise. A friend suggests that you do this for one hour twice a week and the best

time for him/her is between 7:00 – 8:00 am. Bearing in mind nothing but your own internal “clock”, how do you think you would perform?

- Would be in good form
- Would be in reasonable form
- Would find it difficult
- Would find it very difficult

At what time of day do you feel you become tired as a result of need for sleep?

- 8:00 – 8:59 pm
- 9:00 – 10:14 pm
- 10:15 pm – 12:44 am
- 12:45 – 1:59 am
- 2:00 – 3:00 am

You want to be at your peak performance for a test that you know is going to be mentally exhausting and will last for two hours. You are entirely free to plan your day. Considering only your own internal “clock”, which ONE of the four testing times would you choose?

- 8:00 – 10:00 am
- 11:00 am – 1:00 pm
- 3:00 – 5:00 pm

7:00 – 9:00 pm

If you got into bed at 11:00 pm, how tired would you be?

Not at all tired

A little tired Fairly tired

Very tired

For some reason, you have gone to bed several hours later than usual, but there is no need to get up at any particular time the next morning. Which ONE of the following are you most likely to do?

Will wake up at usual time, but will NOT fall back asleep Will wake up at usual time and will doze thereafter

Will wake up at usual time but will fall asleep again Will NOT wake up until later than usual

One night you have to remain awake between 4:00 – 6:00 am in order to carry out a night watch. You have no commitments the next day. Which ONE of the alternatives will suite you best?

Would NOT go to bed until watch was over Would take a nap before and sleep after

Would take a good sleep before and nap after

Would sleep only before watch

You have to do two hours of hard physical work. You are entirely free to plan your day and considering only your own internal “clock” which ONE of the following times would you choose?

- 8:00 – 10:00 am
- 11:00 am – 1:00 pm
- 3:00 – 5:00 pm
- 7:00 – 9:00 pm

You have decided to engage in hard physical exercise. A friend suggests that you do this for one hour twice a week and the best time for him/her is between 10:00 – 11:00 pm. Bearing in mind nothing else but your own internal “clock”, how well do you think you would perform?

- Would be in good form
- Would be in reasonable form
- Would find it difficult
- Would find it very difficult

Suppose that you can choose your school hours. Assume that you went to school for five hours per day and that school was interesting and enjoyable. Which five consecutive hours would you select?(am: 00.00-12.00, pm: 12.00-00.00)

- 5 hours starting between 4:00 – 7:59 am
- 5 hours starting between 8:00 - 8:59 am
- 5 hours starting between 9:00 am – 1:59 pm
- 5 hours starting between 2:00 – 4:59 pm
- 5 hours starting between 5:00 pm – 3:59 am

At what time of the day do you think that you reach your “feeling best” peak?

- 5:00 – 7:59 am
- 8:00 – 9:59 am
- 10:00 am – 4:59 pm
- 5:00 – 9:59 pm

One hears about “morning” and “evening” types of people. Which ONE of these types do you consider yourself to be?

- Definitely a “morning” type
- Rather more a “morning” type than an “evening” type
- Rather more an “evening” type than a “morning” type
- Definitely an “evening” type

PSQI

Sleep Quality Assessment (PSQI)

The following questions relate to your usual sleep habits during the past month only. Your answers should indicate the most accurate reply for the majority of days and nights in the past month. Please answer all questions. It includes 20 questions needed short responses mostly.

During the past month,

When have you usually gone to bed?

How long (in minutes) has it taken you to fall asleep each night?

What time have you usually gotten up in the morning?

How many hours of actual sleep did you get at night?

How many hours were you in bed?

During the past month, how often have you had trouble sleeping because you:

	Click to write Column 1			
	Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
Cannot get to sleep within 30 minutes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wake up in the middle of the night or early morning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Have to get up to use the bathroom	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cannot breathe comfortably	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cough or snore loudly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Feel too cold	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Feel too hot	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Have bad dreams	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Have pain	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other reason(s), please describe, including how often you have had trouble sleeping because of this reason(s):	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Reason(s) if applicable:

Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
---------------------------	-----------------------	----------------------	----------------------------

During the past month, how often have you taken medicine (prescribed or “over the counter”) to help you sleep?

Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?

Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

During the past month, how much of a problem has it been for you to keep up enthusiasm to get things done?

Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

During the past month, how would you rate your sleep quality overall?

Very good	Fairly good	Fairly bad	Very bad
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

SRQ

Here is a list of statements about what you enjoy when you interact with other people. The statements refer to all people in your life, e.g. friends, partners, family, colleagues or people you have just met. Consider how well each statement relates to you and indicate your answer with a tick. NOTE: If there is something you have never experienced, imagine how much you would enjoy it.

Social Rewards

	Strongly Disagree	Disagree	Slightly disagree	Neither nor disagree	Slightly agree	Agree	Strongl y Agree
						e	

I enjoy being around people who think I am an important, exciting person

I enjoy treating others fairly

I enjoy making someone angry

I enjoy going to parties

I enjoy being nice to someone only if I gain something out of it

I enjoy feeling emotionally connected to someone

I enjoy it if others look up to me

I enjoy tricking someone out of something	<input type="radio"/>						
I enjoy having erotic relationships	<input type="radio"/>						
I enjoy being a member of a group/club	<input type="radio"/>						
I enjoy being around people who are impressed with who I am and what I do	<input type="radio"/>						
I enjoy letting someone else tell me what to do	<input type="radio"/>						
I enjoy having many sexual experiences	<input type="radio"/>						
I enjoy embarrassing others	<input type="radio"/>						
I enjoy many people wanting to invite me to their social events	<input type="radio"/>						
I enjoy keeping promises I make to others	<input type="radio"/>						
I enjoy seeing others get hurt	<input type="radio"/>						
I enjoy achieving recognition from others	<input type="radio"/>						
I enjoy it if someone accepts me as I am, no matter what	<input type="radio"/>						
I enjoy having an active sex life	<input type="radio"/>						
I enjoy someone else making decisions for me	<input type="radio"/>						

I enjoy making someone feel happy

I enjoy following someone else's rules

SSS Ladders

Now can you look at the picture of the ladder below

Imagine the ladders show where people fit in your year group

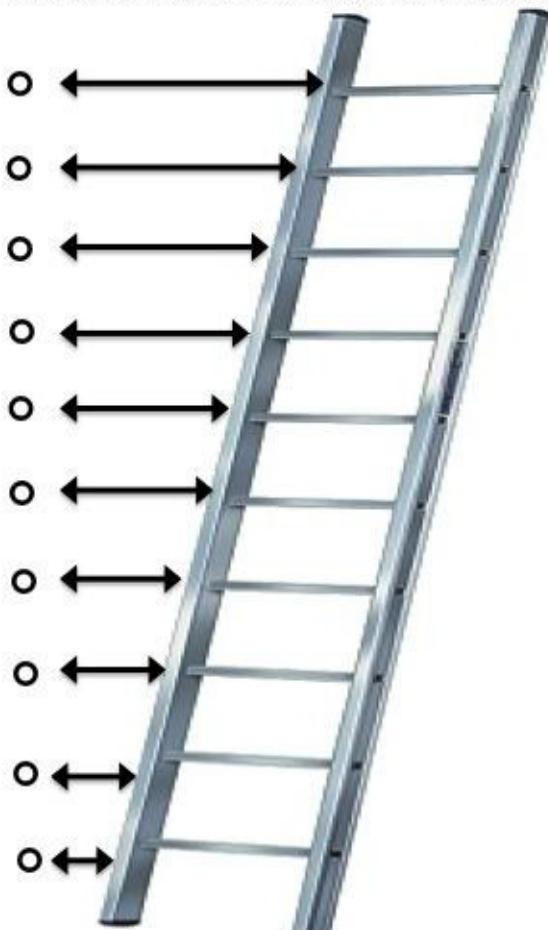
Where would you put yourself?

For example:

How TALL are you compared with the rest of your year group? (not just compared to your own friends.)

Click on the button that shows best where you would be on each ladder

TOP = TALLEST PEOPLE IN YOUR YEAR GROUP



CLICK ON THE BUTTON THAT SHOWS BEST WHERE YOU WOULD BE ON EACH LADDER. How TALL are you compared with the rest of your year group (not just compared to your own friends)? Here we mean Year Group at School or College NOT University.



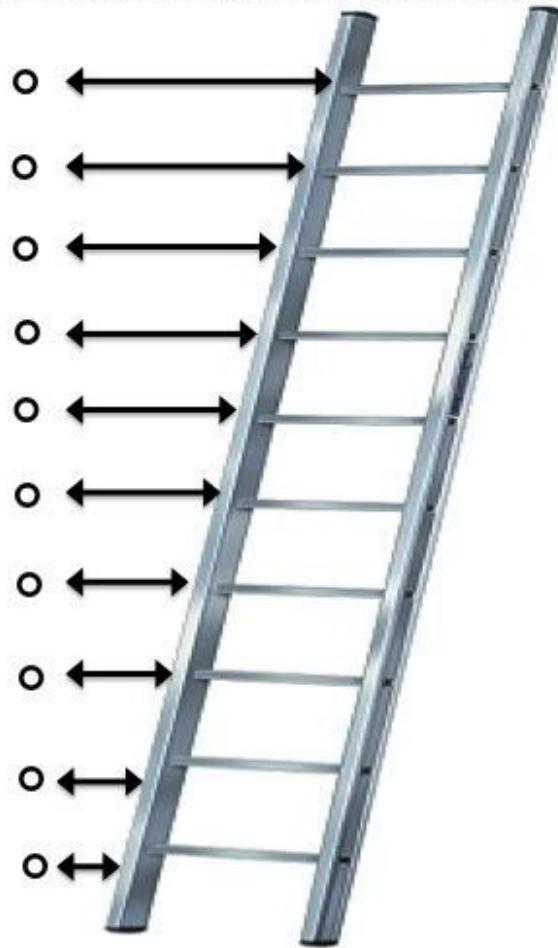
Tallest is the this top button



OK HOW ABOUT...

How POPULAR are you compared with the rest of your year group? (not just compared with your own friends.)

TOP = MOST POPULAR PEOPLE IN YOUR YEAR GROUP

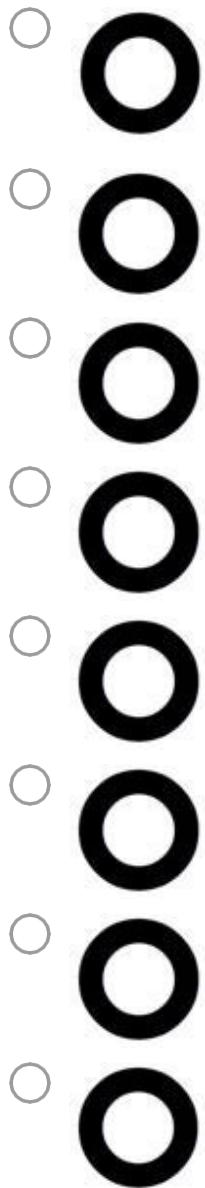


How POPULAR are you compared with the rest of your year group (not just compared to your own friends)?



Most popular is this top button

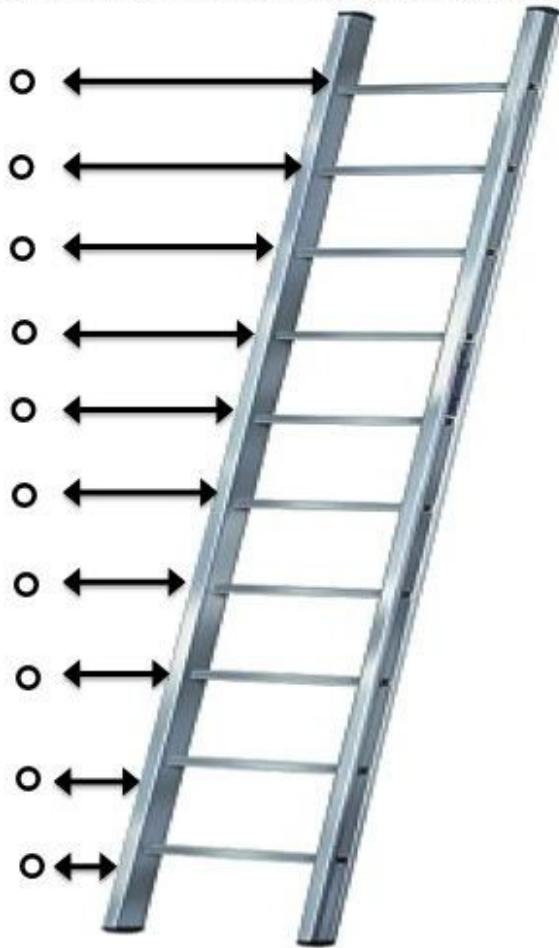




TOP = PEOPLE WHO GET THE BEST GRADES IN YOUR YEAR GROUP

OK HOW ABOUT...

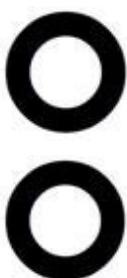
**How well ARE YOU DOING
AT SCHOOL compared with
the rest of your year
group? (not just compared
with your own friends.)**

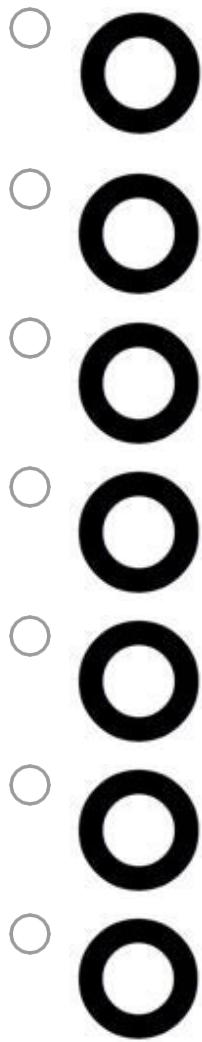


How WELL ARE YOU DOING AT SCHOOL compared with the rest of your year group (not just compared to your own friends)?



Getting the best grades is this top button

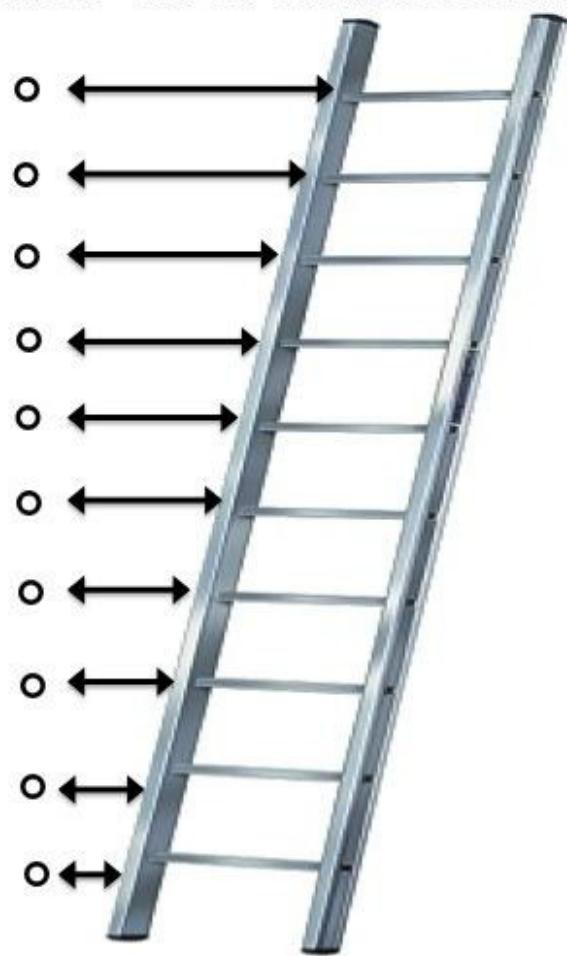




TOP = MOST POWERFUL PEOPLE IN YOUR YEAR GROUP – CAN GET OTHERS TO DO WHAT THEY WANT, IN GOOD OR BAD WAYS

OK HOW ABOUT...

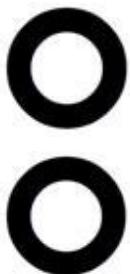
How POWERFUL are you compared with the rest of your year group? (not just compared with your own friends.)

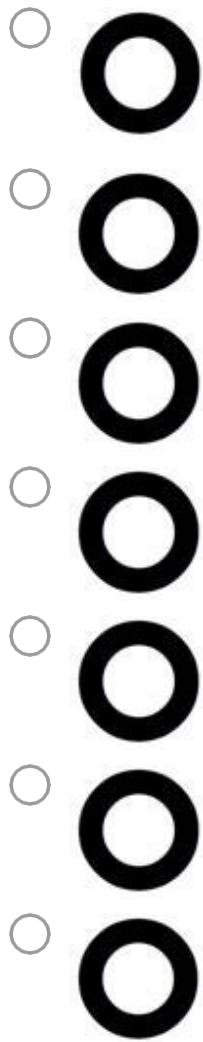


How POWERFUL are you compared with the rest of your year group (not just compared to your own friends)?



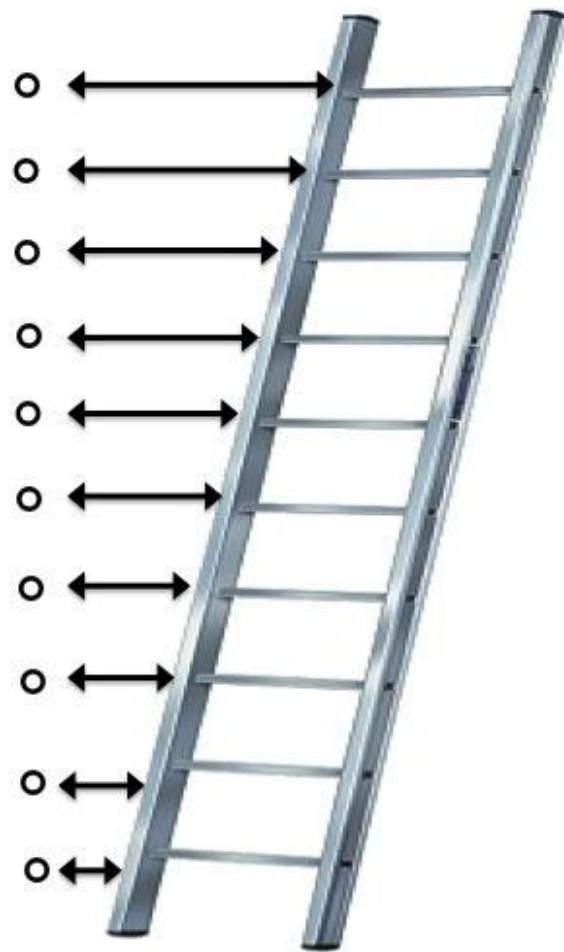
The most powerful is this top button





TOP = PEOPLE WHO MAKE THE MOST TROUBLE IN YOUR YEAR GROUP**OK HOW ABOUT...**

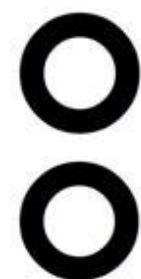
How MUCH OF A TROUBLE MAKER are you compared with the rest of your year group? (not just compared with your own friends.)

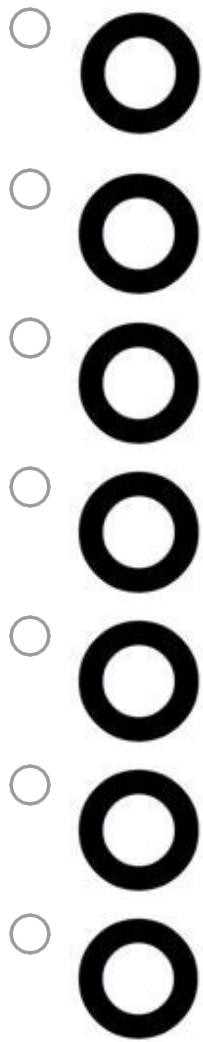


How MUCH OF A TROUBLE MAKER are you compared with the rest of your year group (not just compared to your own friends)?



