Taking back our Life at Night: Revenge Bedtime Procrastination and Perceived Control in College Students

Sophia Linke

S4016130

Department of Psychology, University of Groningen

PSB3E-BT15: Bachelor Thesis
Group 22

Supervisor: (prof.) (dr(s).) Nanxi Yan

In collaboration with: Beatrice Gänzler, Carmen Labee, Galina Tittler

July 11, 2022

.

A thesis is an aptitude test for students. The approval of the thesis is proof that the student has sufficient research and reporting skills to graduate, but does not guarantee the quality of the research and the results of the research as such, and the thesis is therefore not necessarily suitable to be used as an academic source to refer to. If you would like to know more about the research discussed in this thesis and any publications based on it, to which you could refer, please contact the supervisor mentioned.

Abstract

Revenge bedtime procrastination is a newly studied phenomenon in which individuals knowingly fail to go to bed at the intended time. Individuals engage in revenge bedtime procrastination even though this reduces their time to sleep in order to regain a sense of freedom they feel lacked throughout the day. This study investigates whether the amount of time college students spent revenge bedtime procrastinating is predicted by their lack of perceived control in daily life, and whether this effect is moderated by perceived social support. Participants filled out a short online survey including the Sense of Agency Scale and the Multidimensional Scale of Perceived Social Support. The results show a sample in which 95.4% of the 175 participants report that they have engaged in revenge bedtime procrastination. There was evidence that perceived lack of control in daily life predicts revenge bedtime procrastination, but no evidence of perceived social support moderating this effect.

Keywords: revenge bedtime procrastination, perceived control, sense of agency, perceived social support

Taking back our Life at Night: Revenge Bedtime Procrastination and Perceived Control

Nowadays, the importance of sleep for mental- and physical well-being is a widely recognized fact (Gohari et al., 2022). Sleep problems are associated with many negative consequences including chronic health conditions, car accidents, mental distress, work accidents, coronary disease and strokes (Jin & Ziebarth, 2020). In contrast with the awareness surrounding the importance of sleep studies have found that insufficient sleep has increased across the population (Ilona, 2020). Although poor is prevalent among college students, they are no exception to its harmful effects, as it has been found that poor sleep quality reduces immune function among college students (Lueke & Assar, 2022). Insufficient sleep in college students has also been shown to increase obesity-related health risks (Wang et al., 2016). Besides physiological reasons that may prevent a sufficiently good night's rest there are also psychological phenomena that have received more public attention in recent times.

Revenge bedtime procrastination has been reported by individuals frequently (Liang, 2020), but there appears to be a gap in scientific research addressing this issue. The term revenge bedtime procrastination (RBP) describes the phenomenon whereby individuals purposely fail to go to bed at the intended time in order to regain a sense of freedom they feel they lacked throughout the day, even though they understand it will have negative consequences for their sleep (Liang, 2020). The term was popularized on the social media site Twitter, prompting many individuals to share their experiences with RBP, one user describing her experience: "It is a revenge, to get back time for yourself" (Liang, 2020). By delaying their bedtime and therefore reducing hours of sleep, individuals often do not get a sufficient amount of sleep (Kroese et al., 2014).

Aside from the physical- and mental health effects associated with insufficient sleep, it has also been shown to be a costly endeavor regarding an individual's productivity. In their study of multiple US corporations, Rosekind et al. (2010) have estimated that the productivity losses related to fatigue are around $1967 per employee annually. In college students, reduced sleep is associated with poorer academic performance (Estevan et al., 2021). Therefore, a reduction in RBP, and increase in sleep duration, may increase health, well-being, and productivity among students. However, it is not currently known why students engage in RBP in the first place, which poses a significant hurdle for possible interventions. Studies have shown that a lack of awareness about mental health issues among college students can prevent help-seeking behaviors, and since there is very little research on this phenomenon and its causes, it may hinder students from receiving help (Leijdesdorff et al., 2021). This begs the question: what are the causes of revenge bedtime procrastination?

To better understand what causes college students to procrastinate, previous researchers have aimed to explain this behavior based on the theory of planned behavior (Lin & Bai, 2014). The theory of planned behavior is a well-established psychological framework which proposes that an individual's behavioral intention is significantly impacted by the individual's subjective norms, attitudes, and perceived control (Ajzen & Madden, 1986). Furthermore, this theory has been successfully applied to predict adherence to various health-related behaviors in college students (McCaul et al., 1993). Furthermore, the theory of planned behavior was applied to explain insufficient sleep in college students, and found perceived behavioral control to be the strongest within-day predictor (Mead & Irish, 2022). The description of revenge bedtime procrastination includes the statement that procrastination at night is "revenge" on the daytime, which was perceived as stressful and lacking time for personal activities (Suni, 2022). The perceived inability to create time for oneself suggests that perceived control in individuals engaging in RBP may be low during the day, causing the individual to take back control over their life at night.

Control is an important psychological concept that has been found to be a predictor of physical and mental well-being throughout life (Skinner, 1996). An individual's belief about how much control they have over influencing and changing their life circumstances is referred to as perceived control (Zheng et al., 2020). Perceived control has been widely researched in multiple populations, and the effect of perceived control on the population of college students has been documented in different contexts, such as in the context of instructions in the classroom (Perry & Dickens, 1987). In college students, perceived control has been found to influence numerous factors, including academic success (Respondek, 2017). Therefore, it is important to understand whether perceived control in daily life of college students affects their motivation to reduce RBP behaviors.

Another factor that has been found to moderate well-being in college students is whether they perceive that they are receiving emotional support and practical help from meaningful groups such as friends and family, which was found to moderate the variables perfectionism, depression, and anxiety (Zhou et al., 2013). This is referred to as perceived social support. Studies have shown that a lack of perceived social support can have a negative impact on mental health in college students (Huang & Zhang, 2021). In the context of the theory of planned behavior, perceived social support would fall under the variable of "subjective norm", as it has in previous studies (Baenziger et al., 2018; Kerner, 1996; von Linden, 2012), or similarly social support instead of perceived social support (Den Ouden, 1995; Zhao et al., 2021). According to the theory of explained behavior as proposed by Ajzen and Madden, the variable "subjective norm" describes whether, and how much, an individual feels socially pressured to perform a certain behavior. Social support as a subjective norm would, according to

this theory, influence an individual's intention to engage in a certain behavior based on the amount of social support they receive. With the example of health-related behavior, such as going to sleep early in the context of RBP, a strong social support network may exert pressure on an individual to engage in behavior that supports their health and well-being, whereas individuals without such a network do not experience social pressure to take care of themselves. An example illustrating social support as a subjective norm pressuring individuals to engage in health-related behavior is Baenziger et al.'s study on follow-up care of childhood cancer survivors. In this study, patients who experienced more social support, and therefore believed that people they cared about wanted them to receive follow-up care, had higher intentions to receive follow-up care. With RBP, this would translate to individuals who experience social support feeling pressure to take of themselves and go to bed in time, thus reducing RBP behaviors, whereas individuals who do not experience strong social support also do not feel pressure to reduce RBP behaviors. In the interest of possible future interventions, it is helpful to understand whether perceived social support in college students moderates the effect of perceived control in daily life on RBP behaviors.

While the impact of perceived control and perceived social support on the well-being are documented within the college student population, there has been no current research connecting these factors to the phenomenon of revenge bedtime procrastination. However, based on the theory of planned behavior and the connections of perceived control and perceived social support on health-related behaviors, these variables may be connected to an individual's intention in engaging in RBP. Thus, building on these well-established concepts, it is the purpose of this research to bridge this research gap and aim to explore the possible connection between RBP, perceived control and perceived social support in college students to better understand the RBP phenomenon.

(Revenge) Bedtime Procrastination

Delaying a course of action voluntarily even though expecting to be worse off for it is defined as procrastination (Steel, 2007, p.66). In their study on bed-time procrastination, Kroese et al. (2014) found that in their community sample, bed-time procrastination was negatively associated with self-regulation, and that it led to the individuals not getting sufficient sleep. While investigating the reasons individuals state for engaging in bed-time procrastination, Nauts et al. (2019) conducted a qualitative study. In their in-depth semi-structured interviews, they found that participants' answers of bedtime procrastination behavior could be divided into three themes: deliberate procrastination, mindless procrastination, and strategic delay. Mindless procrastination describes participants who do not purposely delay going to bed and simply lose track of time, and strategic delay

includes participants who procrastinate to fall asleep easier and may actually suffer from undiagnosed insomnia. The category of deliberate procrastination includes individuals who intentionally procrastinate going to bed fully knowing that they would be suffering from the consequences of this action, but still delay bedtime to have time to themselves which they feel they deserve. Multiple participants belonging to this category describe that their day is filled with obligations, and that they give in to temptations of delaying bedtime to have more time without them.

While the concept of revenge bedtime procrastination does not appear in this study, the category "deliberate procrastination" closely resembles the concept of revenge bedtime procrastination. We define revenge bedtime procrastination as the intentional delay of bedtime even though the individual knows this will reduce their hours of sleep. This is done to regain a sense of control over their activities, which they felt lacked during the day. This highlights the important distinction between bedtime procrastination, which can be accidental and unintentional, and revenge bedtime procrastination, which is intentional, and the individual is aware of its negative consequences. To illustrate the complicated emotions individuals experience when they intentionally engage in a behavior that they understand is bad for them, social media users relating their personal experiences with RBP are noteworthy. One man describing his experience with RBP on social media expressed that while engaging in this behavior made him feel sad, knowing that his health would suffer, he also experienced it as "great", because he experienced RBP as having "a bit of freedom" (Liang, 2020).

Studies have shown that bedtime procrastination is associated with poor sleep quality in college students. A recent study on Chinese undergraduate students found a significant association between poor sleep quality and bedtime procrastination (Ma et al., 2020). While the concept of RBP in college students specifically had not previously been investigated, this study already serves as an indication that the problem of bedtime procrastination is prevalent and harmful among college students, and therefore should be investigated further as this study aims to do.

Perceived Control in Daily Life

As described above, to better understand the concept of revenge bedtime procrastination, the "revenge" aspect makes an important distinction. In the definition of RBP, there is mention of regaining a sense of control over activities, which was lacking throughout the day. This sense of regaining control appears to be related to the psychological concept of perceived control. Perceived control describes the individual's perception of how much control they have over influencing their life circumstances (Zheng et al., 2020). Control is a complex concept with a variety of different conceptualizations by different researchers. Generally, one can divide the different

conceptualizations encompassing various aspects of perceived control into perceived control over oneself or one's behavior, or the perceived control of external aspects.

Within the context of the theory of planned behavior, important aspects of perceived control are perceived self-efficacy and controllability (Ajzen, 2002). Controllability, according to Ajzen, describes whether and to which degree an individual believes that their behavior is their own choice. The concept of self-efficacy is based on Bandura's work and describes whether and to which degree an individual believes they are capable of successfully performing the behavior. Bandura (1977) proposes that the self-efficacy an individual experiences is based on learned behavior and feedback based on past physiological states, verbal persuasions, performance accomplishments and vicarious experiences. Higher self-efficacy has been shown to be connected to higher performance (Themanson & Rosen, 2015). In a study on Italian college students, self-efficacy is negatively related to intention to drop out of university (Morelli et al., 2021). Furthermore, self-efficacy and another related concept, locus of control, are associated with students' procrastination habits and their performance (Tackett, 2022). Individuals with high self-efficacy were found to have lower procrastination, and individuals with internal locus of control were found to have higher self-efficacy. Locus of control is closely related to the concept of perceived control. Locus of control is defined as an individual's perception of control, which may be internal or external, while perceived control distinguishes between the degree of perceived control, which may be low or high (Rotter et al., 2016). An external locus of control would describe an individual with low perceived control, and an internal locus of control describes an individual with high perceived control. In addition to the connection with procrastination, increased levels of external locus of control are associated with insomnia in university students (Lindsay et al., 2022).

Besides exerting control over one's own behavior, another important aspect of control is that an individual believes they hold over their environment. Mittal and Griskevicius (2014) approach the concept of control from a different perspective, proposing that individuals from different economic backgrounds may experience the same threat as controllable or uncontrollable, based on life history theory. In their study, they found that individuals who experience low control, such as individuals with a low economic status background, respond to an increased sense of control by decreasing impulsive behavior. In the concept of RBP, this could indicate that certain individuals respond to a perceived loss of control by acting impulsively, potentially by engaging in RBP.

In her article, Skinner (1996) describes the importance of control for psychological functioning and proposes an integrative framework organizing the concepts related to control. The construct of perceived control,

according to Skinner, includes various agents, means, and ends, across categories and dimensions, illustrating the complex influences the concept of perceived control has across situations. Skinner further describes the concept of experiences of control as being beneficial and having positive psychological consequences. Research on perceived control following Skinner's work continuously highlight the effects perceived control has both on mental well-being as well as physical health (Pagnini et al., 2016). Perceived control in daily life has also been found to be connected to optimism during the COVID-19 pandemic among adolescents (Wieczorek et al., 2022). While the effect of perceived control on mental health has been highlighted in previous studies, a possible connection between perceived control in daily life and bedtime procrastination has not yet been investigated.