Making the most trouble is this top button

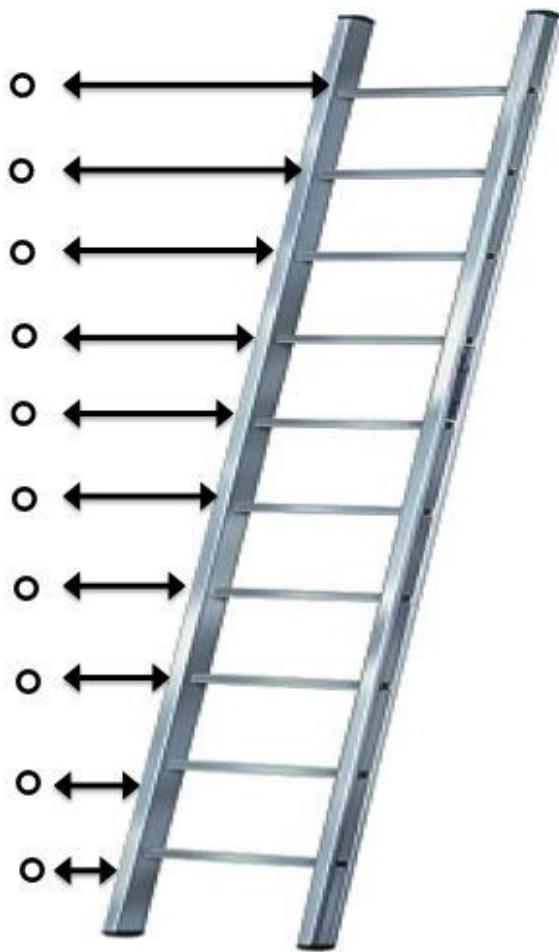




TOP = THE MOST ATTRACTIVE, STYLISH PEOPLE IN YOUR YEAR GROUP

OK HOW ABOUT...

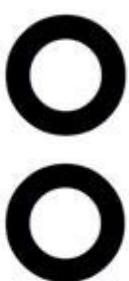
How ATTRACTIVE OR STYLISH are you compared with the rest of your year group? (not just compared with your own friends.)

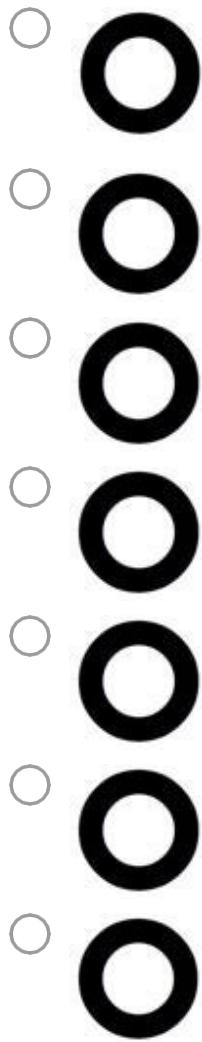


How ATTRACTIVE OR STYLISH are you compared with the rest of your year group (not just compared to your own friends)?



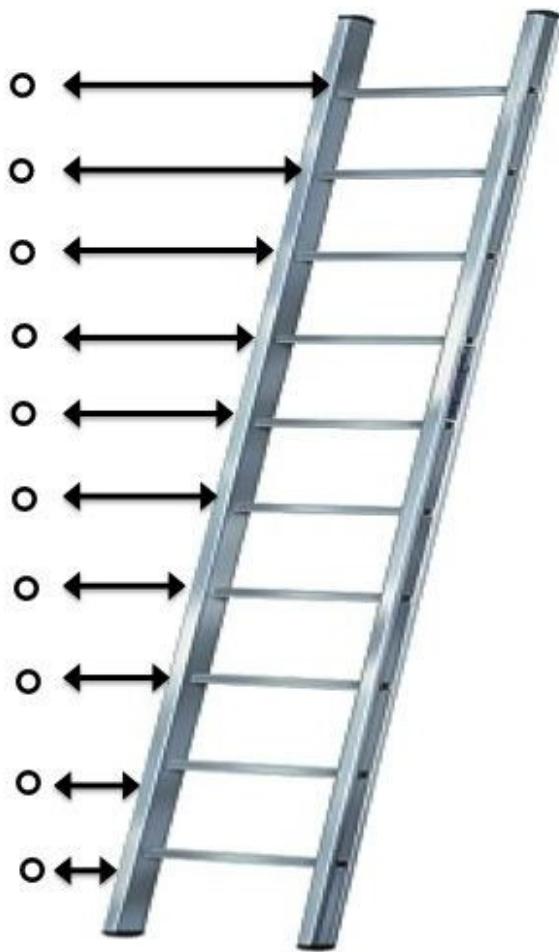
the most attractive and stylish is this top button





TOP = PEOPLE WHO ARE MOST RESPECTED IN YOUR YEAR GROUP**OK HOW ABOUT...**

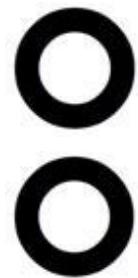
How RESPECTED are you compared with the rest of your year group? (not just compared with your own friends.)

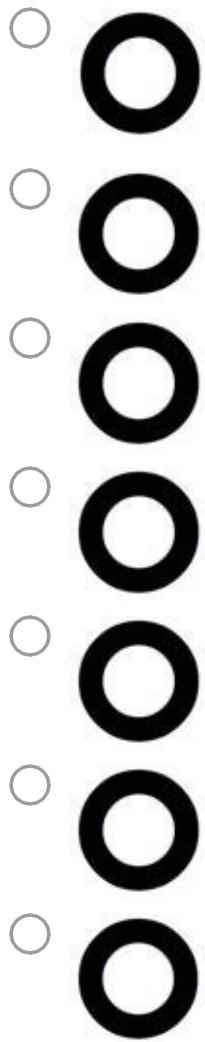


How RESPECTED are you compared with the rest of your year group (not just compared to your own friends)?



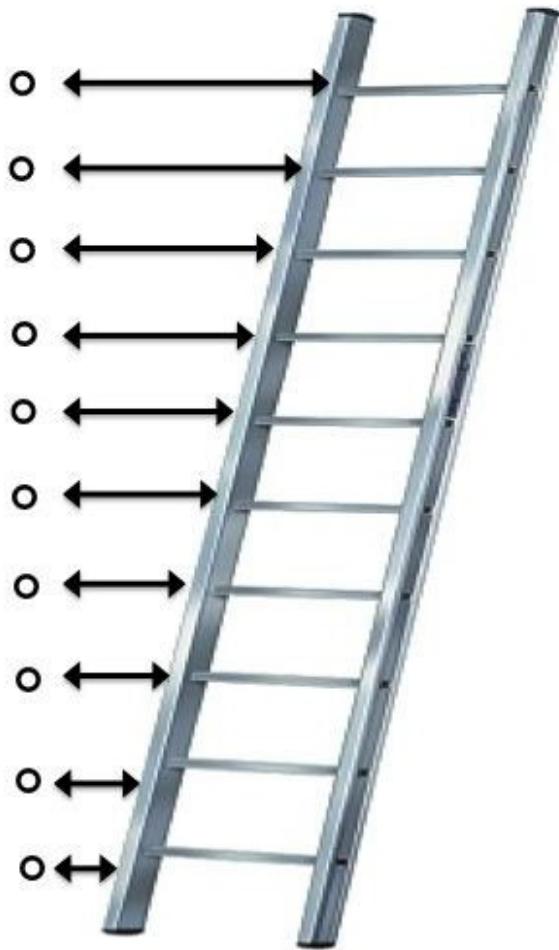
the most respected is this top button





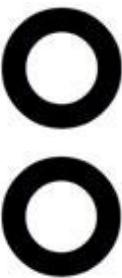
TOP = PEOPLE WHO ARE MOST SPORTY IN YOUR YEAR GROUP**OK HOW ABOUT...**

How SPORTY are you compared with the rest of your year group? (not just compared with your own friends.)



How SPORTY are you compared with the rest of your year group (not just compared to your own friends)?

the most sporty is this top button



○ **○**

○ **○**

○ **○**

○ **○**

○ **○**

○ **○**

○ **○**

GAD-7 Anxiety

Over the last 2 weeks, how often have you been bothered by the following problems?

	Not at all	Several days	More than half the days	Nearly Every Day
--	------------	--------------	-------------------------	------------------

Feeling nervous, anxious or on edge

Not being able to stop or control worrying

Worrying too much

Trouble relaxing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Being so restless that it is hard to sit still	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Becoming easily annoyed or irritable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Feeling afraid as if something awful might happen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?

Not difficult at all
 Somewhat difficult Very difficult
 Extremely difficult

PHQ-9 Depression

Over the last 2 weeks, how often have you been bothered by any of the following problems?

	Not at all	Several days	More than half the days	Nearly every day
--	------------	--------------	-------------------------	------------------

Little interest or pleasure in doing things	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Feeling down, depressed, or hopeless	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Trouble falling or staying asleep, or sleeping too much	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Feeling tired or having little energy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Poor appetite or overeating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Feeling bad about yourself — or that you are a failure or have let yourself or your family down	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Trouble concentrating on things, such as reading the newspaper or watching television	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Moving or speaking so slowly that other people could have noticed? Or the opposite — being so fidgety or restless that you have been moving around a lot more than usual	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Thoughts that you would be better off dead or of hurting yourself in some way	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Participant Debrief Sheet

The effects of chronotype and social reward needs on the mental health of 1st-year students

Investigator: Gamze Kocdemir

g.kocdemir1@lancaster.ac.uk

Thank you for your participation. You completed the Demographics, Morningness Eveningness Questionnaire, Pittsburgh Sleep Quality Index, Social Reward Needs Questionnaire, McArthur Subjective Social Status Ladders, Generalised Anxiety Disorder Assessment and Patient Health Questionnaire. If you are interested in learning more about this research, you can access these resources:

Hasler, B. P., & Clark, D. B. (2013). Circadian Misalignment, Reward-Related Brain Function, and Adolescent Alcohol Involvement. *Alcoholism: Clinical and Experimental Research*, 37(4), 558–565.

<https://doi.org/10.1111/acer.12003> Walker, W. H., Walton, J. C., DeVries, A. C., & Nelson, R. J. (2020). Circadian rhythm disruption and mental health.

Translational Psychiatry, 10(1). <https://doi.org/10.1038/s41398-020-0694-0>

Participation is confidential and no identifying information will ever appear in any reports. Data will be stored on encrypted, password protected devices. Remember you can withdraw at any time up to May 2021 (until the end of whole study) and your data will be permanently deleted and not used in the study.

If you have concerns about your sleep and mental health and need advice we recommend these resources:

<https://www.nhs.uk/live-well/sleep-and-tiredness/how-to-get-to-sleep/>

<https://www.lancaster.ac.uk/student-and-education-services/counselling-and-mental-health-service/> <https://www.nhs.uk/conditions/stress-anxiety-depression/>

Thank you for your time in considering to participate in this study, please contact the researcher on g.kocdemir1@lancaster.ac.uk if you have any further queries, or would like to withdraw from the study.

If you have any concerns or complaints about this project you can contact an independent person at

Lancaster University: Dr Gill Vince Email: g.vince@lancaster.ac.uk

If you wish to speak to someone outside of the Medical School Doctorate Programme, you may also contact: Dr Laura Machin Tel: +44 (0)1524 594973

Chair of FHM REC Email: l.machin@lancaster.ac.uk

Faculty of Health and Medicine

(Lancaster Medical School)

Lancaster University

Lancaster

LA1 4YG

Block 9

Thank you for your participation! Please enter in the box below the last 4 digits of student number so we can identify your data if you wish to withdraw from the study.

This information will be stored separate to your responses and encrypted.

If you are happy to be contacted again for the 6 months follow up study please enter your email address and phone number.

This information will be stored separate to your responses and encrypted.

Powered by Qualtrics

Applicant: Gamze Kocdemir
Supervisor: Judith Lunn
Department: LMS
FHMREC Reference: FHMREC19117

03 September 2020

Re: FHMREC19117
The effects of chronotype and social reward needs on mental health of 1st year students

Dear Gamze,

Thank you for submitting your research ethics application for the above project for review by the **Faculty of Health and Medicine Research Ethics Committee (FHMREC)**. The application was recommended for approval by FHMREC, and on behalf of the Chair of the Committee, I can confirm that approval has been granted for this research project.

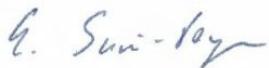
As principal investigator your responsibilities include:

- ensuring that (where applicable) all the necessary legal and regulatory requirements in order to conduct the research are met, and the necessary licenses and approvals have been obtained;
- reporting any ethics-related issues that occur during the course of the research or arising from the research to the Research Ethics Officer at the email address below (e.g. unforeseen ethical issues, complaints about the conduct of the research, adverse reactions such as extreme distress);
- submitting details of proposed substantive amendments to the protocol to the Research Ethics Officer for approval.

Please contact me if you have any queries or require further information. Email:

fhmresearchsupport@lancaster.ac.uk

Yours sincerely,



Dr. Elisabeth Suri-Payer,
Interim Research Ethics Officer, Secretary to FHMREC.

**Faculty of Health and Medicine Research Ethics Committee (FHMREC) Lancaster
University Application for Amendment to Previously Approved
Research**

1. Name of applicant:

Gamze Kocdemir

2. E-mail address and phone number of applicant:

g.kocdemir1@lancaster.ac.uk

3. Title of project:

Effects of Chronotype and Social Rewards on Mental Health of Students

4. FHMREC project reference number: FHMREC19117

5. Date of original project approval as indicated on the official approval letter(month/year):

3 September 2020

03/09/2020

6. Please outline the requested amendment(s)

Note that where the amendment relates to a change of researcher, and the new researcher is a student, a full application must be made to FHMREC

Second data collection will include Social Comparison Questionnaire, ethnicity and faculty questions.

7. Please explain your reason(s) for requesting the above amendment(s):

Preliminary data analysis showed weak validity of included questionnaire and we wish to replace with a different instrument. We also failed to record information on ethnicity and faculty that are factors reported in other studies.

Guidance:

- a) Resubmit your research ethics documents (**the entire version which received final approval, including all participant materials, your application form and research protocol**), with all additions highlighted in yellow, and any deletions simply 'struck through', so that it is possible to see what was there previously.
- b) This should be submitted as a **single PDF** to [Becky Case](#) There is no need to resubmit the Governance Checklist

Applicant electronic signature:

A rectangular box containing a handwritten signature in black ink.

Date

Click or tap to enter a date
22.03.2021

Student applicants: please tick to confirm that you have discussed this amendment application with your

supervisor, and that they are happy for the application to proceed to ethical review

Project Supervisor name (if applicable):

Dr. Judith Lunn

Date application discussed

Click or tap to enter a date.
19.03.2021

You must submit this application from your Lancaster University email address, and copy your supervisor in to the email in which you submit this application

July 2016

Bowland College

Cartmel College

County College

Furness College Fylde
College

Graduate College

Grizedale College

Lonsdale College Pendle
College

What is your flat number, house number and name? (e.g. Flat 14,3, Brotherswater). This information is only used to group responses. We are interested in group sleep patterns in the study. All responses are anonymous and are never shared.

First Amendments in Ethics Application (March, 2021)

Q114. What is your ethnic group?

Asian

Black

Mixed

White

Other

Prefer not to say

Q118. What is your department?

MEQ

Understanding your body clock will help you to understand what times of the day you are more productive and what times are the best for you to sleep. This section includes 19 questions.

Instructions

- A.** Read each question carefully
- B.** Answer each question as honestly as possible. Do not go back and check your answers. Your first response is usually the most accurate
- C.** Please answer ALL questions.

. What time would you get up if you were entirely free to plan your day?

- 5:00 – 6:29 am

Q117. "Most people compare themselves from time to time with others. For example, they may compare the way they feel, their opinions, their abilities, and/or their situation with those of other people. There is nothing particularly "good" or "bad" about this type of comparison, and some people do it more than others. We would like to find out how often you compare yourself with other people. To do that we would like you to indicate how much you agree with each statement below, by using the following scale."

A disagree
strongly

B

C

D

E I agree
strongly

1. I often compare how my loved ones (boy or girlfriend, family members, etc.) are doing with how others are doing

2. I always pay a lot of attention to how I do things compared with how others do things.

3. If I want to find out how well I have done something, I compare what I have done with how others have done.

4. I often compare how I am doing socially (e.g., social skills, popularity) with other people.

	A disagree strongly	B	C	D	E I agree strongly
5. I am not the type of person who compares often with others. (reversed)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. I often compare myself with others with respect to what I have accomplished in life.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. I often like to talk with others about mutual opinions and experiences.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. I often try to find out what others think who face similar problems as I face.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. I always like to know what others in a similar situation would do.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. If I want to learn more about something, I try to find out what others think about it	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. I never consider my situation in life relative to that of other people. (reversed)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

SSS Ladders

Applicant: Gamze Kocdemir

Supervisor: Judith Lunn

Department: LMS

FHMREC Reference: FHMREC20122 (amendment to FHMREC19117)

29 March 2021

Re: FHMREC20122 (amendment to FHMREC19117)

The effects of chronotype and social reward needs on mental health of 1st year students

Dear Gamze and Judith,

Thank you for submitting your research ethics amendment application for the above project for review by the **Faculty of Health and Medicine Research Ethics Committee (FHMREC)**. The application was recommended for approval by FHMREC, and on behalf of the Chair of the Committee, I can confirm that approval has been granted for the amendment to this research project.

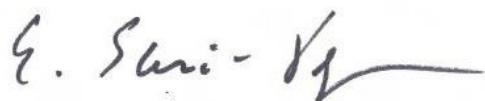
As principal investigator your responsibilities include:

- ensuring that (where applicable) all the necessary legal and regulatory requirements in order to conduct the research are met, and the necessary licenses and approvals have been obtained;
- reporting any ethics-related issues that occur during the course of the research or arising from the research to the Research Ethics Officer at the email address below (e.g. unforeseen ethical issues, complaints about the conduct of the research, adverse reactions such as extreme distress);
- submitting details of proposed substantive amendments to the protocol to the Research Ethics Officer for approval.

Please contact me if you have any queries or require further information.

Email: fhmresearchsupport@lancaster.ac.uk

Yours sincerely,



Dr. Elisabeth Suri-Payer

Research Ethics Officer, Secretary to FHMREC

Q118. What is your department?

Second Amendments (September, 2021)

Q150. Did you meet the eligibility criteria to take part in our widening participation activities and initiatives?

Please see here for more information

(<https://www.lancaster.ac.uk/widening-participation/our-strategy-and-approach/eligibility-criteria/>)

- Yes
- No

Q152. Do you receive a low income grant, scholarship or bursary to help with your University fees?

- Yes
- No
- Prefer not to say

Q151. Is University the first time you have moved from home and lived with peers?

- Yes
- No
- Prefer not to say

Q154. During the past 2 weeks, on how many days did you have 5 or more drinks of beer, wine, or liquor on the same occasion (4 or more if you are a woman)?

MEQ

Understanding your body clock will help you to understand what times of the day you are more productive and what times are the best for you to sleep. This section includes 19 questions.

Instructions

- A. Read each question carefully
- B. Answer each question as honestly as possible. Do not go back and check your answers. Your first response is

Social Comparison and Interest Scale

Q120.

We are interested in how you view yourself in comparison to others. Please circle a number, on the ten scales below, to indicate how you see yourself in comparison to others (i.e. people in general).

Example

Using the example scale below, if someone felt that they

were only slightly better at spelling than most people,

they would circle number 6 or 7.

If someone felt that they were only slightly worse at spelling than most people, they would circle number 4 or 5.

Poorer at spelling

1 2 3 4 5 6 7 8 9

10 Better at spelling

Q1.1. In relation to others I generally feel:

Less intelligent

More intelligent

0 1 2 3 4 5 6 7 8 9 10

Q1.2. In relation to others I generally feel:

Less socially skilled



More socially skilled

Q1.3. In relation to others I generally feel:

Less artistic/musical



More artistic/musical

Q1.4. In relation to others I generally feel:

Less competent at sports



More competent at sports

Q1.5. In relation to others I generally feel:

Less physically attractive



More physically attractive

Q1.6. In relation to others I generally feel:

Less leadership ability



More leadership ability

Q1.7. In relation to others I generally feel:



Q1.8. In relation to others I generally feel:



Q1.9. In relation to others I generally feel:



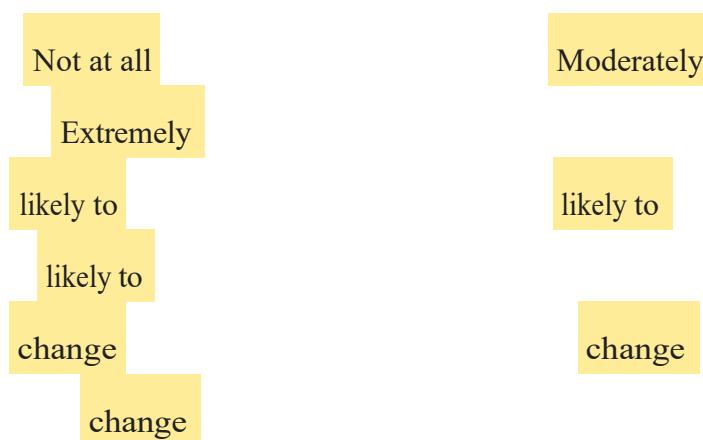
Q1.10. In relation to others I generally feel:



Q2.

Now rate how likely you think these qualities are to

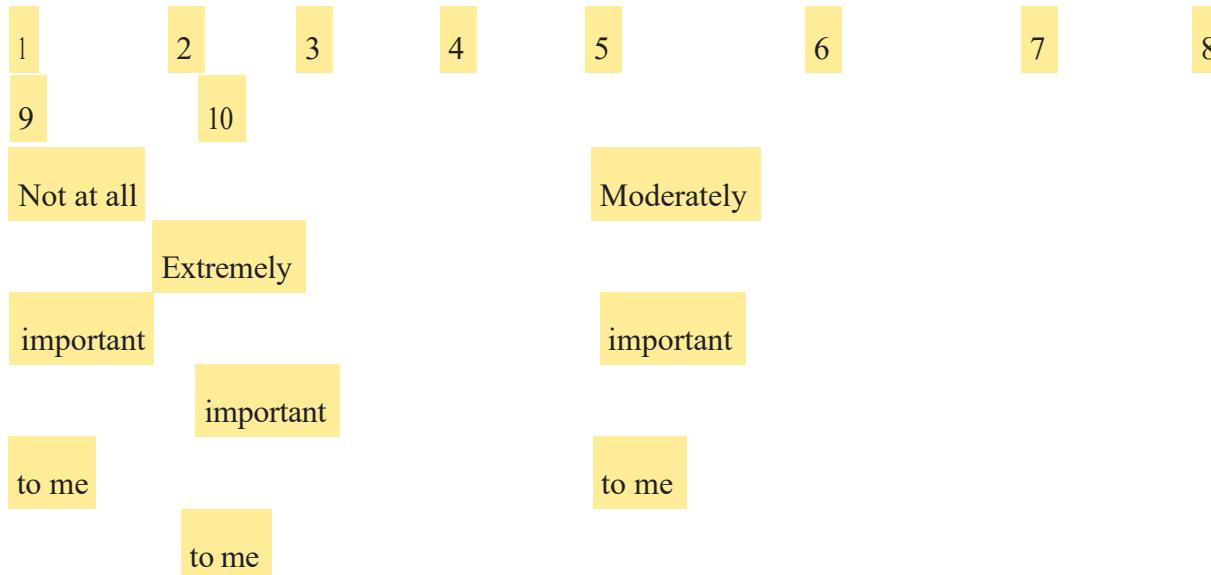
change for you using the following scale:



intelligence/academic ability	0
social skills/social competence	0
artistic and/or musical ability	0
competence or skill at sports	0
physical attractiveness	0
leadership ability	0
common sense	0
emotional stability	0
sense of humour	0
discipline	0
Total	0

Q3. Now rate how personally important each one of these

qualities is to you using the following scale:



intelligence/academic ability

0

social skills/social competence

0

artistic and/or musical ability

0

competence or skill at sports

0

physical attractiveness

0

leadership ability

0

common sense

0

emotional stability

0

sense of humour

0

discipline

0

Total

Applicant: Gamze Kocdemir
Supervisor: Judith Lunn
Department: LMS
FHMREC Reference: FHMREC21006

28 September 2021

Re: FHMREC21006
Effects of Chronotype and Social Rewards on Mental Health of Students

Dear Gamze,

Thank you for submitting your research ethics application for the above project for review by the **Faculty of Health and Medicine Research Ethics Committee (FHMREC)**. The application was recommended for approval by FHMREC, and on behalf of the Chair of the Committee, I can confirm that approval has been granted for this research project.

As principal investigator your responsibilities include:

- ensuring that (where applicable) all the necessary legal and regulatory requirements in order to conduct the research are met, and the necessary licenses and approvals have been obtained;
- reporting any ethics-related issues that occur during the course of the research or arising from the research to the Research Ethics Officer at the email address below (e.g. unforeseen ethical issues, complaints about the conduct of the research, adverse reactions such as extreme distress);
- submitting details of proposed substantive amendments to the protocol to the Research Ethics Officer for approval.

Please contact me if you have any queries or require further information. Email:

fhmresearchsupport@lancaster.ac.uk

Yours sincerely,



Tom Morley,
Research Ethics Officer, Secretary to FHMREC.



SOCIAL COMPARISONS AND BURNOUT WORKSHOP - Approved

Information Regarding this Research Project

Are you conducting a research project?

(for more information on research projects please see our [ethics pages](#))

Yes No

Does your research only involve animals?

Are you undertaking this research as/are you filling this form out as:

Academic/Research

Staff Non Academic

Staff

Staff Undertaking a Programme of

Study PhD or DClinPsy student

Undergraduate, Masters, Master by Research, MPhil or other taught postgraduate programme

Which Faculty are you in?

Faculty of Health and Medicine

Which department are you in?

Lancaster Medical School

Will your project require NHS REC approval? (If you are not sure please read the guidance in the information button)

Yes No

Do you need Health Research Authority (HRA) approval? (Please read the guidance in the information button)

Yes No

Have you already obtained, or will you be applying for ethical approval, from another institution outside of Lancaster University? (For example, an external institution such as: another University's Research Ethics Committee, the NHS or an institution abroad (eg an IRB in the USA)? Please select one of the following:

No, I do not need ethical approval from an external institution.

Yes, I have already received ethical approval from an external institution.

Yes, I will be applying for ethical approval from an external institution after I have received confirmation of ethical approval from my Faculty Research Ethics Committee (FREC) at Lancaster University, if the FREC grants approval.

Is this an amendment to a project previously approved by Lancaster University?

Yes No

Will your research involve any of the following? (Multiple selections are possible, please see icon for details)

Human Participants

- Data relating to humans (Secondary/Pre-existing data only)
- Data collection from online sources such as social media platforms, discussion forums,
- online chat-rooms
- Human Tissue
- None of the above

Project Information

Please confirm/amend the title of this project.

SOCIAL COMPARISONS AND BURNOUT WORKSHOP

E

Is this a funded Project?

Yes No

Research Site(s) Information

Will you be recruiting participants from research sites outside of Lancaster University? (E.g. Schools, workplaces, etc; please read the guidance in the information button for more information)

Yes No

Applicant Details

Are you the named Principal Investigator at Lancaster University?

Yes No

Please check your contact details are correct. You can update these fields via the personal details section located in the top right of the screen. Click on your name and email address in the top right to access "Personal details". For more details on how to do this, please read the guidance in the information button.

First Name

Gamze

Surname

Kocdemir

Department

Psychology

Faculty

Medical School

Email

g.kocdemir1@lancaster.ac.uk

Principal Investigator

You have stated that you are the Principal Investigator for this project.

First Name

Gamze

Surname

Kocdemir

Department

Psychology

Email

g.kocdemir1@lancaster.ac.uk

Supervisor Details

Search for your supervisor's name. *If you cannot find your supervisor in the system please contact rso-systems@lancaster.ac.uk to have them added.*

First Name

Judith

Surname

Lunn

Department

Lancaster Medical School

Faculty

Faculty of Health and Medicine

Email

j.lunn1@lancaster.ac.uk

Do you need to add a second supervisor to sign off on this project?

Yes No

Additional Team Members

Other then those already added, please select which type of team members will be working on this project:

- I am not working with any other team members.
- Staff
- Student
- External

Details about the participants

As you are conducting research with Human Participants/Tissue you will need to answer the following questions before your application can be reviewed.

If you have any queries about this please contact your [Ethics Officer](#) before proceeding.

What's the minimum number of participants needed for this project?

10



What's the maximum number of expected participants?

100

30

○ ○

Do you intend to recruit participants from online sources such as social media platforms, discussion forums, or online chat rooms?

● ○ ○

Will you get written consent and give a participant information sheet with a written description of your research to all potential participants?

Yes No I don't know

Will any participants be asked to take part in the study without their consent or knowledge at the time or will deception of any sort be involved?

© 2010 Pearson Education, Inc.

Is your research with any vulnerable groups?

(Vulnerable group as defined by Lancaster University Guidelines)

© 2010 Pearson Education, Inc.

Is your research with any adults (aged 18 or older)?

Yes No

Is your research data collected with completely anonymous adult (aged 18 or older) participants, with no

contact details or other uniquely identifying information (e.g. date of birth) being recorded?

Is your research with adult participants (aged 18 years, or older) in private interactions (for example, one to one interviews, online questionnaires)?

Is your research with any young people (under 18 years old)?

Yes No I don't know

Does your research involve discussion of personally sensitive subjects which the participant might not be willing to otherwise talk about in public (e.g. medical conditions)?

Yes No I don't know

Could the study induce psychological stress or anxiety, or produce humiliation or cause harm or negative consequences beyond the risks encountered in a participant's usual, everyday life?

Yes No I don't know

•

Is there a risk that the nature of the research topic might lead to disclosures from the participant concerning either: Their own or others involvement in illegal activities
~~Other activities that represent a threat to themselves or others (e.g. sexual activity, drug use, or professional misconduct)?~~

•
•
• Yes No I don't know
•

Does the study involve any of the following:

Physically intrusive procedures including touching or attaching equipment to participants
Administration of substances
Ultrasound or sources of non-ionising radiation (e.g. lasers)
Sources of ionising radiation, (e.g. X-rays)
Collection or use of samples of Human Tissue (e.g. Saliva, skin cells, blood etc.)

Yes No I don't know

Details about Participant relationships

Do you have a current or prior relationship with potential participants? For example, teaching or assessing students or managing or influencing staff (this list is not exhaustive).

Yes No I don't know

If you need written permission from a senior manager in an organisation where research will take place (e.g. school, business) will you gain this in advance of undertaking your research?

Yes No I don't know N/A

Will you be using a gatekeeper to access participants?

Yes

No

I don't know if I will be using a gatekeeper

Will participants be subjected to any undue incentives to participate?

Yes

No

I don't know

Will you ensure that there is no perceived pressure to participate?

Yes

No

I don't know

Participant data

Will you be using video recording or photography as part of your research or publication of results?

Yes

No

Will you be using audio recording as part of your research?

Yes

No

Will you be using portable devices to record participants (e.g. audio, video recorders, mobile phone, etc)?

No

Yes, and all portable devices will be encrypted as per the Lancaster University ISS standards, in particular where they are used for recording identifiable data

Yes, but these cannot be encrypted because they do not have encryption functionality. Therefore I confirm that any identifiable data (including audio and video recordings of participants) will be deleted from the recording device(s) as quickly as possible (e.g. when it has been transferred to a secure medium, such as a password protected and encrypted laptop or stored in OneDrive) and that the device will be stored securely in the meantime

Will you be using other portable storage devices in particular for identifiable data (e.g. laptop, USB drive, etc)? (Please read the help text)

No

Yes, and they will be encrypted as per the Lancaster University ISS standards in particular where they are used for recording identifiable data

Will anybody external to the research team be transcribing the research data?

Yes No

General Queries

Does any member of the research team, or their families and friends, have any links to the funder or organisations involved in the research?

Yes No I don't know

Can the research results be freely disseminated?

Yes No I don't know

Will you use data from potentially illicit, illegal, or unethical sources (e.g. pornography, related to terrorism, dark web, leaked information)?

Yes No I don't know

Will you be gathering/working with any special category personal data?

Yes No I don't know

Are there any other ethical considerations which haven't been covered?

Yes No I don't know

REC Review Details

Based on the answers you have given so far you will need to answer some additional questions to allow reviewers to assess your application.

It is recommended that you do not proceed until you have completed **all of the previous questions**.

Please confirm that you have finished answering the previous questions and are happy to proceed.

I confirm that I have answered all of the previous questions, and am happy to proceed with the application.

Questions for REC Review

Summarise your research protocol in lay terms (indicative maximum length 150 words).

Note: The summary of the protocol should concisely but clearly tell the Ethics Committee (in simple terms and in a way which would be understandable to a general audience) what you are broadly planning to do in your study. Your study will be reviewed by colleagues from different disciplines who will not be familiar with your specific field of research and it may also be reviewed by the lay members of the Research Ethics Committee; therefore avoid jargon and use simple terms. A helpful format may include a sentence or two about the background/ “problem” the research is addressing, why it is important, followed by a description of the basic design and target population. Think of it as a snapshot of your study.

This proposal is based on a previously approved ethics protocol. FHM REC Reference is FHM-2022-0739-RECR-2. We will explore an additional construct using the same protocol for the educational workshop. This ethics proposal is for a piece of research aiming to gain more understanding on the knowledge of first year medical students on the topic of professional burnout. Medical students have multiple stressors during their studies and as a result, like their qualified colleagues, may experience burnout. While doctors often receive teaching/interventions aiming to reduce rates of burnout, less emphasis has been put onto medical students. This piece of research aims to produce an educational intervention on the topic of burnout and deliver this to first year medical students at Lancaster University, in a small group workshop. We will produce a questionnaire on Qualtrics to be completed before and immediately after. These will measure experience of burnout within the first year medical students, their knowledge about academic social comparisons on burnout, upward-downward academic social comparisons, subjective social status, sleep quality, chronotype, depression and anxiety. We will use these questionnaires to investigate whether the intervention had any short term effect on the student’s ability to recognise and understand the effects of academic social comparisons on burnout. In addition to it, it will help them to understand sleep quality, burnout and mental health connections.

State the Aims and Objectives of the project in Lay persons' language.

The aim of this research project is to design and deliver an educational workshop on burnout, targeted at UK first year medical students. We subsequently aim to examine whether this intervention would be a valuable addition to the curriculum in order to combat the current problem with professional burnout amongst students.

- a) Increases medical student understanding of the burnout phenomenon.
- b) Increases medical student ability to recognise burnout in themselves.
- c) Increase medical student ability to recognise the effects of social comparisons on burnout.
- d) Improve understanding the link between burnout, sleep quality and mental health
- e) Is considered to be a good quality teaching resource and should be incorporated into the curriculum

Participant Information

Please explain the number of participants you intend to include in your study and explain your rationale in detail (eg who will be recruited, how, where from; and expected availability of participants). If your study contains multiple parts eg interviews, focus groups, online questionnaires) please clearly explain the numbers and recruitment details for each of these cohorts (see help text).

The sample of participants to be studied will be Lancaster University medical students. Participants will be aged over 18. The study will be restricted to English speaking participants but as the recruitment will be carried out at an English speaking university this should not exclude any participants. We will try to recruit a balanced number of students from each gender if possible, however gender is not a main factor of interest in this study. Each educational workshop will have a maximum of 30 students in order to keep this as a "small group" session. As the study participants will be self-selected it is difficult to know the exact number of participants that will volunteer to be part of the study but given the delivery method of the workshop and the time available for the project we would estimate a minimum of 6 students and maximum of 30. To recruit, the research team will contact the undergraduate faculty to request that they distribute an email aiming to recruit participants. This email will explain the project and will have the participant information sheet attached. It will also have a link to a questionnaire where the students can input their contact details and consent to the research team contacting them to arrange for them to attend a workshop. The research team will also ask the undergraduate medical school faculty to create a post with the same content as the email (including participation sheet and link to the questionnaire to provide contact details) on the student's university portal (Moodle). The personal data provided via this questionnaire will be stored separately from the study' questionnaire responses and all data will be encrypted and stored in separate folders on OneDrive, the University approved secure cloud storage. This data will be destroyed after 2 years and participants will be informed of this.

As you have indicated that your research is with adults (aged 18 years or older), which will be in non-private interactions, please describe the intended participants, and why they are needed for this research.

The participants will be attending a small groups workshop, with approximately 10 students. The workshop format has been chosen so that the learning is interactive and to allow for discussion between students to develop; in order to keep the students engaged and to maximise achievement of the educational intervention's learning outcomes. This means each participants will be present with other participants (i.e. non-private), however the data will be collected via a questionnaire completed privately and participants will not be asked to share any of their questionnaire answers with the group. It will be highlighted both verbally and via a statement on the consent sheet that the purpose of the session is not for student's to share their own experiences of burnout with the group, rather discuss the topic of burnout objectively. However, some students may feel they want to share their experiences. Therefore, participants will also be made aware both verbally and via a statement on the consent form that that any information disclosed by other students attending the workshop should remain confidential to the group, and that they will not discuss the workshop with or in front of anyone who was not involved unless they have the relevant person's express permission.

Please indicate how this group is to be recruited

To recruit, the research team will contact the undergraduate faculty to request that they distribute an email aiming to recruit participants. This email will explain the project and will have the participant information sheet attached. It will also have a link to a questionnaire where the students can input their contact details and consent to the research team contacting them to arrange for them to attend a workshop. The research team will also ask the undergraduate medical school faculty to create a post with the same content as the email (including participation sheet and link to the questionnaire to provide contact details) on the student's university portal (Moodle). Participation will be voluntary. The personal data provided via this questionnaire will be stored separately from the study' questionnaire responses and all data will be encrypted and stored in separate folders on OneDrive, the University approved secure cloud storage. This data will be destroyed after 2 years and participants will be informed of this. The amendments detail further methods of recruitment: attending lectures, recruiting students on clinical placement, distributing the sign up information via student societies (MedSoc and Psychiatry Society), posters on campus.

Please describe how and why they will be involved in the project.

This piece of research aims to produce and evaluate an educational intervention on the topic of professional burnout in medical students. We therefore need to recruit participants in order for them to take part in a 60 minute small group face-to-face educational workshop. The participants will be medical students at Lancaster University. Students are the focus of this study because they have multiple stressors during their studies and as a result, like their qualified colleagues, may experience burnout. While doctors often receive teaching/interventions aiming to reduce rates of burnout, less emphasis has been put onto medical students. We will produce 3 questionnaires on Qualtrics which the student participants will complete before, immediately after and 3 months after the delivery of the workshop. These will measure burnout within the students, their knowledge of burnout, perceived stigma relating to burnout and help-seeking methods they would implement should they ever experience it, using validated psychometric measures where available. In addition to burnout questionnaires, there will be sleep quality, upward-downward social comparison tendencies questionnaires, depression and anxiety questionnaires before the workshop. We will use these questionnaires to investigate whether the intervention had any short term effect on the student's ability to recognise and understand the principles of burnout, connections of burnout with social comparison and sleep quality and mental health. We will also explore whether the intervention has any effect on the stigma felt by the students around burnout and their chosen methods of help-seeking.