Won and Yu (2018) investigated perceived control in the context of students' procrastination. In this study, the perceived parental control over students' studying habits positively predicted the student's tendency to procrastinate. The perceived parental control describes the extent to which the students perceive their parents to be in control of their study habits. This indicates that the students' feeling controlled by their parents, therefore having less control over their studies themselves, may indicate a connection between perceived control and procrastination. In this context, low perceived parental control would correspond to high perceived control, as the students who do not feel controlled by their parents experience more control themselves.

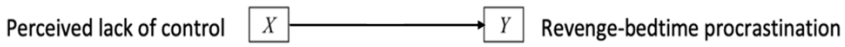
Besides procrastination, in the student population perceived control is a significant predictor of health behavior (McCaul et al., 1993; Kondo, 2021), sleep behavior (Mead & Irish, 2022), academic success (Respondek, 2017) and perceived confidence and competence (Cummings, 2020). Low perceived control has also been shown to lead to dysfunctional psychological responses to stressors such as the COVID-19 pandemic (Sesker et al., 2022).

Being aware of the importance of perceived control for various aspects of psychological functioning, an investigation whether perceived control is related to revenge bedtime procrastination behavior among college students is of interest. Based on the theory of planned behavior, this study aims to discuss the effect that perceived lack of control in daily life has on the experience of revenge bedtime procrastination in college students. Perceived control is hypothesized to be negatively related to RBP based on previous research which found significant negative correlations between procrastination and perceived control (Won & Yu, 2018). This leads to the first hypothesis, as illustrated in Figure 1.

Hypothesis 1. Perceived lack of control will positively predict the frequency of revenge bedtime procrastination.

Figure 1

Illustration of hypothesis one

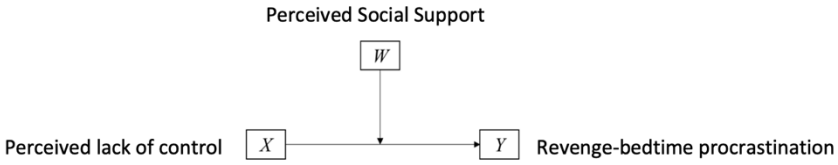


Perceived Social Support

Like perceived control, perceived social support can be integrated into the theory of planned behavior aiming to explain revenge bedtime procrastination behavior. In the context of the theory of planned behavior framework, which includes perceived control, subjective norms, and attitudes, perceived social support corresponds to subjective norms. Perceived social support describes an individual's perception of being engaged and supported via emotional, instrumental, or informational assistance in a supportive social network (Cobb, 1976). Previous research found evidence highlighting the importance of perceived social support in the student population: In their study examining the relationship between subjective well-being and perceived social support, Huang and Zhang (2021) found that among their sample of 515 Chinese college students, there was a positive association between life satisfaction and positive affect with the perceived social support the students received. Moreover, Kleinberg et al. (2013) found an association between social support and locus of control in their study examining the associations between loneliness, social support, locus of control and depression as well as major depression and help-seeking. Further highlighting the connection between control and social support, it has been observed that when individuals experience social exclusion, they often also experience a loss of their sense of control (Su et al., 2017). Furthermore, perceived social support has been previously found to positively moderate effects in the college student population, such as the effects of perfectionism on depression and anxiety (Zhou et al., 2013), between childhood bullying and anxiety (Reid et al., 2016), and the effects of stress on depression (Shi, 2021). In younger students, it was found to moderate the relationship between school adjustment and abuse exposure (Cristescu & Baban, 2022). Based on these findings, it appears that perceived social support an individual receives may act as a moderator between perceived control and RBP frequency, potentially showing stronger effects of a perceived lack of control in daily life on RBP, as there is no social support to buffer this effect or encourage health behavior. Therefore, this study additionally aims to investigate whether the perceived social support the individuals receive moderates the effect of perceived control on RBP. Figure 2 illustrates the moderation effect of the hypothesis.

Figure 2

Illustration of hypothesis two



H2: The perceived social support will positively moderate the relationship between perceived control and revenge bedtime procrastination, decreasing the frequency of revenge bedtime procrastination as it increases.

Method

Participants

The participants were made up of 167 students, 40% of which are undergraduate (bachelor or equivalent) students (47.3% female; $M_{age} = 23.45, SD = .46$, Range = 18—47). Participants reported being enrolled in a variety of 53 different programs, with about 26.9% of the participants being psychology students. The reported countries of origin consisted of ten different countries, with the majority of the participants being from the Netherlands (39.43%), North America (9.14%), and Germany (7.42%). Some of the participants (36%) chose not to disclose their demographic information.

Research Design and Procedure

The measurement used consisted of an online questionnaire created in collaboration of a bachelor thesis project group investigating revenge bedtime procrastination. The survey was created and distributed via Qualtrics (Qualtrics, Provo, UT). The survey includes multiple scales, two of which are relevant for this research: the Sense of Agency Scale (Tapal et al., 2017) and the Multidimensional Scale of Perceived Social Support (Zimet et al., 1988). Additionally, demographical information on the participants was recorded, as well as their self-reported sleep and RBP behavior. Participants were recruited by group-members through an online invitation link to the survey, which was recorded anonymously. The participants were informed about the study through a written explanation prior to taking the survey and gave their informed consent to participate. There was no incentive for taking the survey. The study has received approval from the ethical review process of the University of Groningen. Taking the survey took participants approximately 10 minutes. There were 321 recorded survey responses, however 154 responses had to be removed because of incomplete responses, or because the participants did not give their informed consent.

Measures

The Sense of Agency Scale

To measure perceived control in daily life of the participants, the Sense of Agency Scale: A Measure of Consciously Perceived Control over One's Mind, Body, and the Immediate Environment, was included in the

survey (Tapal et al., 2017). The scale, as suggested by its title, is intended to measure both the perceived control an individual experiences about themselves and their environment. The Sense of Agency Scale includes 13 items, six of which measure the sense of positive agency (SoPA), and seven of which measure the sense of negative agency (SoNa) rated on a 7-point Likert scale. SoPa describes an individual's subjective feeling of self-agency, while SoNa describes the lack thereof, with the help of general statements related to different aspects of the sense of agency: a controlling self, a physical self, and interactions with the environment. Reliability for SoPa and SoNa was estimated at $\omega = 0.80$ $(95\%\ CI = 0.76, 0.83)$ for SoPA and $\omega = 0.75$ $(95\%\ CI = 0.67, 0.79)$ for SoNa. This scale has been used in a multitude of studies to measure sense of gency (Hurault et al., 2020). In this study, Cronbach's alpha was at $\alpha = .839$ for the 13 items of the Sense of Agency Scale, for which the negative sense of agency items two, three, five, six, seven, ten and eleven were reverse coded.