You have indicated that you will collect identifying information from the participants. Please describe all the personal information that you gather for your study which might be used to identify your participants.

On the recruitment questionnaire, participants will be asked to provide their full name and contact email address. The personal data provided via this questionnaire will be stored separately from the study's' questionnaire responses and all data will be encrypted and stored in separate folders on OneDrive, the University approved secure cloud storage. This data will be destroyed after 2 years and participants will be informed of this. In the study questionnaires' demographic section, participants will be asked their university, year group, age, whether this is their first degree, whether they are an international student, gender, ethnicity, sexual orientation, employment outside studies and previous mental health diagnoses. This personal information will be stored securely and be accessible only to the minimum number of people who need it for the research project.

Please describe how the data will be collected and stored.

Data will be collected through the use of online survey software, Qualtrics (<https://www.qualtrics.com/uk/>).

Data storage: Data from the questionnaire will be anonymised and stored electronically on encrypted databases hosted by Lancaster University. Participant data will be recorded using ID numbers, no names will be stored. Consent forms will be electronic and will be on Qualtrics and will precede the pre-workshop questionnaire. The participant will not put any identifiable information on this consent form.

Timescales: We will inform the participants that we intend to store data for 10 years. The data will be in anonymised format and no names of participants will ever be reported.

Data Stewardship: Gamze Kocdemir will have guardianship of the stored data during PhD studies.

Stewardship will then be passed on Dr Judith Lunn who will be responsible for storing/deleting the data after a period of 10 years. The anonymised data will be shared amongst the research team.

Location: Electronic data will be stored on a secure Lancaster University server using an encrypted database. Only the research team named above will have access to the data.

Data security: Data stored on all portable devices (e.g. laptops) will be encrypted as well as password protected; data stored on the University server is secure.

Though the aim is to collect the data via online questionnaires, for equality diversity and inclusion purposes there will be paper copies available for those who do not have suitable devices. The hard copies will be transcribed onto the electronic questionnaire by the researchers (hence the data will be stored as described above) and the hard copies will be destroyed appropriately.

The personal data provided via the recruitment questionnaire will be stored separately from the study's' questionnaire responses and all data will be encrypted and stored in separate folders on OneDrive, the University approved secure cloud storage. This data will be destroyed after 2 years and participants will be informed of this.

Please describe how long the data will be stored and who is responsible for the deletion of the data.

The personal data provided via the recruitment questionnaire will be stored separately from the study's questionnaire responses and all data will be encrypted and stored in separate folders on OneDrive, the University approved secure cloud storage. This data will be destroyed after 2 years and participants will be informed of this.

For data from the study questionnaire itself:

Timescales: We will inform the participants that we intend to store data for 10 years. The data will be in anonymised format and no names of participants will ever be reported.

Data Stewardship: Gamze Kocdemir will have guardianship of the stored data during PhD studies.

Stewardship will then be passed on Dr Judith Lunn who will be responsible for storing/deleting the data after a period of 10 years.

Information about the Research

What are your dissemination plans? E.g publishing in PhD thesis, publishing in academic journal, presenting in a conference (talk or poster).

A report with the findings will be written up and sent with recommendations to Lancaster Medical School regarding incorporation of an intervention to help reduce social comparison related burnout into the undergraduate medical curriculum. Results of the research may be submitted for publication in an academic/professional journal. They may also be presented at conferences in the form of a poster or a presentation, these may be local, national or international.

Comments from the participants that are said during the workshop will not be noted down or quoted in the report. The questionnaire data will be anonymised using a participant number (as previously described). There will only be 2 free text box in the questionnaire. One will be a question asking for feedback on the workshop itself (e.g. any other comments not covered by the Likert scales). The other will be in the help-seeking section where the students can say an job role (but will be told not to give a named supervisor)/organisation they would seek help from if not in the list provided. We might collect anonymous responses through Excel Forms. There will be no free text questions relating to information on the individual participant's own experience of burnout. This will mean that information that could allow identification of the candidate from their answer should not be produced. If extra feedback on the workshop is provided by participants in the free text box and it is reported, it will not be reported with any participant information alongside it i.e. direct/indirect identifiable details will not also be reported. The quotes will also be checked for disclosive data which will be redacted prior to reporting. Depending on the responses the additional feedback may be grouped into themes such as factors pertaining to the digital aids, factor pertaining to the presenter, factors pertaining to workshop content, factors pertaining to workshop logistics (e.g. timing, location).

General Queries

You have indicated that you will be gathering/working with special category data. Please confirm here how you will comply with data protection law (GDPR) for use of special category personal data.

This data will be processed as a task in the public interest (GDPR Article 6(1)(e)). The special category data will be processed under the lawful basis of archiving and research purposes (GDPR Article 9(2)(j)). Such processing is necessary for scientific research in accordance with safeguards. Informed consent from the participant will be gained prior to collecting their personal data for this research purpose. This means that the participants will be informed of the purposes for using their data (this will be explained on the participant information sheet and verbally at the workshop prior to its start) and that the participants give consent for the research team to use their data. The link will be present on participant information sheet to the public-facing information page on data security. Data from the questionnaire will be anonymised and stored electronically on encrypted databases hosted by Lancaster University.

Participant data will be recorded using ID numbers, no names will be stored. Participant information data on number assignment will be stored on a separate electronic file which will be encrypted and password protected. Anonymised data will be stored on a password-protected computer, and will be made available to the researchers. Individuals will not be identifiable from their data.

Participants will be informed that data will be anonymised and responses collated for reports and articles in scientific journal and presentations but no names or images of participants will be used. Individual participant data will not be shared with the Lancaster Medical School, however details of the overall results may be shared if it is believed to that they will have a positive impact on the medical school curriculum. Data stored on all portable devices (e.g. laptops) will be encrypted as well as password protected; data stored on the University server is secure. We will inform the participants that we intend to store data for 10 years. The data will be in anonymised format and no names of participants will ever be reported. There are some limits to confidentiality, if anything said in during the workshop makes the researchers think that a participant, or someone else, is at significant risk of harm, the researcher will have to break confidentiality and speak to a member of staff about this. If possible, they will tell the participant prior to doing this. The participant will be made aware of this fact via the patient information sheet and consent form. It will be highlighted both verbally and via a statement on the consent sheet that the purpose of the session is not for student's to share their own experiences of social comparisons and burnout with the group, rather discuss the topic of burnout objectively. However, some students may feel they want to share their experiences. Therefore, participants will also be made aware both verbally and via a statement on the consent form that that any information disclosed by other students attending the workshop should remain confidential to the group, and that they will not discuss the workshop with or in front of anyone who was not involved unless they have the relevant person's express permission.

Data Storage

How long will you retain the research data?

We will inform the participants that we intend to store data for 10 years.

How long and where will you store any personal and/or sensitive data?

Data from the questionnaire will be anonymised and stored electronically on encrypted databases hosted by Lancaster University. Participant data will be recorded using ID numbers, no names will be stored. Participant information data on number assignment will be stored on a separate electronic file which will be encrypted and password protected. Anonymised data will be stored on a password-protected computer, and will be made available to the researchers. Individuals will not be identifiable from their data. Participants will be informed that data will be anonymised and responses collated for reports and articles in scientific journal and presentations but no names or images of participants will be used. Individual participant data will not be shared with Lancaster Medical School, however details of the overall results may be shared if it is believed to that they will have a positive impact on the medical school curriculum. We will inform the participants that we intend to store data for 10 years.

Please explain when and how you will anonymise data and delete any identifiable record?

The participants will be assigned a participant number at the start of the study before the completion of study questionnaires. Their data will be then be assigned to their participant number, and data will be stored anonymously. Participants will be told their number in the event they want to withdraw their data in up to 2 weeks following the post workshop and so that at each interval (pre-workshop, post-workshop), the participants can input their participant number at the start of the questionnaire. Participant information data on number assignment will be stored on a separate electronic file which will be encrypted and password protected. Anonymised data will be stored on a password-protected computer, and will be made available to the researcher. Individuals will not be identifiable from their data. Participants will never put their name on any study questionnaires. Consent forms will be electronic and will be on Qualtrics and will precede the pre-workshop questionnaire. The participant will not put any identifiable information on this consent form. We will inform the participants that we intend to store data for 10 years.

Project Documentation*

Important Notice about uploaded documents:

When your application has been reviewed if you are asked to make any changes to your uploaded documents please highlight the changes on the updated document(s) using the highlighter so that they are easy to see.

Please confirm that you have read and applied, where appropriate, the guidance on completing the Participant Information Sheet, Consent Form, and other related documents and that you followed the guidance in the help button for a quality check of these documents. For information and guidance, please use the relevant link below:

[FST Ethics Webpage](#)

[FHM Ethics Webpage](#)

[FASS-LUMS Ethics Webpage](#)

[REAMS Webpage](#)

I confirm that I have followed the guidance.

In addition to completing this form you must submit all supporting materials. Please indicate which of the following documents are appropriate for your project:

- Research Proposal (DClinPsy)
- Advertising materials (posters, emails) Letters/emails of invitation to participate Consent forms
- Participant information
- sheet(s) Interview question guides Focus group scripts
- Questionnaires, surveys, demographic sheets
- Workshop guide(s)
- Debrief sheet(s)
- Transcription (confidentiality)
- agreement Other
- None of the above.

Please upload the documents in the correct sections below:

Please ensure these are the latest version of the documents to prevent the application being returned for corrections you have already made.

Please upload all consent forms to be used in this project.

Documents					
Type	Document Name	File Name	Version Date	Version	Size
Consent Form	CONSENT FORM.V2	CONSENT FORM.V2.docx	03/03/2023	2	59.4 KB

Please upload all Participant Information Sheets:

Type	Document Name	File	Name
10 January 2025			

			Version		
			Date	Version	Size
Participant Information Sheet	PARTICIPANT INFORMATION SHEET.V2	PARTICIPANT INFORMATION SHEET.V2.docx	03/03/20232	65.0 KB	

Please upload all advertising materials (posters, emails)

Documents

Type	Document Name	File Name	Version Date	Version	Size
Advertising materials	EMAIL&NOTICEBOARD INVITATION.V2	EMAIL&NOTICEBOARD INVITATION.V2.docx	03/03/2023	2	21.4 KB

Please upload all Questionnaires, surveys, demographic sheets

Documents

Type	Document Name	File Name	Version Date	Version	Size
Questionnaires, surveys, demographic sheets	Qualtrics Survey Software	Qualtrics Survey Software.pdf	24/01/2023	1	764.5 KB

Please upload a copy of your Workshop guide.

Documents

Type	Document Name	File Name	Version Date	Version	Size
Workshop guide	Workshop Guide	Workshop Guide.docx	24/01/2023	1	18.9 KB

Please upload a copy of your Debrief sheet.

Documents

Type	Document Name	File Name	Version Date	Version	Size
Debrief sheet	DEBRIEF SHEET VERSION.V2	DEBRIEF SHEET VERSION.V2.docx	03/03/2023	2	60.5 KB

Declaration

Please Note

Research Services monitors projects entered into the online system, and may select projects for quality control.

All research at Lancaster university must comply with the LU data storage and governance guidance as well as the General Data Protection Regulation (GDPR) and the UK Data Protection Act 2018. ([Data Protection Guidance webpage](#))

I confirm that I have read and will comply with the LU Data Storage and Governance guidance and that my data use and storage plans comply with the General data Protection Regulation (GDPR) and the UK Data Protection Act 2018.

Have you undertaken a health and safety risk assessment for your project through your departmental process? ([Health and Safety Guidance](#))

I have undertaken a health and safety assessment for your project through my departmental process, and where required will follow the appropriate guidance for the control and management of any foreseeable risks.

When you are satisfied that this application has been completed please click "Request" below to send this application to your supervisor for approval.

Signed: This form was signed by Dr Judith Lunn (j.lunn1@lancaster.ac.uk) on 07/03/2023 11:23

Please read the terms and conditions below:

- You have read and will abide by [Lancaster University's Code of Practice](#) and will ensure that all staff and students involved in the project will also abide by it.
- If appropriate a confidentiality agreement will be used.
- You will complete a data management plan with the Library if appropriate. [Guidance from Library](#). You will provide your contact details, as well as those of either your supervisor (for students) or an appropriate person for complaints (such as HoD) to any participants with whom you interact, so they know whom to contact in case of questions or complaints?
- That University policy will be followed for secure storage of identifiable data on all portable devices
- and if necessary you will seek [guidance from ISS](#).

That you have completed the ISS Information Security training and passed

- the assessment. That you will abide by Lancaster University's lone working policy for field work if appropriate.

On behalf of the institution you accept responsibility for the project in relation to promoting good research practice and the prevention of misconduct (including plagiarism and fabrication or misrepresentation of results).

To the best of your knowledge the information you have provided is correct at the time of submission. If anything changes in your research project you will submit an amendment.

Applicant Only: To complete and submit this application please click "Sign" below:

Signed: This form was signed by Miss Gamze Kocdemir (g.kocdemir1@lancaster.ac.uk) on 07/03/2023 11:21



Consent Form

Does delivering an educational intervention to first year medical students on burnout, which focuses on academic social comparison tendencies, have an effect on social comparison awareness, and on understanding the connections of academic social comparisons on burnout, and mental health?

We are asking if you would like to take part in a research project aiming to investigate the effect of delivering an educational intervention focused on burnout in medical students, as we are trying to understand whether by increasing student's knowledge on the social comparisons and burnout phenomenon there will any subsequent effect on understanding the possible connections of social comparison tendencies and burnout.

Before you consent to participating in the study we ask that you read the participant information sheet and tick each box below if you agree. If you have any questions or queries before signing the consent form please speak to the principal investigator, Gamze Kocdemir

By proceeding to the survey:

1. I confirm that I have read the information sheet and fully understand what is expected of me within this study.
2. I confirm that I have had the opportunity to ask any questions and to have them answered.
3. I confirm that I understand that any responses/information I give will remain anonymous unless it is thought that there is a risk of harm to myself or others, in which case the principal investigator will/may need to share this information with their research supervisor.
4. I understand that my participation is voluntary.
5. I understand that I am free to withdraw at any time without giving any reason. But I understand that once my data has been anonymised it might not be possible for it to be withdrawn, though every attempt will be made to extract my data, up to the point of publication.
6. I understand that the information from my questionnaires will be pooled with other participants' responses, anonymised and may be published; all reasonable steps will be taken to protect the anonymity of the participants involved in this project.
7. I consent to information and quotations from my questionnaires being used in reports, conferences and training events.
8. I understand that I will not be asked to share with the group any personal experience of burnout. However, I understand that any information on personal experiences of burnout chosen to be disclosed by other students attending the workshop remains confidential to the group, and I will not discuss the workshop with or in front of anyone who was not involved unless I have the relevant person's express permission.
9. I understand that the researcher will discuss data with their supervisor at Lancaster University as needed.



10. I consent to Lancaster
anonymised data for a period of 10
years after the study
has finished

University keeping the
years after the study

11. By clicking on this link, **you consent to taking part in the current study.**



Participant Information Sheet:

Does delivering an educational intervention to medical students on burnout, which focuses on academic social comparison tendencies, have an effect on social comparison awareness, and on understanding the connections of academic social comparisons, burnout, and mental health?

For further information about how Lancaster University processes personal data for research purposes and your data rights please visit our webpage:
www.lancaster.ac.uk/research/data-protection

My name is Gamze Kocdemir, and I am conducting this research as a part of PhD research at Lancaster University.

You are being invited to take part in the above research study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for reading this.

What is the study about?

The purpose of this study is to design an educational workshop on the role of social comparisons on professional burnout amongst medical students and to deliver this session to a group of medical students. The aim of this study was to see increasing awareness of social comparison tendencies which are connected to burnout ,and understanding academic comparisons and burnout connections. In turn, the results will inform the research team whether this kind of workshop would be a valuable part of the medical undergraduate curriculum, as well as providing recommendations that the medical schools' welfare infrastructure can act upon.

Why have I been approached?

In the past interventions relating to burnout have been targeted at qualified doctors. However the General Medical Counsel (GMC) recognises that medical students experience a range of stressors and hence need help whilst at medical school to developing mechanisms to cope. On this basis, you have been approached because our study is focusing on academic social comparison tendencies, social comparison awareness on burnout, on understanding the connections of academic social comparisons on burnout, sleep quality and mental health,

methods of seeking help in the context of professional burnout in students. It requires participation from first year medical students who will attend a workshop on burnout as part of the educational intervention, in addition to completing questionnaires.

Do I have to take part?

No. It is completely up to you to decide whether or not to take part. If you do decide to take part, you should save a copy of this information sheet to keep and you will need to sign an electronic consent form. If you decide to take part you are free to withdraw from the study up to two weeks without giving a reason.

What will I be asked to do if I take part?

If you decide you would like to take part, you will be asked to attend a half-day session. During the session you will be asked to fill out a pre-workshop questionnaire on your smart phone or laptop. It should take 15-20 minutes to complete. You will then take part in a 60 minute educational workshop on the connections of social comparisons and burnout. This will comprise of both didactic and interactive elements including pair and group work and will be delivered by 1-2 tutors. Following the completion of the workshop you will be asked to complete a post-workshop questionnaire. It should take 10-15 minutes to complete.

Will my data be Identifiable?

The data collected for this study will be stored securely and only the researchers conducting this study will have access to this data.

- The files in which the data are saved on the computer will be encrypted (that is no-one other than the researchers will be able to access them) and the computer itself password protected. The data will be kept by Lancaster University for a period of 10 years after the study has finished.
- Anonymised direct quotations regarding to your opinions on the workshop from your questionnaire may be used in the reports or publications from the study, i.e. your name will not be attached to them. All reasonable steps will be taken to protect the anonymity of the participants involved in this project.
- All your personal data will be confidential and will be kept separately from your questionnaire responses.

There are some limits to confidentiality: if anything said in during the workshop that makes me think that you, or someone else, is at significant risk of harm, I will have to break confidentiality and speak to a member of staff about this. If possible, I will tell you if I have to do this.



What will happen to the results?

The results will be summarised and published in a report which will be sent to interested groups e.g. student welfare departments of medical schools. They will also be submitted for publication in peer reviewed journal and may be disseminated through conferences and meetings which may be national or international. You will not be identified in any publication related to this study; any quotes from the data will be anonymous.

Are there any risks?

This study contains minimal risk, however some questions in the questionnaire will relate to aspects of your mental health. We do request you consider all the above information carefully before you decide whether you would like to take part. If you experience any distress following participation you are encouraged to inform the researcher and contact the resources provided at the end of this sheet.

Are there any benefits to taking part?

You will receive teaching on the topic of professional burnout which you may find interesting. If you are struggling with burnout you may also find benefit in being signposted to appropriate welfare providers. Other than this there are no direct benefits in taking part.

Who has reviewed the project?

This study has been reviewed and approved by the Faculty of Health and Medicine Research Ethics Committee at Lancaster University.

Where can I obtain further information about the study if I need it?

If you have any questions about the study, please contact the main researcher: Gamze

Kocdemir

3rd year PhD student

Email: g.kocdemir1@lancaster.ac.uk

Complaints & Comments

If you wish to make a complaint, raise concerns or make a comment about any aspect of this study and you do not want to speak to the principle investigator or members of the Study Group, you can contact:

Professor Roger Pickup; Deputy Chair of
REC r.pickup@lancaster.ac.uk



Department of Biomedical And Life Sciences
Lancaster University, Lancaster, LA1 4YG

Thank you for taking the time to read this information sheet. You will receive a thank you gift voucher of £10 for your contribution in the study.

Resources in the event of distress

Should you feel distressed either as a result of taking part, now or in the future; or if you feel you are experiencing professional burnout, the following resources may be of assistance.

Lancaster Medical School:

For self-help resources and self-referral form to specialist mental health support, visit:

<https://www.lancaster.ac.uk/student-and-education-services/counselling-and-mental-health-service/>

+44 (0)1524 592690

counselling@lancaster.ac.uk

Counselling and Mental Health Service c/o
ASK A-Floor, University House

Lancaster
University
Lancaster
LA1 4YW

Online CBT programme on Silvercloud at <https://lancasteruni.silvercloudhealth.com/signup/>

If you require emergency mental health support:

If a person's mental or emotional state quickly worsens and the person is unable to keep themselves safe this can be treated as a mental health crisis.

If you are on campus - Dial 999 for the Emergency Services, then afterwards contact the Security Reception on 01524 594541 for Lancaster (staffed 24 hours a day, 365 days a year) to let them know, so they can direct the Emergency Services appropriately on arrival.

If you are off campus - Dial 999 to connect straight to the Emergency Services or go to your local Accident and Emergency Department.

Lancashire and South Cumbria Foundation Trust Wellbeing and Mental Health Crisis Line - Call on 0800 953 0110 (open all year round)



External Welfare Contacts

You can phone your GP and ask for an emergency appointment for mental health reasons. LSCFT Mental Health Helpline/Texting Service

0800 915 4640 (open weekdays 7pm-11pm, and weekends 12 noon-12 midnight)
Text HELLO to 07860022846

LSCFT Mental Health Crisis Line

0800 953 0110 (open all year round)

The Samaritans

Call 116123, 24/7

HOPELineUK

0800 0684141 (Mon- Fri 10am-10pm/Sat-Sun 2pm-5pm)

Student Space

Online support available 24/7 via <https://studentspace.org.uk/>

NHS 111

Call to speak to a highly trained advisor

We Are With You Lancashire: Young people's substance misuse service for under 25s. 0808 164 0074

Lancaster: Ymca, Fleet Square, LA1 1EZ, Lancaster

Online chat via: <https://www.wearewithyou.org.uk/>

Beacon Counselling Trust

National Gambling Helpline Number 0808 8020 133

Email/Noticeboard Invitation to Participate:

Dear Students,

My name is Gamze Kocdemir. I am a PhD student at Lancaster University, Medical School.

As a part of my PhD research, I am carrying out a research project on burnout in medical students. This is entitled: 'Does delivering an educational intervention to medical students on burnout, which focuses on academic social comparison tendencies, have an effect on social comparison awareness, and on understanding the connections of academic social comparisons with burnout, and mental health?'

You are being invited to take part in the above research study. Before you decide if you would like to participate it is important for you to understand why the research is being done and what it will involve. Please take time to read the attached participant information sheet carefully and discuss it with others if you wish, in order to decide whether or not you want to take part.

If there is anything that is not clear or if you would like more information, please feel free to ask any questions. Questions can be directed to g.kocdemir1@lancaster.ac.uk

If after consideration you do wish to take part, please click of the following link and enter your contact details into the questionnaire:

By filling in your contact details you are consenting to the research team contacting you further regarding this project, this will include inviting you to take part in the educational workshop.

Thank you for reading and for your consideration of participation. All participants will receive a thank you gift voucher of £10.

Yours Faithfully,
Gamze Kocdemir
(3rd year PhD student in Medical School at Lancaster University)

Contact Details Questionnaire:

If you are interested in taking part in the study, please fill out the following details below:

First name*:

Surname*:

University email*:

Do you have any recommendation for when sessions should take place based on university schedule?

I confirm that I have read and understand the participant information sheet

I consent to the study researchers to contact me in the future inviting me to participate in the study and the workshop, via the email address provided.



Participant Information Sheet

Information Sheet

Participant

Does delivering an educational intervention to medical students on burnout, which focuses on academic social comparison tendencies, have an effect on social comparison awareness, on understanding the connections of academic social comparisons, burnout, and mental health?

For further information about how Lancaster University processes personal data for research purposes and your data rights please visit our webpage: www.lancaster.ac.uk/research/data-protection

My name is Gamze Kocdemir, and I am conducting this

research as a part of PhD research at Lancaster University. You are being invited to take part in the above research study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for reading this.

What is the study about?

The purpose of this study is to design an educational workshop on the role of social comparisons on professional burnout amongst medical students and to deliver this session to a group of medical students. The aim of this study was to see increasing awareness of social comparison tendencies which are connected to burnout ,and understanding academic comparisons and burnout connections. In turn, the results will inform the research team whether this kind of workshop would be a valuable part of the medical undergraduate curriculum, as well as providing recommendations that the medical schools' welfare infrastructure can act upon.

Why have I been approached?

In the past interventions relating to burnout have been targeted at qualified doctors. However the General

Medical Counsel (GMC) recognises that medical students experience a range of stressors and hence need help whilst at medical school to developing mechanisms to cope. On this basis, you have been approached because our study is focusing on academic social comparison tendencies, social comparison awareness on burnout, on understanding the connections of academic social comparisons on burnout, sleep quality and mental health, methods of seeking help in the context of professional burnout in students. It requires participation from first year medical students who will attend a workshop on burnout as part of the educational intervention, in addition to completing questionnaires.

Do I have to take part?

No. It is completely up to you to decide whether or not to take part. If you do decide to take part, you should save a copy of this information sheet to keep and you will need to sign an electronic consent form. If you decide to take part you are free to withdraw from the study, up until anonymisation of the data, without giving a reason.

What will I be asked to do if I take part?

If you decide you would like to take part, you will be asked to attend a half-day session [in the learning centre at ELHT/on LMS campus - tbc]. During the session you will be asked to fill out a pre-workshop questionnaire on your

smart phone or laptop, this will comprise of ~35 questions and should take 15-20 minutes to complete. You will then take part in a 60 minute educational workshop on the connections of social comparisons and burnout. I will comprise of both didactic and interactive elements including pair and group work and will be delivered by 1-2 tutors. Following the completion of the workshop you will be asked to complete a post-workshop questionnaire, this will comprise of ~25 questions and should take 15-20 minutes to complete .

Will my data be Identifiable?

The data collected for this study will be stored securely and only the researchers conducting this study will have access to this data. o The files in which the data are saved on the computer will be encrypted (that is no-one other than the researchers will be able to access them) and the computer itself password protected. The data will be kept by Lancaster University for a period of 10 years after the study has finished. Anonymised direct quotations regarding to your opinions on the workshop from your questionnaire may be used in the reports or publications from the study, i.e. your name will not be attached to them. All reasonable steps will be taken to protect the anonymity of the participants involved in this project. All your personal data will be confidential and will be kept separately from your questionnaire responses. There are some limits to confidentiality: if

anything said in during the workshop that makes me think that you, or someone else, is at significant risk of harm, I will have to break confidentiality and speak to a member of staff about this. If possible, I will tell you if I have to do this.

What will happen to the results?

The results will be summarised and published in a report which will be sent to interested groups e.g. student welfare departments of medical schools. They will also be submitted for publication in peer reviewed journal and may be disseminated through conferences and meetings which may be national or international. You will not be identified in any publication related to this study; any quotes from the data will be anonymous.

Are there any risks?

This study contains minimal risk, however some questions in the questionnaire will relate to aspects of your mental health. We do request you consider all the above information carefully before you decide whether you would like to take part. If you experience any distress following participation you are encouraged to inform the researcher and contact the resources provided at the end of this sheet.

Are there any benefits to taking part?

You will receive teaching on the topic of professional burnout which you may find interesting. If you are struggling with burnout you may also find benefit in being signposted to appropriate welfare providers. Other than this there are no direct benefits in taking part.

Who has reviewed the project?

This study has been reviewed and approved by the Faculty of Health and Medicine Research Ethics Committee at Lancaster University.

Where can I obtain further information about the study if I need it?

If you have any questions about the study, please contact the main researcher:
Gamze Kocdemir 3rd year PhD
student

Email: g.kocdemir1@lancaster.ac.uk

Complaints & Comments

If you wish to make a complaint, raise concerns or make a comment about any aspect of this study and you do not want to speak to the principle investigator or members of the Study Group, you can contact:

Professor Roger Pickup; Deputy Chair of
REC r.pickup@lancaster.ac.uk
Department of Biomedical And Life Sciences Lancaster University, Lancaster, LA1
4YG

Thank you for taking the time to read this information sheet.

Resources in the event of distress

Should you feel distressed either as a result of taking part, now or in the future; or if you feel you are experiencing professional burnout, the following resources may be of assistance.

Lancaster Medical School:

For self-help resources and self-referral form to specialist mental health support, visit:
<https://www.lancaster.ac.uk/student-and-education-services/counselling-and-mental-health-service/>

+44 (0)1524 592690

counselling@lancaster.ac.uk

Counselling and Mental Health Service c/o ASK A-Floor, University House
Lancaster University Lancaster

LA1 4YW

Online CBT programme on Silvercloud at <https://lancasteruni.silvercloudhealth.com/signup/>

If you require emergency mental health support:

If a person's mental or emotional state quickly worsens and the person is unable to keep themselves safe this can be treated as a mental health crisis.

If you are on campus -

Dial 999 for the Emergency Services, then afterwards contact the Security Reception on 01524 594541 for Lancaster (staffed 24 hours a day, 365 days a year) to let them know, so they can direct the Emergency Services appropriately on arrival.

If you are off campus - Dial 999 to connect straight to the Emergency Services or go to your local Accident and Emergency Department.

Lancashire and South Cumbria Foundation Trust Wellbeing and Mental Health Crisis Line - Call on 0800 953 0110 (open all year round)

External Welfare Contacts

You can phone your GP and ask for an emergency appointment for mental health reasons.

LSCFT Mental Health Helpline/Texting Service 0800 915 4640 (open weekdays 7pm-11pm, and weekends 12 noon-12 midnight)

Text HELLO to 07860022846

LSCFT Mental Health Crisis Line 0800 953 0110 (open all year round) The
Samaritans

Call 116123, 24/7

HOPELineUK

0800 0684141 (Mon- Fri 10am-10pm/Sat-Sun 2pm-5pm)

Student Space

Online support available 24/7 via <https://studentspace.org.uk/>

NHS 111

Call to speak to a highly trained advisor

We Are With You Lancashire:

Young people's substance misuse service for under 25s.

0808 164 0074

Lancaster: Ymca, Fleet Square, LA1 1EZ, Lancaster Online chat via:
<https://www.wearewithyou.org.uk/>

Beacon Counselling Trust

National Gambling Helpline Number 0808 8020 133

Consent Form

Does delivering an educational intervention to medical students on burnout, which focuses on academic social comparison tendencies, have an effect on social comparison awareness, on understanding the connections of academic social comparisons on burnout, and mental health?

We are asking if you would like to take part in a research project aiming to investigate the effect of delivering an educational intervention focused on burnout in medical students, as we are trying to understand whether by increasing student's knowledge on the social comparisons and burnout phenomenon there will any subsequent effect on understanding the possible connections of social comparison tendencies and burnout.

Before you consent to participating in the study we ask that you read the participant information

sheet and tick each box below if you agree. If you have any questions or queries before signing the consent form please speak to the principal investigator, Gamze Kocdemir By proceeding to the survey:

- 1. I confirm that I have read the information sheet and fully understand what is expected of me within this study.**
- 2. I confirm that I have had the opportunity to ask any questions and to have them answered.**
- 3. I confirm that I understand that any responses/information I give will remain anonymous unless it is thought that there is a risk of harm to myself or others, in which case the principal investigator will/may need to share this information with their research supervisor.**
- 4. I understand that my participation is voluntary.**
- 5. I understand that I am free to withdraw at any time without giving any reason. But I understand that once my data has been anonymised it might not be possible for it to be withdrawn, though every attempt will be made to extract my data, up to the point of publication.**
- 6. I understand that the information from my questionnaires will be pooled with other participants' responses, anonymised and may be published; all reasonable steps will be taken to protect the anonymity of the participants involved in this project.**
- 7. I consent to information and quotations from my questionnaires being used in reports, conferences and training events.**
- 8. I understand that I will not be asked to share with the group any personal experience of burnout. However, I understand that any information on personal experiences of burnout chosen to be disclosed by other students attending the workshop remains confidential to the group, and I will not discuss the workshop with or in front of anyone who was not involved unless I have the relevant person's express permission.**
- 9. I understand that the researcher will discuss data with their supervisor at Lancaster University as needed.**
- 10. I consent to Lancaster University keeping the anonymised data for a period of 10 years after the study has finished**

By clicking on this button, you consent to taking part in the current study.

Demographics

. What is your gender?

- Male
- Female
- Other
- Prefer not to say

Q114. What is your ethnic group?

- Asian
- Black
- Mixed
- White
- Other
- Prefer not to say

PSQI

Sleep Quality Assessment (PSQI)

The following questions relate to your usual sleep habits during the past month only. Your answers should indicate the most accurate reply for the majority of days and nights in the past month. Please answer all questions. It includes 20 questions needed short responses mostly.

During the past month,

What time have you usually gone to bed at night? Please use 24 hour clock and numbers and 2 decimal places only. For example 10:15 PM is entered simply as 22.15

How long (in minutes) has it taken you to fall asleep each night? Please use numbers only with no decimal places. For example 30 minutes is entered as 30

What time have you usually gotten up in the morning? Please use the 24 hour clock and numbers and 2 decimal places only. For example 08:45 AM is entered simply as 8.45

How many hours of actual sleep did you get at night? (This may be different than the number of hours you spent in bed). Please use numbers and 2 decimal places. For example 6.75 hours is entered as 6.75

How many hours were you in bed? Please use numbers and 2 decimal places. For example 9.25 hours is entered as 9.25

During the past month, how often have you had trouble sleeping because you:

	Click to write Column 1			
	Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
Cannot get to sleep within 30 minutes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wake up in the middle of the night or early morning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Have to get up to use the bathroom	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cannot breathe comfortably	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cough or snore loudly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Feel too cold	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Feel too hot	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Have bad dreams	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Have pain	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

. Other reason(s), please describe, including how often you have had trouble sleeping because of this reason(s):

. During the past month, how often have you taken medicine (prescribed or “over the counter”) to help you sleep?

Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?

Not during the past month Less than once a week Once or twice a week Three or more times a week

During the past month, how much of a problem has it been for you to keep up enthusiasm to get things done?

Not during the past month Less than once a week Once or twice a week Three or more times a week

During the past month, how would you rate your sleep quality overall?

Very good Fairly good Fairly bad Very bad

SSS Academic

Now can you look at the picture of the ladder below

Imagine the ladders show where people fit in your year group

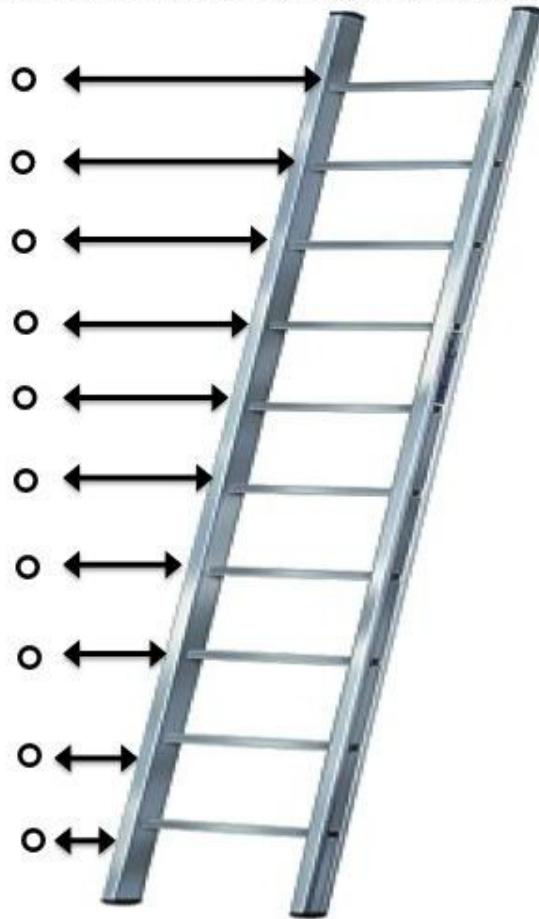
Where would you put yourself?

For example:

How TALL are you compared with the rest of your year group? (not just compared to your own friends.)

Click on the button that shows best where you would be on each ladder

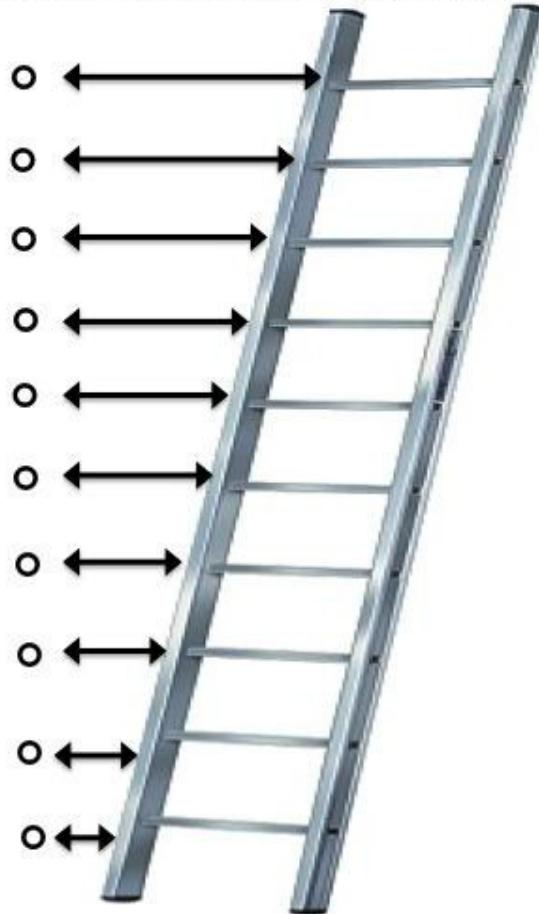
TOP = TALLEST PEOPLE IN YOUR YEAR GROUP



TOP = PEOPLE WHO GET THE BEST GRADES IN YOUR YEAR GROUP

OK HOW ABOUT...

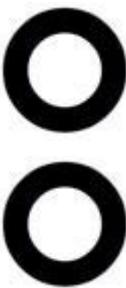
How well ARE YOU DOING AT SCHOOL compared with the rest of your year group? (not just compared with your own friends.)

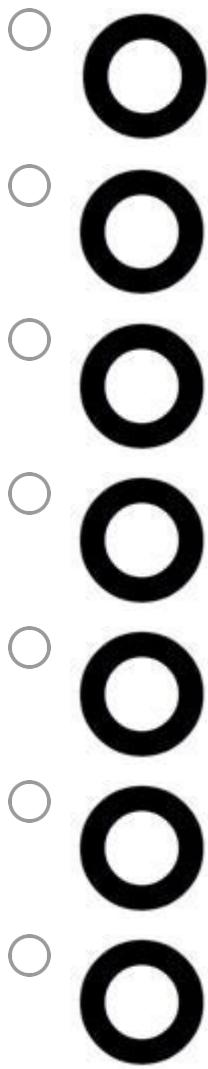


. How WELL ARE YOU DOING AT SCHOOL compared with the rest of your year group (not just compared to your own friends)?



Getting the best grades is this top button





GAD-7 Anxiety

. Over the last 2 weeks, how often have you been bothered by the following problems?

	Not at all	Several days	More than half the days	Nearly Every Day
Feeling nervous, anxious or on edge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Not being able to stop or control worrying	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Not at all	Several days	More than half the days	Nearly Every Day
Worrying too much about different things	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Trouble relaxing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Being so restless that it is hard to sit still	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Becoming easily annoyed or irritable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Feeling afraid as if something awful might happen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

. If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?

Not difficult at all

Somewhat difficult Very difficult

Extremely difficult

PHQ-9 Depression

Over the last 2 weeks, how often have you

been bothered by any of the following problems?