The Multidimensional Scale of Perceived Social Support

The Multidimensional Scale of Perceived Social Support (Zimet et al., 1988) was used to measure perceived social support in the survey. It measures the subjective experience of social support from family, friends, and significant others. The scale includes 12 items rated on a 7-point Likert scale. The reliability for this scale was good ($\alpha = 0.88$). Additionally, this scale has been successfully used across multiple different cultural contexts, such as in Russia (Pushkarev et al., 2018), South Korea (Park et al., 2022), and Romania (Alexe et al., 2021), and translated into multiple languages. In this study, Cronbach's alpha was at $\alpha = .909$ for the 12 items of the Multidimensional Scale of Perceived Social Support.

Revenge Bedtime Procrastination

To measure whether and how much the participants engaged in RBP, the survey included seven items inquiring about participants' RBP and sleep behaviors. The questions (included in the appendix) asked participants to report whether; and if yes why- and how often they engage in RBP, their sleep habits during the weekdays and weekends, and whether they feel like their sleep is sufficient. If participants indicated their RBP frequency as zero, it was coded as missing in the statistical analysis. Ten participants in this sample reported their frequency as zero and were therefore excluded from relevant parts of the analysis.

Data Analytic Plan

The calculation of the descriptive statistics and the analysis were carried out using SPSS version 28 (IBM Corp. 2021). First, descriptive statistics about participants were calculated. The reliability of the scales was examined using Cronbach's alpha. Then the relationships between sense of agency, social support and RBP frequency were investigated. To examine associations between all variables, bivariate correlations were

conducted. Relevant aspects of the information given about revenge bedtime procrastination were illustrated. Hypotheses one and two were tested. The first hypothesis was tested using a linear regression to test the relationship between perceived control and RBP. The second hypothesis, the moderation of perceived social support on the relationship between sense of agency and RBP frequency, was investigated using the OLS regression conditional process modeling program PROCESS (Hayes, 2022). Finally, an exploratory analysis was conducted to examine the participant's responses to the open question on why they engage in RBP.

Results

Descriptive analysis

Table 2 shows the frequency of participants who state they engaged in RBP. Figure 4 shows the difference in satisfaction with the number of hours of sleep between participants who engage in RBP and those who do not. The difference in sleep quality between participants who engage in RBP and those who do not is significant, $\chi^2 = (4, N = 167) = 10.826$, $p = .029$.

Table 2

Frequency of revenge bedtime procrastination in sample

Answer	N	%
Yes	167	95.4
No	8	4.6

Figure 4

Difference in sufficiency of sleep in RBP population vs. Non-RBP

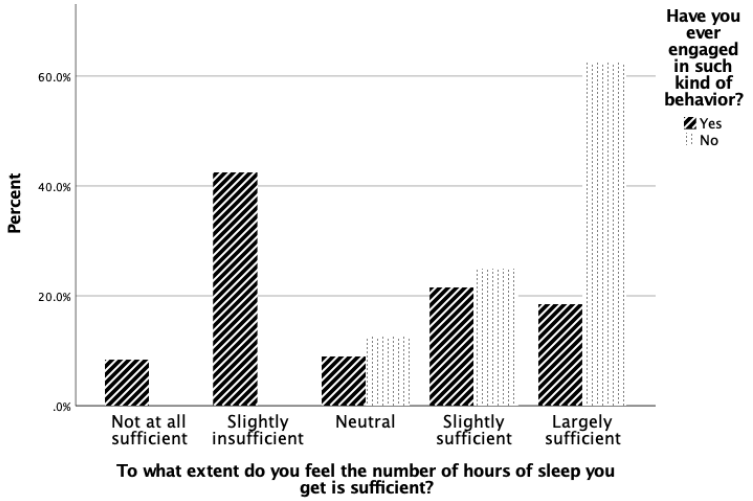


Table 3 shows descriptive statistics and bivariate correlations between the variables. The correlation between RBP frequency and sense of agency showed a moderate negative correlation ($r(157) = -.23$, $p < .01$.).

The correlation between RBP frequency and perceived social support was also moderately negatively correlated, the correlation being significant at ($r(157) = -.37, p < .01.$). The correlation between sense of agency and perceived social support is positive and stronger, and also significant at ($r(157) = .46, p < .01$).

Table 3

Bivariate correlations between Revenge Bedtime Procrastination, Sense of Agency and Perceived Social Support

Variable	*n*	*M*	*SD*	1	2	3
1. RBP	157	3.74	1.85	—		
2. Sense of Agency	157	5.97	.83	−.23**	—	
3. Perceived Social Support	157	5.43	1.13	-.37**	.46**	—

*$p < .05$. **$p < .01$

The results of the regression analysis testing the effect of sense of agency on RBP frequency are depicted in Table 4. The results show a significant effect.

Table 4

ANOVA Sense of Agency and RBP frequency

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	28.264	1	28.264	8.624	.004*
	Residual	508.029	155	3.278		
	Total	536.293	156			

*$p < .05$.

The results of the regression analysis are illustrated in Figure 5. The results of the moderation analysis are depicted in Table 5 and illustrated in Figure 6.

Table 5

Hayes Moderation Analysis

Variable	*β*	*SE*	*t*	95% CI
Constant	10.41	3.46	3.01	3.59 ~17.25
Sense of Agency	–.83	.78	–1.07	–2.36~.70
Perceived Social Support	–1.14	.69	–1.65	–2.50 ~.23
PSS*Sense of Agency	.13	.15	.87	–.164 ~.44

*$p < .05$. **$p < .01$

The Hayes Moderation Analysis suggests that about 15% of the variance in RBP frequency is accounted for by the predictors ($R^2 = .148, F(3,153) = 8.85, p < .01$). The moderation analysis found that sense of

agency moderated by social support is not significant ($\beta = -.88,\ p = .216$) The moderator, perceived social support, was also not significant ($\beta = -1.18, p = .078$).