	Not at all	Several days	More than half the days	Nearly every day
Little interest or pleasure in doing things	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Feeling down, depressed, or hopeless	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Trouble falling or staying asleep, or sleeping too much	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Feeling tired or having little energy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Poor appetite or overeating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Feeling bad about yourself — or that you are a failure or have let yourself or your family down	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Trouble concentrating on things, such as reading the newspaper or watching television	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Moving or speaking so slowly that other people could have noticed? Or the opposite — being so fidgety or restless that you have been moving around a lot more than usual	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Not at all	Several days	More than half the days	Nearly every day
------------	--------------	-------------------------	------------------

Thoughts that you would be better off dead or of hurting yourself in some way

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------

Experience of Burnout

Q162. Click to write the question text

Strongly Agree	Agree	Disagree	Strongly Disagree
----------------	-------	----------	-------------------

I always find new and interesting aspects in my university work.

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------

There are days when I feel tired before I arrive at university.

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------

It happens more and more often that I talk about my university work in a negative way.

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------

After university, I tend to need more time than in the past in order to relax and feel better.

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------

I can tolerate the pressure of my university very well.

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------

	Strongly Agree	Agree	Disagree	Strongly Disagree
Lately, I tend to think less at university and do my jobs almost mechanically.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I find my university work to be a positive challenge.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
During my university work, I often feel emotionally drained.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Over time, one can become disconnected from this type of work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
After doing my university work, I have enough energy for my leisure activities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sometimes I feel sickened by my university tasks.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
After university, I usually feel worn out and weary.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This is the only type of work that I can imagine myself doing.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Usually, I can manage the amount of my work well.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel more and more engaged in my university work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Strongly
Disagree

Agree

Disagree

Strongly Agree

When I do my university work, I usually feel energized.

Knowledge of Social Comparisons and Burnout

Q171. At present, how would you describe your current knowledge of social comparisons and professional burnout?

1=very little knowledge 2=some knowledge 3=good knowledge 4 = excellent knowledge

1

2

3

4

Q174. Which of the following is the correct definition of burnout, as per the International Classification of Diseases 11?

- The feeling of being under too much mental or emotional pressure
- As syndrome conceptualised as resulting from chronic workplace stress that has not been successfully managed

- The mind and body's reaction to stressful, dangerous, or unfamiliar situations
- An emotion experienced by someone who can not recognise that there are good things in the future, characterised by a lack of optimism and positivity.

Q172. Which of the following have been cited as contributing factors to professional burnout? (Tick all that apply)

- Low sleep quality
- Downward social comparisons Upward social comparisons
- Competitive nature of medical school Financial difficulties whilst in university

Q173. What are social comparisons worsening professional burnout?

- Downward academic social comparisons Upward academic social comparisons
- Neither upward nor downward academic comparisons
- Upward or downward comparisons causing negative thoughts and emotions

Upward-Downward Academic Comparisons

Q160. Click to write the question text

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
-------------------	----------	----------------------------	-------	----------------

I compare myself to those who have better academic performance than me rather than those who do not have better academic performance

I find myself thinking about whether my own academic performance compares well with successful peers in my university and in other universities.

At the academic event (conferences, seminars etc.) I wonder if my academic success is as enough as the people I see there with very successful peers

I tend to compare myself to people I think academically better than me.

	Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
When I see a person with high academic success, I tend to wonder how I 'match up' with them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I compare my academic performance to peers who have a better grades than me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I see a person who is academically less successful than me, I think about how my academic success compares to theirs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At the academic events, I compare academic performance to those with less academic success.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think about how my academic success is compared to people with very low academic success	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At academic events, seminars and lectures, I often compare my academic attendance, performance to the people with less academic attendance and performance.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Strongly Disagree	Disagree	Neither nor Agree	Agree	Strongly Agree
----------------------	----------	----------------------	-------	-------------------

I tend to compare my grades with peers whose grades are not as high

<input type="radio"/>				
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

Participant Debrief Sheet

Debrief Sheet:

Dear Student,

Thank you for participating in our study on academic social comparisons and burnout in medical students. We are very grateful that you took the time to attend the educational workshop and complete the questionnaires.

What was the purpose of the study?

The purpose of this study was to design an educational workshop on the role of social comparisons on professional burnout amongst medical students and to deliver this session to a group of medical students. The aim of this study was to see increasing awareness of social comparison tendencies which are connected to

burnout, and understanding academic comparisons and burnout connections. In turn, the results we have collected will inform us whether this kind of workshop would be a valuable part of the medical undergraduate curriculum, as well helping us provide recommendations that the medical schools' welfare infrastructure can act upon.

How will the results be used?

The results will be summarised and published in a report which will be sent to interested groups e.g. student welfare departments of medical schools. They will also be submitted for publication in peer reviewed journal and may be disseminated through conferences and meetings which may be national or international. You will not be identified in any publication related to this study; any quotes from the data will be anonymous.

Resources in the event of distress

Should you feel distressed either as a result of taking part, now or in the future; or if you feel you are experiencing professional burnout you can seek support from the contacts highlighted in the workshop. These include:

Lancaster Medical School:

For self-help resources and self-referral form to specialist

mental health support, visit: <https://www.lancaster.ac.uk/student-and-education-services/counselling-and-mental-health-service/>

+44 (0)1524 592690

counselling@lancaster.ac.uk

Counselling and Mental Health Service c/o ASK A-Floor, University House
Lancaster University Lancaster

LA1 4YW

Online CBT programme on Silvercloud at <https://lancasteruni.silvercloudhealth.com/signup/>

If you require emergency mental health support:

If a person's mental or emotional state quickly worsens and the person is unable to keep themselves safe this can be treated as a mental health crisis.

If you are on campus - Dial 999 for the Emergency Services, then afterwards contact the Security Reception on 01524 594541 for Lancaster (staffed 24 hours a day, 365 days a year) to let them know, so they can direct the Emergency Services appropriately on arrival.

If you are off campus - Dial 999 to connect straight to the Emergency Services or go to your local Accident and Emergency Department.

Lancashire and South Cumbria Foundation Trust Wellbeing and Mental Health Crisis Line - Call on 0800 953 0110 (open all year round)

External Welfare Contacts

You can phone your GP and ask for an emergency appointment for mental health reasons.
LSCFT Mental Health Helpline/Texting Service 0800 915 4640 (open weekdays 7pm-11pm, and weekends 12 noon-12 midnight)

Text HELLO to 07860022846

LSCFT Mental Health Crisis Line 0800 953 0110 (open all year round) The Samaritans

Call 116123, 24/7

HOPELineUK

0800 0684141 (Mon- Fri 10am-10pm/Sat-Sun 2pm-5pm)

Student Space

Online support available 24/7 via <https://studentspace.org.uk/>
NHS 111

Call to speak to a highly trained advisor

We Are With You Lancashire:

Young people's substance misuse service for under 25s. 0808 164 0074
Lancaster: Ymca, Fleet Square, LA1 1EZ, Lancaster Online chat via:
<https://www.wearewithyou.org.uk/> Beacon Counselling Trust
National Gambling Helpline Number 0808 8020 133

Where can I obtain further information about the study if I need it? If you have any questions about the study, please contact the main researcher:

Gamze Kocdemir

3rd year PhD student in Medical School at Lancaster University

Email: g.kocdemir1@lancaster.ac.uk

Complaints If you wish to make a complaint or raise concerns about any aspect of this study and do not want to speak to the researcher, you can contact:

Title: Dr Jemma Kerns; Research Director Email: j.kerns@lancaster.ac.uk

Division: Lancaster Medical School Lancaster University Lancaster LA1
4YW

If you wish to speak to someone outside of the ELHT Foundation Programme, Study Group and medical school you may also contact: Professor Roger Pickup; Deputy Chair of REC r.pickup@lancaster.ac.uk

Department: Biomedical And Life Sciences Lancaster University, Lancaster, LA1 4YG

Thank you again for participating in this study. Yours Faithfully,

Workshop Feedback

Q177. Below you find a series of statements in the table with which you may agree or disagree. Using the scale, please indicate the degree of your agreement by selecting the number that corresponds with each statement

1= Strongly disagree, 2 = Moderately Disagree 3= Slightly disagree 4= Neither Agree or Disagree, 5 = Slightly Agree 6 = Moderately Agree 7 = Strongly Agree

1 2 3 4 5 6 7 8

The presentation slides were clear	<input type="radio"/>							
The presenting style was good	<input type="radio"/>							
The presenter was knowledgeable on the subject.	<input type="radio"/>							
It was made clear what the learning outcomes of the workshop were	<input type="radio"/>							

1 2 3 4 5 6 7 8

The content of the workshop was relevant to me	<input type="radio"/>							
The content of the workshop was at a level appropriate for my stage in training	<input type="radio"/>							
There was sufficient interactivity	<input type="radio"/>							
The length of the workshop was appropriate	<input type="radio"/>							

Q178. Do you have any further feedback on the workshop that you would like to provide?

Powered by Qualtrics



Debrief Sheet:

Dear Student,

Thank you for participating in our study on academic social comparisons and burnout in medical students. We are very grateful that you took the time to attend the educational workshop and complete the questionnaires. You will receive a thank you gift voucher of £10 for your contribution in the study.

What was the purpose of the study?

The purpose of this study was to design an educational workshop on the role of social comparisons on professional burnout amongst medical students and to deliver this session to a group of medical students. The aim of this study was to see increasing awareness of social comparison tendencies which are connected to burnout, and understanding academic comparisons and burnout connections. In turn, the results we have collected will inform us whether this kind of workshop would be a valuable part of the medical undergraduate curriculum, as well helping us provide recommendations that the medical schools' welfare infrastructure can act upon.

How will the results be used?

The results will be summarised and published in a report which will be sent to interested groups e.g. student welfare departments of medical schools. They will also be submitted for publication in peer reviewed journal and may be disseminated through conferences and meetings which may be national or international. You will not be identified in any publication related to this study; any quotes from the data will be anonymous

Resources in the event of distress

Should you feel distressed either as a result of taking part, now or in the future; or if you feel you are experiencing professional burnout you can seek support from the contacts highlighted in the workshop. These include:

Lancaster Medical School:

For self-help resources and self-referral form to specialist mental health support, visit:

<https://www.lancaster.ac.uk/student-and-education-services/counselling-and-mental-health-service/>

+44 (0)1524 592690

counselling@lancaster.ac.uk

Counselling and Mental Health Service c/o ASK

A-Floor, University House

Lancaster University

Lancaster

LA1 4YW

Online CBT programme on Silvercloud at <https://lancasteruni.silvercloudhealth.com/signup/>

If you require emergency mental health support:

If a person's mental or emotional state quickly worsens and the person is unable to keep themselves safe this can be treated as a mental health crisis.

If you are on campus - Dial 999 for the Emergency Services, then afterwards contact the Security Reception on 01524 594541 for Lancaster (staffed 24 hours a day, 365 days a year) to let them know, so they can direct the Emergency Services appropriately on arrival.

If you are off campus - Dial 999 to connect straight to the Emergency Services or go to your local Accident and Emergency Department.

Lancashire and South Cumbria Foundation Trust Wellbeing and Mental Health Crisis Line - Call on 0800 953 0110 (open all year round)

External Welfare Contacts

You can phone your GP and ask for an emergency appointment for mental health reasons.

LSCFT Mental Health Helpline/Texting Service

0800 915 4640 (open weekdays 7pm-11pm, and weekends 12 noon-12 midnight)

Text HELLO to 07860022846

LSCFT Mental Health Crisis Line

0800 953 0110 (open all year round)

The Samaritans

Call 116123, 24/7

HOPELineUK

0800 0684141 (Mon- Fri 10am-10pm/Sat-Sun 2pm-5pm)

Student Space

Online support available 24/7 via <https://studentspace.org.uk/>

NHS 111

Call to speak to a highly trained advisor

We Are With You Lancashire: Young people's substance misuse service for under 25s.

0808 164 0074

Lancaster: Ymca, Fleet Square, LA1 1EZ, Lancaster

Online chat via: <https://www.wearewithyou.org.uk/>

Beacon Counselling Trust

National Gambling Helpline Number 0808 8020 133

Where can I obtain further information about the study if I need it?

If you have any questions about the study, please contact the main researcher:

Gamze Kocdemir

3rd year PhD student in Medical School at Lancaster University

Email: g.kocdemir1@lancaster.ac.uk

Complaints

If you wish to make a complaint or raise concerns about any aspect of this study and do not want to speak to the researcher, you can contact:

Title: Dr Jemma Kerns; Research Director

Email: j.kerns@lancaster.ac.uk

Division: Lancaster Medical School

Lancaster University

Lancaster

LA1 4YW

If you wish to speak to someone outside of the ELHT Foundation Programme, Study Group and medical school you may also contact:

Professor Roger Pickup; Deputy Chair of REC

r.pickup@lancaster.ac.uk

Department: Biomedical And Life Sciences

Lancaster University, Lancaster, LA1 4YG

Thank you again for participating in this study.

Yours Faithfully,
Gamze Kocdemir
(3rd year PhD student in Medical School at Lancaster University)

Name: Gamze Kocdemir

Supervisor: Judith Lunn

Department: Psychology

FHM REC Reference: FHM-2023-3360-RECR-2

Title: SOCIAL COMPARISONS AND BURNOUT WORKSHOP

Dear Miss Gamze Kocdemir,

Thank you for submitting your ethics application in REAMS, Lancaster University's online ethics review system for research. The application was recommended for approval by the FHM Research Ethics Committee, and on behalf of the Committee, I can confirm that approval has been granted for this application.

As Principal Investigator/Co-Investigator your responsibilities include:

- ensuring that (where applicable) all the necessary legal and regulatory requirements in order to conduct the research are met, and the necessary licences and approvals have been obtained.
- reporting any ethics-related issues that occur during the course of the research or arising from the research to the Research Ethics Officer at the email address below (e.g. unforeseen ethical issues, complaints about the conduct of the research, adverse reactions such as extreme distress).
- submitting any changes to your application, including in your participant facing materials (see attached amendment guidance).

Please keep a copy of this email for your records. Please contact me if you have any queries or require further information.

Yours sincerely,

Dr Laura Machin

Chair of the Faculty of Health and Medicine Research Ethics Committee

fhmresearchsupport@lancaster.ac.uk



APPENDIX B

Demographics of Participants

Cohort 1 Time 1:

We included questions about:

- Age (What is your year of birth?)
- Gender (What is your gender? Male/Female/Other)
- Gap year (Did you have a gap year? Yes/No)

In addition to them, there were college, flat and house number questions, but we removed them in Wave 2.

Cohort 1 Time 2:

We added two questions:

- Ethnicity (What is your ethnic group? Asian, Black, Mixed, White, Other, Prefer not to say)
- Faculty (What is your faculty?)

Cohort 2 Time 1: We added five questions, but we removed the gap year question.

In addition to Age, Gender, and Ethnicity questions

- Department (What is your department?)
- Eligibility Criteria (Did you meet the eligibility criteria to take part in our widening participation activities and initiatives? Please see here for more information (<https://www.lancaster.ac.uk/widening-participation/our-strategy-and-approach/eligibility-criteria/>)
- Low income (Do you receive a low income grant, scholarship or bursary to help with

your University fees?)

- Is University the first time you have moved from home and lived with peers?
- Alcohol (During the past 2 weeks, on how many days did you have 5 or more drinks of beer, wine, or liquor on the same occasion (4 or more if you are a woman)? (Just enter the number only. For example for 2 days enter number 2)

APPENDIX C

Drop Out Analyses

Drop Out Comparisons in Cohort 1

Table C.1

Drop Out Comparisons of Students Completing the Study in both October and April, and Participants Lost to Follow-up in April in Cohort 1

	Yes (n = 106)		No (n = 54)		<i>t</i> (158)	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
MEQ	50.01	9.85	51.15	9.45	0.70	.48	.12
PSQI	8.68	2.49	8.52	2.05	-0.41	.68	-.07
SSS	35.42	9.23	37.48	10.04	1.30	.20	.22
GAD7	8.37	5.99	7.17	5.33	-1.25	.22	-.21
PHQ9	8.65	6.43	7.69	5.14	-0.96	.34	-.16

Note. Yes = Participants completed the study at Time 1 (October) and Time 2 (April). No = Participants completed the study only at Time 1 and lost to follow-up at Time 2.

There is no significant difference in the chronotype, sleep quality, social status, anxiety, and depression scores between participants completing both data collection points in October and April and participants only completing in October and lost to follow-up in April.

Drop Out Comparisons in Cohort 2

Table C.2

Drop Out Comparisons of Students Completing the Study in both October and April, and Participants Lost to Follow-up in April in Cohort 2

	Yes (n = 39)		No (n = 32)		t (69)	p	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
MEQ	47.85	7.52	48.19	8.81	0.18	.86	.04
PSQI	6.32	3.05	6.25	2.83	-0.09	.93	-.02
SSS	35.87	11.04	32.69	10.77	-1.22	.23	-.29
GAD7	7.90	5.60	8.94	6.23	0.74	.46	.18
PHQ9	8.21	6.17	7.88	5.80	-0.23	.82	-.06

Note. Yes = Participants completed the study at Time 1 (October) and Time 2 (April). No = Participants completed the study only at Time 1 and lost to follow-up at Time 2.

There is no significant difference in the chronotype, sleep quality, social status, anxiety, and depression scores between participants completing both data collection points in October and April and participants only completing in October and lost to follow-up in April.

Appendix D

Detailed Table for Risk of Bias in Included Studies

Table D.1

Risk of Bias in Included Studies via Cochrane Risk of Bias Tool for Randomised Studies (RoB)

	Selection Bias		Performance Bias	Detection Bias	Attrition Bias	Reporting Bias	Reviewer Discussion Notes and Final RoB Agreement
	Random sequence generation	Allocation concealment	Blinding of participants	Blinding of outcome assessment	Incomplete outcome data	Selective reporting	
1. Morris et al., 2016)	Low Participants were randomly allocated. Randomization was carried out using random number generator in Excel, operated by	No information Participants were allocated randomly. Just no specific information about whether they know or not.	High They invited undergraduate students who were experiencing stress to take part in the study and learn techniques used to manage stress. Then	High Participants were informed of the group to which they had been randomly allocated. They might know study outcomes?	Low Most participants completed the study. (81.2%). Non completers were comparable to those who completed The study on the self-report	No information They don't mention that they registered a protocol before beginning the study.	Issues related to deviation in protocols were discussed (Online modules vs. treatments accessed offline) blinding to intervention. Final Agreement:

	first two authors.		participants know the aim of the study. They might think “I am in this study and I need to control my stress better.”		measure at the pre-intervention session.		“Some concerns” in Risk of Bias.
2. Hall et al., 2018	Low Participants were blindly and randomly allocated to three intervention groups or waitlist control group, using a random number generator.	Low Participants were blindly allocated.	Low	No information	Low Students with previous mindfulness experience and who were experiencing language barriers had increased odds of dropping out. Also, intervention without reminders led to a dropout more. It helped to see the importance of reminders. However, it	No information They don't mention that they register a protocol. However, they report all the outcomes they mentioned in the beginning.	Final Agreement: “Low” Risk of Bias

					didn't affect results.		
3.Hershner and O'Brien, 2018	Low They randomized to the intervention group.	Low The Office of the Registrar performed randomization to the intervention (sleptostayawake.org online education) or control group (no education) using simple number randomization and directly emailed the recruitment email to students.	No information	No information	No information	No information They don't mention that they register a protocol. However, they report all the outcomes they mentioned in the beginning.	Absence of information and no pre-registration. Final Agreement: "Some Concerns" in Risk of Bias.
4. Ehrampoush et al., 2019	Low The subjects were equally allocated into 3 groups of intervention and control using the table of random numbers and computer by the simple random sampling method.	Low Participants and researchers don't know the groups that participants were allocated.	No information They don't say single-blind or double-blind.	No information They don't indicate whether participants knew outcome assessments or not.	No information They don't mention how many participants withdrew.	No information They don't mention a registered protocol. However, they reported all the outcome variables they mentioned at the beginning.	Two reviewers used different risk of bias tools (ROBINS and RoB). Final agreement: "Some concerns" in Risk of Bias
5.Friedrich et al., 2018	No information	Low	No information	No information	Some concerns	High They didn't register a	Issues on randomization method. There is no

	Students were randomly assigned to the SWIS intervention condition or a waiting-list control condition. They did not mention randomization method.	They were allocated randomly. They didn't know which group they were.	They don't mention it as single-blind or double-blind.	They don't say that participants were blind to outcome assessments.	Fifteen of 56 (27%) participants were lost to attrition from pre- to post-measurement. The completers did not differ from the non-completers on any dependent variable, age, or gender. Twenty two of 41 participants were lost to attrition from post- to follow-up measurement (54%). Again, the completers did not differ from the non-completers on any dependent variable, age, or gender. Not certain it	protocol. We don't know if they selectively reported or not. However, they mentioned they measured sleep related outcomes but did not mention in results. Also, they did not mention from a sleep measurement.	protocol. Final agreement: "Some concerns" in Risk of Bias.
--	--	---	--	---	--	--	---

					affected outcome results or not.		
6. Freeman et.al., 2017	Low Randomisation with an automated online system.	Low The research team was unable to affect randomisation. Participants completed assessments independently online.	Low Single-blind.	Low Screening, informed consent, assessments, allocation to conditions, and delivery of the intervention were carried out online using the automated system. (True Colours) It also got a scheduled collection of outcome measures.	Some concerns The dropout from the study was high(50%) during the study. Was greater in the treatment group than in the control group. Compared with participants who remained in the study, participants who dropped out from both groups were younger and more likely to be male.	Low There is a study protocol.	Issues were discussed and final agreement: "Low " Risk of Bias.