Figure 5

Illustration of regression analysis

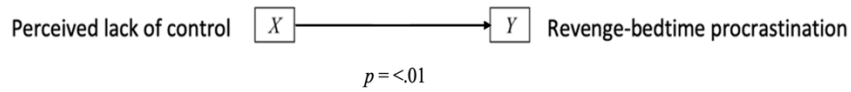
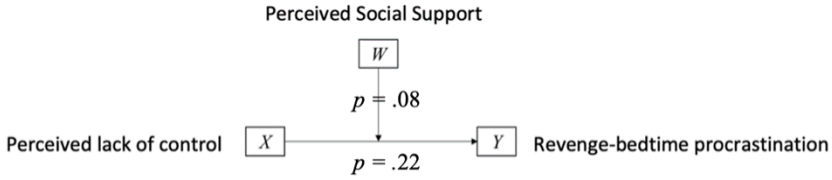


Figure 6

Illustration of moderation analysis



Exploratory Analysis

The question of why participants believe they engage in RBP yielded 196 responses. While these responses expressed unique individual experiences, multiple underlying themes could be identified. An overview of some of the most common types of responses can be found in Table 1. Figure 3 shows a word cloud illustrating the most frequently used phrases by participants indicated by the size of the word, created with MonkeyLearn Inc. (2022). While some responses can be sorted into distinct categories, a large portion of participants made statements that express overlap between multiple reasons, such as “The night is my free moment, while the day is supposed to be working time. Therefore I make my day very short and the night longer. It is linked to my anxiety and procrastination issues. “. Another notable pattern in the responses is that a large number of participants report procrastinating using videogame devices, social media, their phone, or a streaming platform such as Netflix, mentioned by approximately 38 participants (19.4%). Furthermore, many participants report feeling less pressure from others and the opportunity to be alone and enjoy “me-time” (stated by approximately 38 participants, 19.4%), while other participants use the nighttime to socialize (approximately 10 participants, 5.1%). Stress, busy schedules, and obligations during the day are also frequently reported (approximately 43 participants, 21.9%).

Table 1
Categories of participant reasons for RBP

Category	Example quote

Leisure	While I can feel tired during the day, that feeling goes away around 8pm. I spend time with my family and engage in entertainment until much later than I should but am having an enjoyable time so I do not start a bedtime ritual at a reasonable time.
Alone time	I feel like I should be allowed to have time for myself after a long day. I think I deserve to decide such behaviour.
Media consumption	To watch a movie or a series because I was not able to during the day.
Avoidance of others	It's the only time I get to enjoy myself without obligations to others
Taking back control	Gain control and no expectations and responsibilities late at night
Psychopathology	I have ADHD, and even with meds, I feel so sluggish in the mornings and like the time slips away from me. I have to make up for that.
Fear of missing out	I think I will miss out on interesting stuff online if I go to sleep directly once I lay down on my bed.
Appreciation of nighttime	A sense of calm and tranquility at night when everyone else is sleeping
Productivity	Feeling of not being „done“ with the day, stress, other activities that seem more important to me

Figure 3

Word cloud illustrating frequently used participant explanations

Discussion

Previous research has shown that sufficient sleep, social support, and perceived control are important factors related to individual well-being (Jin & Ziebarth, 2020; Skinner, 1996; Respondek, 2017). This study investigated the hypothesis that perceived lack of control in daily life will predict the amount of revenge bedtime procrastination frequency. Secondly, it was investigated whether perceived social support will moderate this effect. It additionally provided some new data on the prevalence and effects of revenge bedtime procrastination among college students.

The results found in this study support the hypothesis that perceived lack of control in daily life is predictive of RBP behavior, as expected based on the theory of explained behavior. However, the results found no support for the hypothesis that perceived social support moderates this effect. Additionally, the findings of this study indicate that there is correlation among the three variables, although the direction of the relationship is not clear from the present study. Lastly, the survey results indicate that RBP is not only extremely prevalent among college students, but also suggests an impact on subjective sleep quality.

Theoretical and Practical Implications

Being one of the first studies on revenge bedtime procrastination in college students, this study has important theoretical and practical implications. Our findings suggest that RBP is common among college students, lending support to the previous literature describing individuals struggling with bedtime procrastination

(Nauts et al.,2019). Bearing in mind the importance of sleep for various health reasons (Jin & Ziebarth, 2020), these results should not be overlooked. The results confirming hypothesis one provide support to the studies discussed earlier stressing the importance of perceived control. Since perceived control in this study encompassed both internal and external factors, findings are compatible with multiple theories about perceived control as a variable related to health behaviors and procrastination, including the theory of planned behavior, and the conceptualization of control by Skinner (1996). Perceived control has never before been investigated as a predictor of RBP, therefore the results of this study add a new element to these previous findings. Since the frequency of RBP increases as the perceived control decreases, this provides additional evidence that the concept of perceived control is important for well-being, and a valid predictor of health behaviors and procrastination in college students. The second hypothesis is not supported by the results of this study However, the current finding suggests that there are conceptual differences between the two variables and the ones perceived social support has been shown to moderate. Variables in which it was a significant moderator were school adjustment and abuse exposure, (Cristescu & Băban 2022), perfectionism with depression and anxiety (Zhou et al., 2013), childhood bullying and anxiety (Reid et al., 2016), and effects of stress on depression (Shi, 2021). Since these variables included psychopathology, the effects of social support as a moderator may be different in a non-clinical sample like the present study. However, the result of this hypothesis is not in direct contradiction with the theories it was based on, since the direction of the relationship was as expected according to previous findings, such as with the theory of planned behavior. It is therefore important to further research the nature of the connection between the variables to fully explain the association of perceived social support, perceived control, and RBP in the context of the theory of planned behavior. Furthermore, in the exploratory part of the study, a variety of themes among the reasons participants gave for engaging in RBP were identified. Currently, there are no resources and very limited information on the RBP phenomenon available to college students, which can be improved by future research and interventions. It appears that while most college students engage in RBP and many wish to reduce it, it is likely that many of them are not aware that RBP is a common phenomenon. This lack of awareness can potentially impact help-seeking (Leijdesdorff et al., 2021). Additionally, the RBP frequency being correlated to two concepts that are connected to mental health is indicative that further research in the field of clinical psychology may be beneficial to individuals struggling with RBP.

Practical implications of the finding of this study include possible directions for the design of future interventions of RBP. While causal directions could not be inferred from the present study, if a causal link between perceived control and RBP is established in future research, interventions can aim to enhance perceived

control in individuals struggling with RBP to reduce RBP. Studies by Rippé et al. (2021) have shown that perceived control can be successfully enhanced in interventions.

Limitations and Future Directions

The findings of this study should be considered in light of several limitations. Firstly, this study was exploratory, meaning there was only limited prior research about revenge bedtime procrastination to inform the study. This study was limited to the population of college students; therefore, future research must be conducted with a diverse sample representative of the general population to investigate whether there are differences between these groups. Since this study was a self-report, it is necessary to investigate relationships with different measurements to ensure that answers are not biased. While the sample size was sufficient to generate reliable results, it would be beneficial to increase the sample in both size and diversity, as this study was limited to participants from almost exclusively western countries. Furthermore, this study was limited in examining the relationships between variables as no causal relationships could be inferred based on these results. To create an intervention for RBP, future studies must find the direction of the relationship between variables. While this study was focused on RBP, the findings suggest a moderately strong positive association between perceived social support and perceived control that may be of interest for further research. This study was one of the first aiming to answer the question of what causes RBP, and there are currently no satisfying conclusions to it, but instead a selection of potential explanations. This proves to be a further indication that future research about the effects and causes of RBP is necessary. Since perceived control has been found to be a significant predictor of RBP frequency and perceived social support was significantly correlated with it, the third variable of the theory of planned behavior, attitude, should also be considered as an explanatory variable to fully explain RBP with the help of the theory of planned behavior in the future. Notably, one of the reoccurring themes among participant responses was the use of social media or streaming platforms. While these participants have self-identified as engaging in RBP, which is specifically defined as deliberate procrastination and not accidental procrastination, there may be causes outside of the individual's control or awareness causing this behavior. Research has shown that artificial intelligence (AI) systems creating algorithms on popular streaming sites use specific mechanisms that manipulate users into staying on the website, such as hyper-nudging techniques which use highly personalized data to keep the user engaged and active without them knowing (Reviglio & Agosti, 2020). The effect that new technology such as AI has on bedtime behavior, and whether this type of bedtime procrastination still falls under the RBP category, should be investigated in the future. While social support was not a significant moderator in this study, it should be further investigated whether the results can be replicated in a clinical

sample, as the previous studies in which perceived social support significantly acted as a moderator were examining psychological disorders such as depression and anxiety.

Conclusions

The results of this study highlight the prevalence of the phenomenon of revenge bedtime procrastination in college students, while giving support to the idea that perceived lack of control in daily life predicts the frequency of it. There is no support that social support would significantly moderate this effect. Learning more about RBP will potentially positively impact our health, well-being, and productivity. Although the research questions have been answered, a central question remains: why are so many of us resorting to taking back our lives at night? While it may be impossible to fully answer this question at this point in time, there are many reasons to believe that many of us are taking revenge on some part of our life during the day we feel no control over, while the nighttime presents a collective sigh of relief for us. Hopefully, with increased awareness and research on this issue, we will soon be able to spend our nights asleep again.

References

Alexe, D. I., Sandovici, A., Robu, V., Burgueño, R., Tohănean, D. I., Larion, A. C., & Alexe, C. I. (2021). Measuring perceived social support in elite athletes: Psychometric properties of the Romanian version of the multidimensional scale of perceived social support. *Perceptual and Motor Skills*, *128*(3), 1197–1214. https://doi.org/10.1177/00315125211005235

Ajzen, I., & Madden, T. J. (1986). Prediction of goal-directed behavior: Attitudes, intentions, and perceived behavioral control. *Journal of Experimental Social Psychology*, *22*(5), 453–474. https://doi-org.proxy-ub.rug.nl/10.1016/0022-1031(86)90045-4

Ajzen, I. (2002). Perceived behavioral control, self-efficacy, locus of control, and the theory of planned behavior. *Journal of Applied Social Psychology*, *32*(4), 665–683. https://doi.org/10.1111/j.1559-1816.2002.tb00236.x

Baenziger, J., Roser, K., Mader, L., Christen, S., Kuehni, C. E., Gumy, P. F., Tinner, E. M., & Michel, G. (2018). Can the theory of planned behavior help explain attendance to follow-up care of childhood cancer survivors? *Psycho-Oncology*, *27*(6), 1501–1508. https://doi-org.proxy-ub.rug.nl/10.1002/pon.4680

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. Psychological Review, 84(2), 191–215. https://doi-org.proxy-ub.rug.nl/10.1037/0033-295X.84.2.191

Bandura, A. (1990). Perceived self-efficacy in the exercise of personal agency. Journal of Applied Sport Psychology, 2(2), 128–163. https://doi-org.proxy-ub.rug.nl/10.1080/10413209008406426

Cristescu, D. S., & Băban, A. (2022). Exposure to abuse and school adjustment: The moderator and mediator roles of perceived social support from parents, classmates, and teachers. *Journal of Education for Students Placed at Risk*. https://doi-org.proxy-ub.rug.nl/10.1080/10824669.2021.2023540

Cobb, S. (1976). Social support as a moderator of life stress. *Psychosomatic Medicine*, *38*(5), 300–314. https://doi.org/10.1097/00006842-197609000-00003

Cummings, R. J. (2020). Revealing true images: A study of perceptions of confidence and competence in reflective writing on undergraduate students to enhance written expression efficacy [ProQuest Information & Learning]. In *Dissertation Abstracts International Section A: Humanities and Social Sciences* (Vol. 81, Issue 12–A).

Den Ouden, M. D. (1995). Intentions are not enough: The role of intentions in behavioural change. In J. M. Peiró, F. Prieto, J. L. Meliá, & O. Luque (Eds.), *Work and organizational psychology: European contributions of the nineties.* (pp. 23–32). Erlbaum (Uk) Taylor & Francis, Publ.

Estevan, I., Sardi, R., Tejera, A. C., Silva, A., & Tassino, B. (2021). Should I study or should I go (to sleep)? The influence of test schedule on the sleep behavior of undergraduates and its association with performance. *PLoS ONE*, *16*(3). https://doi-org.proxy-ub.rug.nl/10.1371/journal.pone.0247104

Gohari, A., Baumann, B., Jen, R., & Ayas, N. (2022). Sleep deficiency: epidemiology and effects. *Clinics in Chest Medicine*, *43*(2), 189–198. https://doi.org/10.1016/j.ccm.2022.02.001

Hayes, A. F. (2022). Part III. Moderation Analysis. In *Introduction to mediation, moderation, and conditional process analysis, third edition: A regression-based approach* (3rd ed., pp. 231–364). essay, Guilford Publications.