					<p>For the secondary measures, ISI, PHQ-9, Altman Mania Scale, and WSAS scores were slightly higher, and the WEMWBS score was slightly lower, in the missing groups than the non-missing groups</p> <p>There is improvement in depression and anxiety but maybe it could show no improvement for depression if missing groups would continue because</p>		
--	--	--	--	--	--	--	--

					missing group has higher depression.		
	Selection Bias		Performance Bias	Detection Bias	Attrition Bias	Reporting Bias	
	Random Sequence Generation	Allocation Concealment	Blinding of Participants	Blinding of outcome assessment	Incomplete outcome data	Selective reporting	
7.Bruehlman-Senecal et al., 2020	Low Randomization was conducted via Qualtrics and stratified by loneliness levels (high and low) following to dividing students into two groups.	Low They indicated that researchers were not blind to participants' condition during data collection or analysis. However, randomization was automated via Qualtrics and outcomes were self-reported, minimizing risk of bias due to no interaction with researchers.	High They indicated that as multiple previous pilot trials of technology-based behavioural interventions, it proved impractical to blind participants to their assigned condition.	Some concerns There is no explicit statement about it.	Low Retention rate was 97%. The completion rate of follow-up surveys was consistently high across all time periods and did not show significant variations by condition at any time point.	Low Outcomes listed in the ClinicalTrials.gov registration (NCT04164654) align with those reported in the article.	Final agreement: "Low" Risk of Bias.

8. Lee and Jung, 2018	Low Participants were randomised into either an experimental or wait-list control condition using a computer-generated random numbers table.	Some concerns Random numbers were used, but no allocation concealment strategy is provided. Thus, the risk is unclear. Researchers might be knowing allocation.	High Participants were not blinded. Experimental participants used the DeStressify app, and controls were waitlisted.	Some concerns No direct statement about outcome assessment is provided.	Low Drop out rate was 20%. They don't indicate drop out reasons.	Low Results include all primary and secondary outcomes from the methods. The study protocol was not registered but editor reported a low risk in conflict of interest section because the study was considered formative, guiding the development of the application.	Final agreement: “Some concerns” in Risk of Bias.
9. Raevuori et al., 2021	Low Randomization was performed using block randomization by the Clinpal software, a data secure online patient data collection	Low Researchers, assistants and patients were blind to the stratification and randomisation sequence.	High Blinding of the patients, therapists or researchers for patients' group status was impossible; this awareness might have	High Participants were aware of being in an intervention group. It is online and self-reported. It might affect outcomes.	Low Attrition was 12.8%, and they have done an intention-to-treat analysis and the last observation carried forward method (LUCF)	Low They registered a protocol. Primary and secondary outcomes were reported as planned in protocol.	Issues around blinding of participants and researchers and outcome assessments were discussed. Final Agreement:

	and storage platform for clinical trials by eClinicalHealth Ltd		biased reporting.				“Some concerns” in Risk of Bias.
10. Esmaeili and Ahmadi, 2018	Some concerns They randomly allocated students to intervention and control groups. However, they did not mention the randomisation method.	No information They did not mention allocation concealment for participants and researchers. Participants probably know that they are in the intervention group because it is a mobile app.	High Participants know they were receiving an intervention	Some concerns They don't give information whether participants know outcome assessment or not but participants can guess from questions.	No information They don't mention drop-out rates.	No information They don't mention a registered protocol.	Two reviewers used different risk of bias tools (ROBINS and RoB). Final agreement: “Some concerns” in Risk of Bias.
11. Gellis et al., 2013	Some concerns Participants were randomly allocated by using a coin tossing procedure.	Some concerns. It is in-person intervention. Participants know the assigned group. It is stated in study description as well. They don't mention whether researchers know the allocation.	High Risk Participants know that they were getting intervention. It is mentioned in study description to inform participants	Some concerns Participants know their sleep will be assessed at the end but no information about depression and anxiety.	Some concerns 7 students did not continue to the follow up but reasons are unknown.	No information They don't mention registered protocol.	Final agreement: “Some concerns” in Risk of Bias.

Table D.2

Risk of Bias in Included Studies via Cochrane Risk of Bias Tool for Non-Randomised Studies (ROBINS-I)

	Risk of bias due to confounding	Risk of bias in classification of interventions	Risk of bias in selection of participants into the study (or into the analysis)	Risk of bias due to deviations from intended interventions	Risk of bias due to missing data	Risk of bias arising from measurement of the outcome	Risk of bias in selection of the reported result	Reviewer Discussion Notes and Final RoB Agreement
1.Trockel et al., 2011	Moderate They did not allocate students randomly to health promotion programs. Students in one residence participated 8-week CBT sleep help	Low The "Refresh" and "Breathe" programs were well-defined, with their content clearly outlined.	Low The analysis covered all students who completed both pre- and post-intervention assessments.	Low Both programs were circulated over email as self-help interventions, minimising the potential for systematic discrepancies in their implementation.	Low The "Refresh" and "Breathe" groups completed the study at high rates (83% and 79%, respectively). Individuals who dropped out had no significant changes in baseline sleep quality,	Moderate The study utilised self-reported data. Knowing which program they received may have influenced their responses.	Moderate They don't mention that they registered a protocol before beginning the study despite the major outcomes and	Final Agreement: "Moderate" Risk of Bias.

	programme group. Students in other residence participated to another health promotion programme.				depression scores, compared to those who completed the study, suggesting that missing data did not influence the results.		analyses being clearly defined.	
2. Baroni et al 2018	Moderate Before study began, the two groups were different. The sleep course and a comparison groups had significant baseline sex and race/ethnicity disparities. These variables were adjusted for in the analysis, although residual confounding remained.	Low The intervention and comparison groups were clearly defined based on course enrolment.	Moderate The participants included a convenience sample of students enrolled in either a sleep course or a psychopathology course. Students that self-select into a course on sleep might have a heightened interest or concern in sleep issues.	Low The courses were delivered as described	Serious Completion of follow-up decreased to 54%, and dropout analysis indicated that participants who withdrew had differences in baseline measurements.	Moderate Most outcomes were self-reported, introducing potential reporting or social desirability bias.	Moderate They don't mention that they registered a protocol. However, they report all outcomes they mentioned in the beginning,	Issues on incomplete outcome data were discussed. The study was agreed to be robust. Final Agreement: "Moderate" Risk of Bias.

3.Ball and Bax, 2002	Serious Groups were based on existing sections and not randomized. No adjustment for potential baseline differences, e.g., group composition or academic ability.	Low Interventions (feedback vs discussion) were clearly defined and delivered consistently.	Moderate Students were selected from intact classes, and there is no evidence of differential recruitment between groups.	Moderate There was no blinding, and participants may have changed behaviour based on knowledge of intervention. No attempt to control deviations.	Moderate Dropout was mentioned but not fully accounted for. No analysis or imputation of missing outcomes.	Serious All outcomes were self-reported by unblinded participants, increasing risk of measurement bias.	Moderate No protocol or statistical analysis plan reported. Possibility of selective outcome reporting.	We discussed issues about randomization and self reporting in unblinded participants. Final Agreement: "Critical" Risk of bias.
-----------------------------	---	---	---	---	--	---	---	---

4. Levenson et al., 2016	Moderate No control group or randomization	Low Clearly defined intervention	Low Voluntary participation in a university setting	Moderate No blinding, self-guided.	Serious The dropout rate for total participants who completed full pre- and post-intervention outcomes is 43.6%. The authors do not provide reasons for missing data.	Moderate Self-reported outcomes	Moderate They do not mention from protocol but all major outcomes discussed in the methods are reported.	Final Agreement: "Serious" Risk of Bias.
--------------------------	---	-------------------------------------	--	---------------------------------------	---	------------------------------------	---	--

Appendix E

Result Section: Academic Social Comparisons and Mental Health

The results of post hoc exploratory correlations between subdomains of social comparisons and anxiety and depression outcomes showed a significant association between greater academic-related social comparisons and poorer mental health in Cohort 1 and Cohort 2. As stated in Table E.1 below the academic dimension of the School-Based Subjective Social Status Scale (SSS Academic) (Sweeting & Hunt, 2014), and the Abilities dimension of the Social Comparison Orientation Scale (SCO Abilities) (Gibbons & Bunk, 1999) were connected to both anxiety and depression in the first cohort of university students. Furthermore, when sleep and chronotype scores were partially controlled for, lower SSS Academic scores remained linked to higher depression scores, and SCO Abilities remained associated with anxiety (Table E.2). There was no correlation between other dimensions (e.g. popularity, powerlessness, and attractiveness) and depression. Therefore, the findings from the literature review and these subdomain analyses combined, indicate the need for further investigation of social comparisons in university students and to focus more explicitly on social comparisons in the domain of academic abilities.

Table E.1

Descriptive Statistics and Correlations for SCO, SSS Academic and Mental Health in Cohort 1 Time 2 (without controlling sleep quality (PSQI) and chronotype (MEQ) scores)

Variable	M	SD	1	2	3	4	5
1.GAD-7	8.39	5.81	-				
2.PHQ-9	8.49	6.21	.75*	-			
3.SSS-	7.08	2.02	-.32*	-.44*	-		
Academic							
4.SCO-	19.79	3.42	.42*	.25*	-.05	-	
Abilities							
5.SCO-	16.53	3.03	-.05	.01	.04	.16	-
Opinions							

Note. N = 118. GAD-7: anxiety; PHQ-9: depression; SSS Academic: Subjective Social Status Questionnaire Academic Dimension: How well are you doing at school compared with the rest of your year group?; SCO Abilities: Social Comparison Orientation Scale Abilities dimension (e.g.item 2: I always pay a lot of attention to how I do things compared with how others do things.); SCO Opinions: Social Comparison Orientation Scale Opinion dimension.

*p < .01. **p < .05.

Table E.2

Descriptive Statistics and Correlations for SCO, SSS Academic and Mental Health in Cohort 1 Time 2 whilst Partially Controlling Sleep quality (PSQI) and Chronotype (MEQ) Scores

Variable	M	SD	1	2	3	4	5
1.GAD-7	8.39	5.81	-				
2.PHQ-9	8.49	6.21	.66*	-			
3.SSS-Academic	7.08	2.02	-.18	-.31*	-		
4.SCO-Abilities	19.79	3.42	.33*	.10	.08	-	
5.SCO-Opinions	16.53	3.03	-.08	-.01	.05	.18	-

Note. N = 118. GAD-7: anxiety; PHQ-9: depression; SSS Academic: Subjective Social Status Questionnaire Academic Dimension: How well are you doing at school compared with the rest of your year group?; SCO Abilities: Social Comparison Orientation Scale Abilities dimension (e.g.item 2: I always pay a lot of attention to how I do things compared with how others do things.); SCO Opinions: Social Comparison Orientation Scale Opinion dimension.

*p < .01. **p < .05.

Similarly, there was a connection between SSS Academic, SCI ability self-worth (Thwaites & Dave Dagnan, 2004) and both anxiety and depression in 2021 (Cohort 2) at the beginning of the university. Lower SSS academic and SCI ability self-worth was connected to, higher anxiety and depression. Higher scores in SCO Abilities (more comparisons in abilities) were also connected to higher anxiety (Table E.3). After partially controlling sleep and chronotype, SSS Academic and SCI Ability self-worth was still connected to both anxiety and

depression. Lower scores in SSS Academic and SCI Ability self-worth were connected to higher anxiety and depression (Table E.4). Findings in Cohort 2 also supported the need for focusing on academic social comparisons.

Table E.3

The Correlations Between SCO, SSS Academic and Mental Health in Cohort 2 Time 1 (without controlling sleep and chronotype)

Variable	M	SD	1	2	3	4	5	6
1.GAD-7	8.37	5.87	-					
2.PHQ-9	8.06	5.96	.81*	-				
3.SSS-	5.86	2.25	-.41*	-.49*	-			
Academic								
4.SCO-	16.44	4.46	.31**	.15	-.05	-		
Abilities								
5.SCO-	20.01	2.74	.20	-.09	.09	.43*	-	
Opinions								
6.SCI-	6.13	1.65	-.40*	-.49*	.51*	-.26*	-.17	-
AbilitySelf								
Worth								

Note. N = 71. GAD-7: anxiety; PHQ-9: depression; SSS Academic: Subjective Social Status Questionnaire Academic Dimension: How well are you doing at school compared with the rest of your year group?; SCO Abilities: Social Comparison Orientation Scale Abilities dimension; SCO Opinions: Social Comparison Orientation Scale Opinion dimension; SCI-AbilitySelfWorth: Social Comparison and Interest Scale: It consists of intelligence/academic ability and discipline.

*p < .01. **p < .05.

Table E.4

The Correlations Between SCO, SSS Academic and Mental Health in Cohort 2 Time 1 By Controlling Sleep and Chronotype

Variable	M	SD	1	2	3	4	5	6
1.GAD-7	8.40	5.91	-					
2.PHQ-9	8.10	5.99	.75*	-				
3.SSS-Academic	5.81	2.23	-.30**	-.38*	-			
4.SCO-Abilities	16.40	4.49	.23	.01	.03	-		
5.SCO-Opinions	19.99	2.75	.19	-.17	.11	.42*	-	
6.SCI-Ability	6.09	1.64	-.32*	-.42*	.45*	-.22	-.17	-
Self Worth								

Note. N = 70. *p ≤ .01. **p < .05.

Appendix F

Workshop Script

SLIDE 1-Academic Social Comparisons and Burnout

Hi everyone, welcome!! Thank you for your interest and participation in the academic social comparisons and burnout workshop. My name is Gamze, and I'm a PhD student at Lancaster University Medical School. My research focuses on students' mental well-being, and mainly social factors and sleep factors on mental well-being, and I organise this workshop as a part of my PhD project. In this workshop, I will focus on the connection between social comparisons (specifically academic social comparisons) and burnout. I am so glad you're here today. Hopefully, it can be helpful for all of you.

SLIDE 2-Questionnaire before the workshop

Firstly, could you please fill in pre pre-workshop questionnaire by reading the barcode on your phones? It will take just 2-3 min. and includes a participant information form, and consent form, and a very short demographic questions section.

SLIDE 3-Workshop Programme

So to start, I can talk about the workshop programme. I will explain *the definition of burnout and common signs, *the level of burnout in medical students, * risk factors for burnout, *social comparisons and burnout...(in slide)

In addition to the didactic teaching part, there will be activity parts. I try to make it as simple and fun as possible. There will be a video and some activities to contribute to you. The first part will be about burnout, and the second part about academic social comparisons. I wrote them in detail in the slide. You will respond to some questions and watch a video on the burnout

part. In the academic social comparisons part, there will be activities to understand the adverse effects and decrease adverse social comparisons.

SLIDE 4-Aims

The main aims of the workshop are to understand the effectiveness and necessity of that type of workshop for university students, and to show the possible effects of academic social comparisons on burnout. Being aware of these connections might help to avoid the adverse effects of academic social comparisons.

SLIDE 5-Burnout Definition and Common Signs

Before I talk about the connection between social comparisons and burnout, I can explain what burnout is and what the common signs are. Do you know what burnout is and the description of burnout?

Burnout is a state of physical and emotional exhaustion. It can occur when you experience long-term stress in your job/university work or when you have worked in a physically or emotionally draining role for a long time (in slide). Based on the literature, it is similar to depression, but it is described as mainly work-related.

SLIDE 6-Common Signs of Burnout

These are common signs of burnout from studies (slide).

When you have burnout, you might constantly feel tired, especially after work. Feeling helpless and detached or alone, having self-doubt. You might not feel good enough or successful enough, as much as your peers.

SLIDE 7-The Prevalence of Burnout in University Students

Now we can see how common burnout is in university students.

Do you want to guess the prevalence of burnout and burnout symptoms in university students? What is the percentage of burnout that university students experience? One-third of university

students experienced burnout according to a study two years ago (Kaggwa, Kajjimu, Sserunkuma et al. (2021). University students were from both low- and middle-income countries.

SLIDE 8-The Prevalence of Burnout in University Students

Now, could you guess the prevalence of burnout symptoms? For example, emotional exhaustion or feeling tired emotionally. What is the percentage? (choices are in the slide).55.4%. As you can see, it is more than half of the students. And guess for reduced academic efficacy or productivity? (choices are in slide) It is 30.9%. It is also from a study two years ago. University students were from different parts of the world, such as Europe, Asia, and America.

SLIDE 9-Burnout in Medical Students

(It is a part only for medical school students)

Burnout shows itself early in medical students' careers. Several studies indicated the prevalence of burnout among medical students. There was an increase in burnout among medical students from year 1 to year 5.

Would you like to guess the percentage of burnout symptoms in medical students in the UK? Being disengaged or disconnected (in slide), being exhausted and tired (in slide). Studies in the UK specifically have shown that more than 80% of students surveyed met the burnout criteria for being disengaged, and more than 85% met the criteria for being exhausted. One study even suggested that over a quarter of the students they surveyed were experiencing burnout. Furthermore, burnout initially experienced during medical school has been shown to persist into post-graduate training. As we said before, it even persists into postgraduate training. This is why it's important to find out what causes medical students to feel burned out in the beginning.

SLIDE 10-Risk Factors for Burnout

Now we can talk about risk factors for burnout. I have a short and cute video that you can enjoy and learn. You can watch, and you can try to catch risk factors and precautions from the video, and we can discuss after. Some factors are: not having time for hobbies, not socialising, trying to be the best in your work and ignoring the other parts of your life.

There are various factors worsening burnout symptoms for medical students, according to studies in the literature, such as workload, perceived lack of control, study/assessment periods, sleep deprivation, insufficient free time for personal or family life, difficulties in managing finances, and the competitive nature of medical school.

We saw some of them in the video as well. As you can see, the competitive nature of medical school is one thing affecting burnout symptoms. It is connected to academic social comparisons. This is why we need to understand how academic social comparisons affect burnout symptoms.

SLIDE 11- Academic Social Comparisons in University Students

Have you thought about the effects of social comparisons on burnout levels? There are many social comparison dimensions. Do you think which dimension medical students compare themselves to others? It might be athletic ability, physical appearance, academic success.

According to interviews with medical students, they found that academic-social comparisons were an important part of students' struggles. This part is important. All students coming to medical school are academic high achievers. These are some comments from medical students (in the slide). As you can see, there are clear adverse academic social comparisons that might affect burnout.

SLIDE 12-Orange Dot

Do you think which orange dot is bigger? Left or right? They are both the same. It is Ebbinghaus's illusion. What does it explain about social comparisons? Is there someone who has a response?

You can see that the assessment of yourself depends on where you are, who you compare with. Being placed in a class with a higher performance level (represented by the larger surrounding circles in the left panel), the student will evaluate their own abilities as worse (i.e., the centre circle seems smaller) compared with when the student is placed in a class with an overall lower performance level is lower.

The student evaluates their own abilities as better or worse depending on the performance levels of the students they are surrounded by—and presumably compare themselves with. In the two scenarios, when measured objectively, the size of the centre circle—or the student's ability—is the same, but the student's perceptions and evaluations of their ability levels in the two scenarios are different.

Would you like to talk about your thoughts, experiences, feelings on academic social comparisons?(in slide).

SLIDE 13- Academic Social Comparisons and Burnout/Mental Health

(Question in the slide)

SLIDE 14-Upward-Downward Comparisons-Mental Health

In addition to the factors contributing to burnout I mentioned, social comparisons are connected to burnout as well. People are driven to evaluate themselves and compare themselves to other people as a natural human tendency. There are three types of social comparisons:

- Upward comparisons are when you compare yourself to someone better, and
- Downward comparison when you compare yourself to someone less proficient than you.
- As for lateral comparisons, it is a comparison you see as equal to you in various areas.

There are positive and negative sides to these comparisons. On the positive side, if you compare yourself to someone better than you, you might feel motivated to be more like them. But If you compare yourself to someone less proficient than you, might feel grateful and thankful for what you have got.

However, there are negative effects as well. If you always compare yourself to someone better, it might produce feelings of jealousy, anger, hostility, and these are the things that can increase psychological stress. Downward social comparisons can also have negative effects, and these include pity and worry.

I included both studies about burnout and mental health. As you can see upward social comparisons are connected to more burnout and worse well-being. Two of the studies were on university students. In this last one, upward social comparisons increased burnout after 2 months. This study was on nurses.

SLIDE 15-Matching Exercise

There are a variety of emotions occurring after social comparisons, such as worry, envy, optimism, and admiration. How do thoughts in social comparisons affect burnout and mental well-being? Also, think about what type of social comparison they are? Could you please match them? (in slide)

SLIDE 16- Activity-Academic Social Comparison Stories

Mentioning the thought-emotion process is important as well. In which type of comparison, a person feel hostility? It is an upward comparison, but you might feel motivated as well after upward comparisons. You might feel a range of emotions depending on your perspective and thoughts. Now I want you to read two stories and catch the differences (Questions are in the slide).

SLIDE 17-Tips and Activities to Decrease Harmful Effects of Academic Social Comparisons- Always Challenge Your Thoughts

There are ways to decrease the negative effects of social comparisons. I will mention in the next slides. Firstly, you should always try to challenge your automatic thoughts (in slide).

SLIDE 18-Gratitude

As a gratitude exercise to alleviate the adverse effects of social comparisons and improve mental well-being and decrease burnout, you can make a list of five things that you are grateful for in your life and do this exercise daily. If you need help finding items, think back to something that has happened in the last week that you're grateful for.

- Make a list of five things that you are grateful for in your life.
- Try not to repeat items.
- Don't worry if the items are big or small.
- You can do it daily

SLIDE 19-Realize Your Unique Sides

One thing causing social comparisons is uncertainty. According to the research, more self concept clarity decreases harmful social comparisons. If you realize your unique sides, it can help you.

SLIDE 20-Appreciation

If you find it hard not to compare yourself to others, try to reframe the comparisons so you can show gratitude. Also, instead of trying to find a specific person to use as a comparison, use an "abstract" comparison point.

Adler and Fagley (2005) used when measuring appreciation: "I reflect on the worst times in my life to help me realise how fortunate I am now." In this item, the reference point is a previous, more negative time in one's life. Using this comparison point, instead of a different person, might help you focus on the positive aspects of your life currently.

Discuss a time you did this. Could this example be described as an "upward" or "downward" comparison? How did this type of comparison affect you?

Also, you can fill the table like in the slide about your progress towards your personal academic goals and other goals compared to the past.

SLIDE 21-Self Compassion

(In slide).

SLIDE 22- Malleability of Intelligence

Interventions that teach students about the malleability of intelligence have been successful in changing student learning approach and academic performance, with young children (e.g. Kamins and Dweck, 1999), adolescents (e.g. Good et al., 2003), and college students (e.g. Aronson et al., 2002).

Thinking about intelligence as changeable and malleable, rather than stable and fixed, results in greater academic achievement, especially for people whose groups bear the burden of negative stereotypes about their intelligence.

As you know, high perceived control create positive emotions while low perceived control creates negative emotions. By knowing this, believing if you work hard, you can also be successful as much as your peer might increase positive emotions and decrease the adverse effects of academic social comparisons. It helps to alleviate burnout.

In addition to them, sharing academic challenges with your peers and talking about the experiences of former peers will help you. Someone mentioning their academic challenges and how they overcame or succeeded will be helpful. Also, you should be aware of academic social comparisons on social media as well as trying to improve yourself in time management. It alleviates the connection between social comparisons and mental health.

SLIDE 23-The end of the workshop Qualtrics Survey

As the last short survey, could you please scan the barcode and fill it.

Appendix G
Workshop Toolkit

***ACADEMIC SOCIAL COMPARISONS
AND BURNOUT TOOLKIT***



Version 1.0
June 2024

CONTENTS

INTRODUCTION

THE DEVELOPMENT PROCESS OF THIS TOOLKIT	2
WHO THIS TOOLKIT IS FOR	3
THE KEY AIMS OF THIS TOOLKIT	4



PRACTICAL RECOMMENDATIONS

PLANNING THE WORKSHOP	5
CONDUCTING THE WORKSHOP-	
1.DIDACTIC PART	6-9
2.ACTIVITY PART	10-14

ADDITIONAL DETAILS

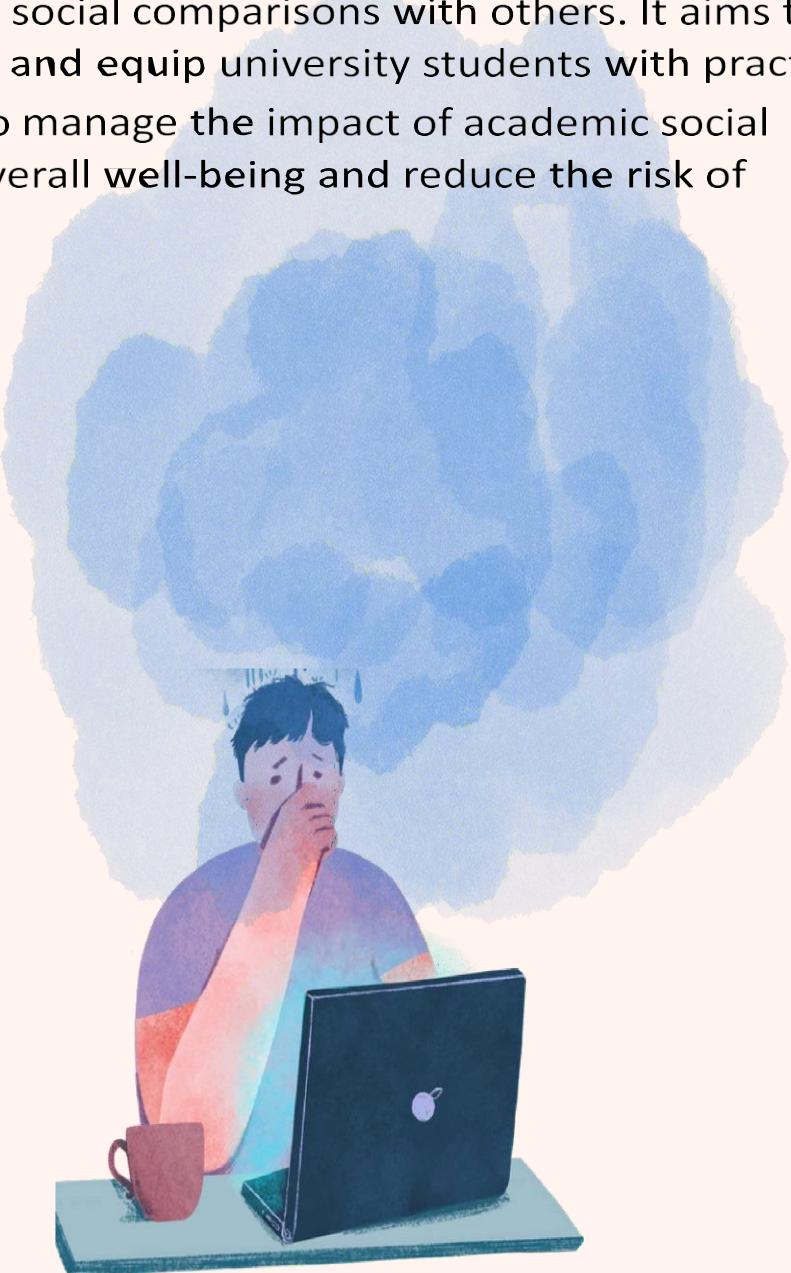
AUTHOR INFORMATION	15
ACKNOWLEDGEMENTS	15

2

THE DEVELOPMENT PROCESS

THIS TOOLKIT

This “Academic Social Comparisons and Burnout” Workshop toolkit was developed from a study that explored students make social comparisons with others. It aims to awareness and equip university students with practical strategies to manage the impact of academic social their overall well-being and reduce the risk of

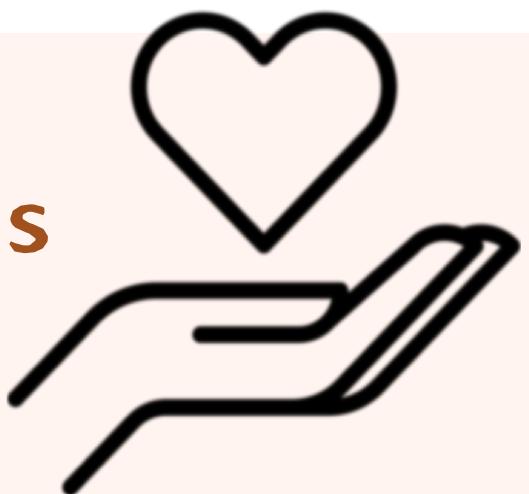


WHO THIS TOOLKIT IS FOR

The toolkit can be used by anyone wanting to enhance the psychological well-being of university students. This involves mental health support services, researchers and lecturers from universities, non-profit organisations, and other interested parties who want to support university students in preventing professional burnout.



THE KEY AIMS OF THIS TOOLKIT

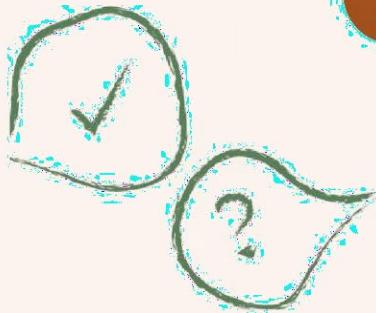


We know that mental health interventions for university students do not always take into account that students make social comparisons with others and this can have a negative impact on their mental well-being. The research we did with university students revealed a link between social comparisons on academic skills and mental health. This supports other research that shows there are negative consequences of academic social comparisons for university students. There are suggested techniques in the literature to decrease adverse social comparisons and improve mental health. Therefore we combined recommended techniques into activities that can be delivered in an engaging workshop with students.

PLANNING THE WORKSHOP

1

You might not need ethics approval if you don't plan to collect any research data. However, you should confirm this with your institution.



2

You can reach university students by circulating an email including a registration link and you can use flyers.



3

The workshop should ask students to form groups of no more than 5 students to allow all students to express their thoughts and experiences. We suggest for a class of 30 students at least 2 staff/facilitators would be fine. We suggest at least 1.5 to 2 hours for the workshop. A pen and some paper is all that is needed so each group can write ideas down. The workshop has slides with sounds and videos so AV equipment is needed for the workshop.



CONDUCTING THE WORKSHOP

6

1. DIDACTIC PART

Academic Social Comparisons and Burnout

A workshop about the connections between social comparisons and burnout, and some tips to avoid unfavourable social comparisons



Gamze Kocdemir
Ph.D. student at Lancaster University Medical School

Date: November 27, 2023
g.kocdemir@lancaster.ac.uk

Hi everyone, welcome!! Thank you for your interest and participation in the academic social comparisons and burnout workshop. I can introduce myself. My name is ..., and I'm.... at ... I decided to organize this workshop because...

1

In the beginning of the workshop, you can introduce yourself and explain the reason of organizing the workshop. You can also explain the reason of focusing academic social comparisons.

Workshop Programme

- Burnout definition and common signs
- The Prevalence of Burnout in University Students
- Risk Factors for Burnout
- Academic Social Comparisons in University Students
- Academic Social Comparisons and Burnout/Mental Health
- Tips to Decrease Harmful Effects of Academic Social Comparisons
- End of Workshop Questionnaire



2

You can explain the workshop programme by describing the didactic and activity parts. Then you can move on to explain the aims of the workshop.

Aims of workshop



- 1 Increasing awareness about the connections between academic social comparisons and burnout
- 2 Understanding the effectiveness of that type of workshop
- 3 Learning how to decrease adverse social comparisons

3

You can ask questions to students in the didactic parts. It will increase active involvement of the participants in the workshop.

What is the percentage of burnout that university students experience?

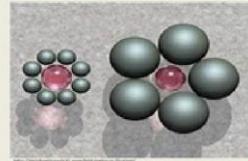
- A) Between 10%-20%
- B) Between 20%-30%
- C) Between 30%-40%



Kappela, Kajima, Suenarakuma et al. (2021)



Which dot is bigger? Left or right?



What does it explain about academic social comparisons?

Dissertation: Social Comparisons in the Classroom Related: Insights into Underlying Processes Using Immersive Virtual Reality as a Research Tool

Which type of academic social comparisons with peers might be connected to burnout and worse well-being? Upward, downward or lateral comparisons?

4

Sometimes they need to share experiences and opinions, you can indicate that there is no pressure to talk though.

Would you like to talk about your thoughts/experiences/feelings on academic social comparisons?
(No pressure to talk ☺)



5

6 Then you can play the video. The main message of the video was to have a balanced work-life routine. Participants found it one of the most effective strategies in the workshop.



6



2

2 You can give gift cards as a gratitude for their participation.

3



CONDUCTING THE WORKSHOP

10

2. ACTIVITY PART

The following three activities help students think positively about their strengths and abilities.

1 Gratitude Activity

You can ask participants to write their **academic strengths** they are grateful for

Be Grateful for Your Strong Sides

Please write **the academic strengths** you are grateful for

(e.g. Good time management, Resilience, Goal setting, Organizational skills, Research skills)

Also, Think about **academic weaknesses** to improve your weaknesses.

CREATE A POSITIVE PERSONAL MANTRA
List 3 true compliments to repeat to yourself daily.

Emmons and McCullough, 2003

You can ask participants to write their academic goals and their progress towards these goals compared to the past. You can give participants a paper with 5*5 grid line to write their goals in this activity



2 Appreciation Activity



Change the comparison person from a person to a period

Compare yourself now with more negative time of your life

Could you please write your **academic goals**? How is your **progress** towards your personal academic goals compared to the past?

G O A L S				
Own a car	Make new friends	Have a healthy relationship	Go back to school	Get in touch with your spirituality
Gain self-control	Make it through the day	Get your groove on!	Get your driver's license	Read a book
Want good for others	Find a significant other	Free!	Learn how to clean	Learn something new
Call a friend	Gain control over your emotions	Go for a walk	Pick up a new hobby	Communicate better with others
Give up drinking	Join a team	Exercise more	Strengthen your bond with family members	Vote in the upcoming election



3 Realize Your Unique Sides Activity

You can ask participants to think about and write down at least **five things they consider unique** about themselves.

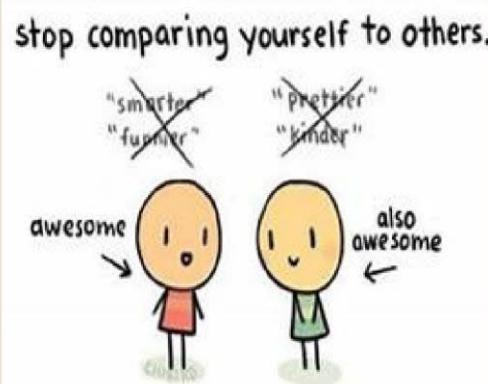
Realize Your Unique Sides

Reflect on Your Unique Qualities
(5-10 minutes)

Think about and write down at least **five things** you consider **unique about yourself**.

These can be:

- *talents,
- *hobbies,
- *personal values,
- *experiences, or
- *any other characteristics that make you who you are.



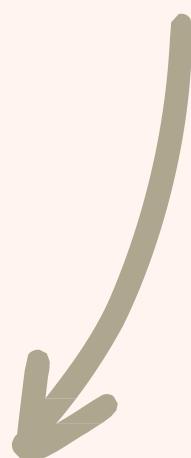


TIPS FOR MENTAL WELLBEING

12

1 Understanding the Thought-Emotion Connection and Challenging Negative Thoughts

You can give examples of thoughts and emotions to help to challenge their social comparison thoughts.



ACTIVITY- SOCIAL COMPARISON STORIES

Both are upward social comparisons.

1. What are differences? **Thoughts, emotions and behaviours** of Mark and Sarah?

2. Is it a harmful social comparison? Does it increase or decrease burnout risk?

Always Challenge Your Thoughts

I will never be good enough.	need	Feelings of inadequacy
I don't belong to this school.	Isolated	Disconnected
I will work hard by considering my limits	Motivation	Inspiration
I can focus on things	Hope	
I need to improve instead of aiming to be the best.	→	

13



2

Suggestion about Self-Compassion

According to research, high self compassion helps to decrease negative feelings after social comparisons. You can suggest to students to be compassionate towards themselves.

Self-Compassion

High self compassion – Less negative feelings after social comparisons





Choi et.al., 2014

3

Suggestion About Sharing Academic Challenges with Peers and Normalizing the Failure

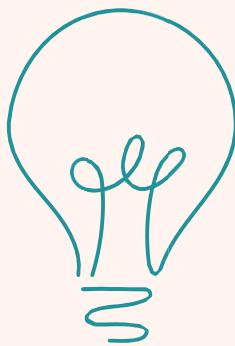
It is a part of an intervention study about social comparisons. You can suggest students to be open about sharing academic difficulties and normalize failure.

Share academic challenges with your peers



Being open when things don't go our way helps **normalize the failure** we all have to endure.

Micari and Pazos, 2014



14



4 Being Aware of Academic Social Comparisons on Social Media

Academic social comparisons on social media are also connected to anxiety based on a study. You can suggest them to be aware of academic social comparisons on social media.

Be Aware of Academic Social Comparisons on Social Media



Anto et.al., 2023

5 Improving Time Management

Better time management can help reduce negative social comparisons and protect mental health.

Try to Improve Time Management

Time management alleviates the connection between social comparisons and mental health.



AUTHOR INFORMATION

This toolkit was prepared at
Lancaster University by:

Gamze Kocdemir, PhD Student,
Lancaster Medical School

Supervisors

Judith Lunn, Senior Lecturer in
Health Psychology, Lancaster Medical

School

Guillermo Perez Algorta, Senior
Lecturer, Division of Health Research



ACKNOWLEDGMENTS

We would like to express sincere
gratitude to brilliant students
who actively engaged in the
workshop, contributed to its