Huang, L., & Zhang, T. (2021). Perceived social support, psychological capital, and subjective well-being among college students in the context of online learning during the covid-19 pandemic. *The Asia-Pacific Education Researcher*, *(20210806)*. https://doi.org/10.1007/s40299-021-00608-3

IBM Corp. Released 2021. IBM SPSS Statistics for Windows, Version 28.0. Armonk, NY: IBM Corp

Jin, L., & Ziebarth, N. R. (2020). Sleep, health, and human capital: evidence from daylight saving time. *Journal of Economic Behavior and Organization*, *170*, 174–192. https://doi.org/10.1016/j.jebo.2019.12.003

Kerner, M. S. (1996). Attitudinal, social, and practical correlates to exercise behavior: A test of the theory of planned behavior [ProQuest Information & Learning]. In *Dissertation Abstracts International: Section B: The Sciences and Engineering* (Vol. 57, Issue 3–B, p. 2140)

Kleinberg, A., Alouja, A., & Vasar, V. (2013). Social support in depression: structural and functional factors, perceived control and help-seeking. *Epidemioligy and Psychiatric Sciences*, *22*(4). https://doi.org/https://dx-doi-org.proxy-ub.rug.nl/10.1017%2FS2045796013000504

Kondo, A., Abuliezi, R., Naruse, K., Oki, T., Niitsu, K., & Ezeonwu, M. C. (2021). Perceived Control, Preventative Health Behaviors, and the Mental Health of Nursing Students During the COVID-19 Pandemic: A Cross-Sectional Study. *INQUIRY: The Journal of Health Care Organization, Provision, and Financing*. https://doi.org/10.1177/00469580211060279

Kroese, F. M., De Ridder, D. T., Evers, C., & Adriaanse, M. A. (2014). Bedtime procrastination: introducing a new area of procrastination. *Frontiers in Psychology*, 611.

Leijdesdorff, S., Klaassen, R., Wairata, D.-J., Rosema, S., van Amelsvoort, T., & Popma, A. (2021). Barriers and facilitators on the pathway to mental health care among 12-25 year olds. *International Journal of Qualitative Studies on Health and Well-Being*, *16*(1). https://doi-org.proxy-ub.rug.nl/10.1080/17482631.2021.1963110

Liang, L.-H. (2020, November 26). *The psychology behind 'revenge bedtime procrastination'*. BBC Worklife. Retrieved March 17, 2022, from https://www.bbc.com/worklife/article/20201123-the-psychology-behind-revenge-bedtime-procrastination

Lin, L., & Bai, X. (2014). A study of academic procrastination based on the theory of planned behavior. *Chinese Journal of Clinical Psychology*, *22*(5), 855–859.

Lindsay, J. A. B., McGowan, N. M., King, N., Rivera, D., Li, M., Byun, J., Cunningham, S., Saunders, K. E. A., & Duffy, A. (2022). Psychological predictors of insomnia, anxiety and depression in university students: potential prevention targets. Bjpsych Open, 8(3), 86. https://doi.org/10.1192/bjo.2022.48

Lueke, N. A., & Assar, A. (2022). Poor sleep quality and reduced immune function among college students: Perceived stress and depression as mediators. *Journal of American College Health*. https://doi-org.proxy-ub.rug.nl/10.1080/07448481.2022.2068350

Ma, X., Meng, D., Zhu, L., Xu, H., Guo, J., Yang, L., Yu, L., Fu, Y., & Mu, L. (2022). Bedtime procrastination predicts the prevalence and severity of poor sleep quality of chinese undergraduate students. *Journal of American College Health*, *70*(4), 1104–1111. https://doi.org/10.1080/07448481.2020.178547

McCaul, K. D., Sandgren, A. K., O'Neill, H. K., & Hinsz, V. B. (1993). The value of the theory of planned behavior, perceived control, and self-efficacy for predicting health-protective behaviors. *Basic and Applied Social Psychology*, *14*(2), 231–252. https://doi-org.proxy-ub.rug.nl/10.1207/s15324834basp1402_7

Mead, M. P., & Irish, L. A. (2022). The theory of planned behaviour and sleep opportunity: An ecological momentary assessment. *Journal of Sleep Research*, *31*(1), 1–8. https://doi-org.proxy-ub.rug.nl/10.1111/jsr.13420

Mittal, C., & Griskevicius, V. (2014). Sense of control under uncertainty depends on people's childhood environment: A life history theory approach. Journal of Personality and Social Psychology, 107(4), 621–637. https://doi-org.proxy-ub.rug.nl/10.1037/a0037398

MonkeyLearn Inc. (2022). *Word cloud result*. WordCloud Generator By Monkeylearn. Retrieved July 1, 2022, from https://monkeylearn.com/word-cloud/result.

Morelli, M., Chirumbolo, A., Baiocco, R., & Cattelino, E. (2021). Academic failure: Individual, organizational, and social factors. Psicología Educativa, 27(2), 167–175. https://doi-org.proxy-ub.rug.nl/10.5093/psed2021a8

Nauts, S., Kamphorst, B. A., Stut, W., De Ridder, D. T., & Anderson, J. H. (2019). The explanations people give for going to bed late: A qualitative study of the varieties of bedtime procrastination. *Behavioral Sleep Medicine*, *17*(6), 753-762.

Pagnini, F., Bercovitz, K., & Langer, E. (2016). Perceived control and mindfulness: implications for clinical practice. *Journal of Psychotherapy Integration*, *26*(2), 91–102. https://doi.org/10.1037/int0000035

Park, G., Hwang, Y., Kim, J. H., & Lee, D. H. (2022). Validation of the South Korean adolescents version of the multidimensional scale of perceived social support. *Psychology in the Schools*. https://doi.org/10.1002/pits.22613

Perry, R. P., & Dickens, W. J. (1987). Perceived control and instruction in the college classroom: Some implications for student achievement. *Research in Higher Education*, *27*(4), 291–310. https://doi.org/10.1007/bf00991660

Pushkarev, G. S., Zimet, G. D., Kuznetsov, V. A., & Yaroslavskaya, E. I. (2018). The multidimensional scale of Perceived Social Support (MSPSS): Reliability and validity of Russian version. *Clinical Gerontologist*, *43*(3), 331–339. https://doi.org/10.1080/07317115.2018.1558325

Qualtrics. (2005). Version (06.2022). *Qualtrics*. Retrieved June 10, 2022, from https://www.qualtrics.com/.

Reid, G. M., Holt, M. K., Bowman, C. E., Espelage, D. L., & Green, J. G. (2016). Perceived social support and mental health among first-year college students with histories of bullying victimization. *Journal of Child and Family Studies*, *25*(11), 3331–3341. https://doi.org/10.1007/s10826-016-0477-7

Respondek, L., Seufert, T., Stupnisky, R., & Nett, U. E. (2017). Perceived academic control and academic emotions predict undergraduate university student success: examining effects on dropout intention and achievement. *Frontiers in Psychology*, *8*, 243–243. https://doi.org/10.3389/fpsyg.2017.0024

Reviglio, U., & Agosti, C. (2020). Thinking outside the black-box: the case for "algorithmic sovereignty" in social media. *Social Media Society*, *6*(2). https://doi.org/10.1177/2056305120915613

Rippé, C. B., Weisfeld-Spolter, S., Yurova, Y., & Kemp, A. (2021). Pandemic Pedagogy for the New Normal: Fostering Perceived Control During COVID-19. *Journal of Marketing Education*, *43*(2), 260–276. https://doi.org/10.1177/0273475320987287

Ros

ekind, M. R., Gregory, K. B., Mallis, M. M., Brandt, S. L., Seal, B., & Lerner, D. (2010). The cost of poor sleep: Workplace productivity loss and associated costs. *Journal of Occupational and Environmental Medicine*, *52*(1), 91–98. https://doi-org.proxy-ub.rug.nl/10.1097/JOM.0b013e3181c78c30

Rotter, J. B. (2016). *Perceived control : theory, research, and practice in the first 50 years*. (J. W. Reich & F. J. Infurna, Eds.). Oxford University Press. Retrieved May 26, 2022. DOI:10.1093/acprof:oso/9780190257040.001.0001

Sesker, A. A., Lee, J. H., Luchetti, M., Aschwanden, D., Stephan, Y., Terracciano, A., & Sutin, A. R. (2022). Personality and change in perceived control during the acute stage of the coronavirus pandemic. *Personality and individual differences*, *192*, 111607.

Shi, B. (2021). Perceived social support as a moderator of depression and stress in college students. *Social Behavior and Personality: An International Journal*, *49*(1), 1–9. https://doi-org.proxy-ub.rug.nl/10.2224/sbp.9893

Skinner, E. A. (1996). A guide to constructs of control. *Journal of Personality and Social Psychology*, *71*(3), 549–70.

Steel, P. (2007). The nature of procrastination: a meta-analytic and theoretical review of quintessential self-regulatory failure. *Psychol. Bull*. 133, 65–94. doi: 10.1037/0033-2909.133.1.65

Su, L., Jiang, Y., Chen, Z., & DeWall, C. N. (2017). Social exclusion and consumer switching behavior: a control restoration mechanism. Journal of Consumer Research, 44(1), 99–117.

Suni, E. (2022, April 8). *Revenge bedtime procrastination: Definition & psychology*. Sleep Foundation. Retrieved June 24, 2022, from https://www.sleepfoundation.org/sleep-hygiene/revenge-bedtime-procrastination

Synofzik, M., Vosgerau, G., & Voss, M. (2013). The experience of agency: an interplay between prediction and postdiction. *Frontiers in psychology*, *4*, 127.

Tackett, S. P. (2022). The impact of academic motivation, procrastination, and locus of control on college students' self-efficacy [ProQuest Information & Learning]. In Dissertation Abstracts International: Section B: The Sciences and Engineering (Vol. 83, Issue 7–B)

Tapal, A., Oren, E., Dar, R., & Eitam, B. (2017). The sense of agency scale: a measure of consciously perceived control over one's mind, body, and the immediate environment. *Frontiers in Psychology*, *8*, 1552–1552. https://doi.org/10.3389/fpsyg.2017.01552

Themanson, J. R., & Rosen, P. J. (2015). Examining the relationships between self-efficacy, task-relevant attentional control , and task performance: Evidence from event-related brain potentials. British Journal of Psychology, 106(2), 253–271. https://doi-org.proxy-ub.rug.nl/10.1111/bjop.12091

Wang, G., Jiang, Y., Zhang, Y., Liu, S., & Jiang, F. (2016). Sacrificing sleep for scores: A cross-cultural perspective on the hidden costs of sleep loss in adolescents. *Behavioral Sleep Medicine*, *14*(5), 581–583. https://doi-org.proxy-ub.rug.nl/10.1080/15402002.2016.1201966

Wieczorek, L. L., Bleckmann, E., Brandt, N. D., & Wagner, J. (2022). Gloomy and out of control? Consequences of the covid-19 pandemic on momentary optimism in daily live of adolescents. *Current Psychology: A Journal for Diverse Perspectives on Diverse Psychological Issues*. https://doi-org.proxy-ub.rug.nl/10.1007/s12144-022-03313-6

Won, S., & Yu, S. L. (2018). Relations of perceived parental autonomy support and control with adolescents' academic time management and procrastination. *Learning and Individual Differences*, *61*, 205–215. https://doi.org/10.1016/j.lindif.2017.12.001

von Linden, M. (2012). The theory of planned behavior as a predictor of sleep hygiene and sleep quality [ProQuest Information & Learning]. In *Dissertation Abstracts International: Section B: The Sciences and Engineering* (Vol. 72, Issue 10–B, p. 6372).

Zhao, Y., Wang, H., Sun, D., Ma, D., Li, H., Li, Y., Zhang, X., Xie, Z., & Sun, J. (2021). Job satisfaction, resilience and social support in relation to nurses' turnover intention based on the theory of planned behaviour: A structural equation modelling approach. *International Journal of Nursing Practice*, *27*(6). https://doi-org.proxy-ub.rug.nl/10.1111/ijn.12941

Zheng, L., Miao, M., & Gan, Y. (2020). Perceived control buffers the effects of the covid-19 pandemic on general health and life satisfaction: the mediating role of psychological distance. *Applied Psychology. Health and Well-Being*, *12*(4), 1095–1114. https://doi.org/10.1111/aphw.12232

Zhou, X., Zhu, H., Zhang, B., & Cai, T. (2013). Perceived social support as moderator of perfectionism, depression, and anxiety in college students. *Social Behavior and Personality*, *41*(7), 1141–1152. https://doi.org/10.2224/sbp.2013.41.7.1141

Zimet, G. D., Dahlem, N. W., Zimet, S. G., & Farley, G. K. (1988). The Multidimensional Scale of Perceived Social Support. *Journal of Personality Assessment*, *52*(1), 30–41. https://doi-org.proxy-ub.rug.nl/10.1207/s15327752jpa5201_2

Appendix

Below you will find several statements and questions regarding your bedtime and sleeping behaviors. Please choose or give answers that are the most applicable to you.

The following statements are aimed at your bedtime behavior. For each of them, please decide whether it applies to you by using the scale from "never" to "always"

Revenge Bedtime Procrastination describes the voluntary decision to delay bedtime despite being aware of the negative consequences, such as sleep deprivation and feelings of guilt.

Have you ever engaged in such kind of behavior?

How often do you engage in such kind of behavior?

Why do you engage in such kind of behavior? Please type an answer below:

Do you feel like your engagement in these bedtime behaviors have changed over the past six months?

Please indicate, on average, how many hours you usually sleep during week nights:

Please indicate, on average, how many hours you usually sleep during weekend nights:

To what extent do you feel the number of hours of sleep you get is sufficient? Please indicate this on the scale: