Self-Compassion in the Relationship between Personality Traits and Bedtime Procrastination

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A R T I C L E I N F O	*A B S T R A C T*
ORIGINAL ARTICLE ***Corresponding Author:** Saeideh Bazzazian **Email:** sbazzazian@gmail.com **Tel:** +98 912651903 	**Background**: Since sleep is considered an important factor for the physical and mental health of humans, it is very important to pay attention to its quantity quality and abnormalities during it. Therefore, the purpose of this research is to investigate the role of self-compassion mediation in the relationship between Personality traits and bedtime procrastination. **Methods:** The research method was descriptive-correlational. The statistical population included all undergraduate students of the humanities faculties of Tehran University in the academic year of 2022-2023, who were selected through Cluster sampling of 343 students. Data collection tools included the Bedtime Procrastination Questionnaire (BPS), Self-Compassion Questionnaire (SCS), and Neo Personality Questionnaire (FFI-NEO). Finally, the data were analyzed using the Pearson correlation method and structural equations using SPSS version 22 and AMOS version 24 Software. **Results:** The goodness of fit index for the research model was significant, which indicated the appropriate fit of the model. The result showed that the direct effect of personality and bedtime procrastination was -0.36 and the indirect effect of personality through self-compassion and bedtime procrastination was -0.19. **Conclusion:** The results of the present study showed that personality and self-compassion play an important role in bedtime procrastination. Therefore, the relations obtained can be used to improve the lifestyle and promote sleep health in students and other people. **Keywords**: Personality, compassion, procrastination

Introduction

Sleep is considered a fundamental factor for the restoration of individuals. In other words, adequate and high-quality sleep is closely related to better physical and mental well-being (Takeuchi et al., 2022). In recent years, sleep disorders have garnered significant attention (Ashrafi et al., 2018). Consequently, addressing sleep disorders, which encompass quantitative and qualitative aspects and irregularities in timing, holds great significance (Eshak, 2022). An important aspect is that approximately 28% of adults report sleeping about 6 hours or less per night. However, this phenomenon is not solely attributed to external factors or sleep disorders; at times, the restriction of sleep time is due to delaying bedtime, referred to as bedtime procrastination (Kroese et al., 2014). The irrationality of this phenomenon lies in the absence of significant barriers that would impede the execution of a planned task, yet the individual postpones it without valid justification (Kroese et al., 2014). Procrastination can result in stress, poor performance, reduced well-being, financial setbacks, and an increased risk of mental and physical disorders by constraining the available time for task completion (Brando-Garrido et al., 2022).

Saed et al. (2019) demonstrated the relationship between bedtime procrastination and procrastinator cognition with insomnia. The results indicated that bedtime procrastination and procrastinator cognition account for 33% of the variance in insomnia among students (Saed et al., 2019). The stability of procrastination over time suggests that it should be considered a personality trait (Herzog-Krzywoszanska et al., 2021). Previous studies have also indicated that personality is among the influential factors in bedtime procrastination and its quality. Achievement-striving and orderliness, both facets of conscientiousness, are indirectly associated with daytime fatigue due to their impact on bedtime procrastination. Conversely, impulsiveness and self-consciousness, both facets of neuroticism, are directly linked to daytime fatigue without the mediating effect of bedtime procrastination. Thus, it can be acknowledged that personality factors play a crucial role in shaping sleep-related health behaviors (Baharloo et al., 2021; Herzog-Krzywoszanska et al., 2021).

Individual personality encompasses a set of underlying individual differences that are not directly observable and are often called psychological traits. These traits elucidate the stable patterns of individuals' cognitive and behavioral processes (Phan & Rauthmann, 2021). Personality traits are important factors that influence psychological well-being, with sleep quality being a significant component (Herzog-Krzywoszanska et al., 2021). The Five-Factor Model is the most comprehensive theory studied and identified. It describes behavioral patterns and organizes them hierarchically into five broad dimensions of human personality: openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism (McCrae & John, 1992). Among these dimensions, low conscientiousness and high neuroticism are consistently associated with poor sleep quality and increased daytime fatigue (Kim et al., 2015). Furthermore, in previous studies, the relationship between self-compassion and personality factors has also been discussed (Mahbod & Khormai, 2019; Pyszkowska, 2020). Furthermore, Neff and colleagues demonstrated a positive relationship between extraversion, agreeableness, and conscientiousness and a negative relationship between neuroticism and self-compassion (Neff et al., 2007). The results of Kim et al.'s study in 2015 also indicated that key personality traits and variables resembling traits, such as self-esteem, general self-efficacy, and locus of control, are associated with sleep-related outcomes (Kim et al., 2015). A significant gap in the research literature is the rare examination of pathways that connect personality to sleep. Thus, one of the mediating variables between these two factors is self-compassion.

Self-compassion consists of three main components that include self-kindness, which

involves being kind to oneself in the face of self-criticism; common humanity, which is the ability to recognize that pain, suffering, and difficulties are shared experiences among all humans and serve as an antidote to isolation; and mindfulness, which refers to individuals' awareness of their internal unpleasant experiences, such as distressing and negative thoughts and feelings, in a non-overidentified manner, as opposed to over-identification where one excessively engages with their experiences (Ashoori et al., 2023). Self-compassion is characterized by adopting a kind, accepting, and non-judgmental stance towards oneself during times of failure or difficulty. It involves a mindful response to negative emotions arising from challenges and acknowledging that one is not alone in one's suffering. As demonstrated in the research by Sirois et al. (2019), individuals with self-compassion are less engaged in bedtime procrastination (Sirois et al., 2019). Additionally, Salehzadeh-Einabad and colleagues (2017) also concluded that these three aspects of self-compassion, self-judgment, isolation, and overidentification significantly correlate with bedtime procrastination (Einabad, 2017). On the other hand, inadequate sleep is significantly related to poor performance, and most students facing academic challenges and declines are unaware that their sleep habits might be related to these issues (Mohammadi Gavandarreh et al., 2018). Therefore, according to the importance of the acknowledged materials, the vacancy of effective research that can evaluate the relationship of the variables of this research is felt. Therefore, the results of this research can play a significant role in identifying influential factors on student well-being. The present study aims to evaluate the mediating role of self-compassion in the relationship between personality and bedtime procrastination.

Methods

The current research was descriptive and fell under the category of correlational studies, with a practical objective and structured structural

equation modeling. The statistical population included all undergraduate students in the humanities faculties of various universities in Tehran city, namely Tehran North, Tehran West, Tehran Central, and Tehran South universities, during the academic year 1401-1402 (2022-2023). From this population, a sample of 343 individuals was selected using Cluster sampling. The sample size was determined based on the Kline formula, suggesting a ratio of 10 to 20 participants per observed variable (Kline, 2012). In this regard, Hooman suggested assuming 300 cases as good, 500 as very good, and 1000 as excellent for increasing estimation accuracy and achieving convergence (Hooman, 2005). Therefore, based on this consideration and anticipating participant attrition, non-cooperation, and questionnaire contamination, a sample size of 350 individuals was estimated. The inclusion criteria for this study were willingness to participate and informed consent, age range of 18-50 years, and absence of psychological disorders. The exclusion criteria included the inability to read the questionnaires due to visual impairments and personal withdrawal from the study. After preparing the questionnaires and obtaining informed consent from the students, along with assuring them that their information would remain confidential and that there was no need to provide personal identifiers, the questionnaires were handed over to them. They were asked to read the questionnaires carefully and answer them honestly. Ultimately, 343 valid samples were collected.

The tools used in this research included the following:

1. Demographic Information Questionnaire: Participants responded to questions in this questionnaire regarding age, gender, marital status, employment status, and criteria related to inclusion and exclusion.

2. Bedtime Procrastination Scale (BPS): Bedtime procrastination will be measured using a 9-item scale developed by Kroese and colleagues. Items such as "I go to bed later than I intended to" and "I easily get distracted by other activities when

I should go to bed, especially in the evening" are included (4). The questions are rated on a 5-point Likert scale ranging from 1 (never) to 5 (always), and the scoring for questions 2, 3, 7, and 9 is reversed. The Cronbach's alpha obtained in Kroese et al.'s study is reported to be 0.88, and for the retest assessment after one month, a Pearson correlation coefficient of 0.79 was obtained. The Iranian version of Cronbach's alpha, reported by Saad et al., is 0.82, and the internal and external validity of the questionnaire has been reported to be good (Saed et al., 2019).

- NEO Five-Factor Inventory (NEO-FFI): This questionnaire, developed by Costa and McCrae, includes five factors: Neuroticism, Extraversion, Openness to Experience, Agreeableness, and conscientiousness. Each factor consists of 12 items, and the scoring is done on a 5-point Likert scale ranging from " completely disagree (0)" to " completely agree (4)" (Costa & McCrae, 1992). The Cronbach's alpha coefficients for the five factors in Atashafrouz and Araban's study ranged from 0.61 to 0.84 (Atashafrouz & Araban, 2017). The internal stability of the NEO questionnaire has been obtained in the statistical range of 0/68 to 0/86 (McCrae & Costa Jr, 1991).

Self-Compassion Scale (SCS): Developed by Neff and colleagues, this scale consists of 12 items rated on a 5-point Likert scale ranging from "rarely (1)" to "almost always (5)." The construct validity of this scale has been reported at 0.86 using Cronbach's alpha (Raes et al., 2011). Shahbazi and colleagues reported a Cronbach's alpha coefficient of 0.91 for the overall scale, ranging from 0.77 to 0.92 for its six subscales, and the content, form, and criterion validity of this questionnaire were evaluated as appropriate (Shahbazi et al.).

The collected data were analyzed using IBM SPSS Statistics 22 (SPSS) software for assessing descriptive indicators, including mean, median, variance, and Pearson correlation. Additionally, IBM SPSS Amos 24 (AMOS) software was employed to examine the model fit.

Results

This table presents the demographic indices percentages and frequency distribution findings. The data shows that out of the total participants, 92 individuals (26.8%) were male. The average age of the participants was 20.88 years, with a standard deviation of 3.00 (participants' ages ranged from 18 to 47 years).Table 1.

Table 1. Demographic Information of Participants Based on Gender, Employment Status, and Marital Status

Variable	Level	Frequency (Percentage)
Gender	Male	(26.8) 92
	Female	(73.2) 251
Employment status	Unemployed	(63.0) 216
	Employed	(37.0) 127
Marital Status	Single	(95.3) 327
	Married	(4.7) 16

Bedtime procrastination is positively and significantly correlated at the 0.01 level with some personality traits, such as neuroticism. However, it is negatively and significantly correlated at the 0.01 level with traits like extraversion and achievement-striving (p < 0.01). There is no significant relationship between bedtime procrastination and traits like openness to experience and agreeableness.

On the other hand, bedtime procrastination is negatively and significantly correlated at the 0.01 level with variables related to self-compassion and mindfulness, which are positive aspects of self-compassion. However, over-identification and self-judgment are positively and significantly correlated at the 0.01 level (p < 0.01). There is no significant relationship between bedtime procrastination and other aspects of self-compassion. Table 2.

Table 2. Correlation Matrix between self-compassion, personality, bedtime procrastination

Component	Bedtime procrastination	Self-Compassion	Over-Identification	Mindfulness	Isolation	Common humanity	Self-Judgment	Self-Kindness	Standard deviation	Mean
Neuroticism	0.17	-0.19	0.58	-.36	0.58	15-..	36·.	24-·.	7.36	21.10
Extraversion	-0.14	0.16	-0.29	0.35	-0.17	35.0	17.0-	38.0	83.5	17.40
Openness To Experience	-0.05	-0.08	-0.06	0.16	-0.06	0.16	-0.04	17.0	5.43	20.49
Agreeableness	0.01	0.01	-0.12	0.19	-0.14	0.16	09.0-	0.19	5.53	20.83
Conscientiousness	-0.25	0.17	-0.26	0.37	-0.16	24.0	-0.37	37.0	6.77	16.87
Bedtime Procrastination	-	-0.04	0.16	-0.14	09.0	0.001	14.0	-0.15	6.44	21.25
Mean	-	36.59	6.06	6.61	21.6	6.64	01.6	74.6	-	-
Standard Deviation	-	3.94	1.98	1.92	00.2	1.66	96.1	75.1	-	-

Note: Values less than 0.11 are not statistically significant. Correlations between 0.11 and 0.14 are significant at the 5% level, and values higher than this are significant at the 1% level. Sample size: 343.

Initially, correlations between variables were computed using Pearson's correlation coefficient. Subsequently, to investigate the mediating role of self-compassion in the relationship between personality and bedtime procrastination, the theoretical model presented in Figure 1 was tested using structural equation modeling (SEM) with maximum likelihood estimation. The model's goodness of fit was assessed using the chi-square (χ^2) test and the chi-square-to-degrees-of-freedom ratio (χ^2/df). The non-significance of the χ^2 test and a value less than 3 for χ^2/df indicate a good fit of the model (Kline, 2012; Tabachnick et al., 2007).

Due to the sensitivity of the chi-square statistic to sample size, comparative fit indices such as Comparative Fit Index (CFI), Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), and Root Mean Square Error of Approximation (RMSEA) were also utilized to assess model fit. Values greater than 0.95 for CFI, GFI, and AGFI indicate an acceptable model fit. In contrast, a value less than 0.05 for RMSEA is considered desirable, and values between 0.05 and 0.08 are considered acceptable (Cheung & Lau, 2008) Table 3.

Table 3. Model Fit Indices

Model fit index	Status	Calculated value	The appropriate value of the index
Chi-Square (χ^2) Statistic		43.40	
Degrees of Freedom (df)	Appropriate	17	+
Significance Level of Chi-Square (α)	Appropriate	0.01	<0.05
Chi-Square Statistic divided by Degrees of Freedom (χ^2/df)	Acceptable	2.5	< 3
GFI	Desirable	0.97	< 0.95
AGFI	Desirable	0.93	< 0.90
CFI	Desirable	0.94	< 0.95
RMSEA	Desirable	0.6	< 0.80

After the analysis and modification of the model, the final model of the current research is presented as follows.
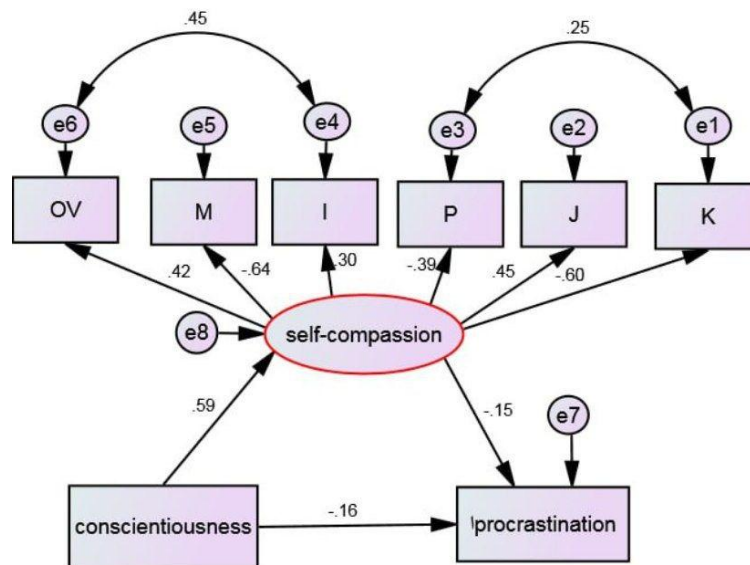

Figure 1. A tested conceptual model of the mediating role of self-compassion in the relationship between personality traits and bedtime procrastination

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To test the model presented in Figure 1, structural equation modeling (SEM) was employed, and the model fit indices are provided in Table 3. The analysis demonstrated that conscientiousness can significantly predict bedtime procrastination, mediated by self-compassion. The direct effects of conscientiousness and self-compassion on bedtime procrastination were statistically significant at $p < 0.01$, with standardized coefficients of -0.16 and -0.15, respectively. An indirect effect of conscientiousness on bedtime procrastination through self-compassion of -0.18 was also obtained. In the final model, the predictor variable explained 23% of the variance in the mediating variable and 35% of the variance in the criterion variable.

Table 4. Standardized Direct and Indirect Effects and Explained Variance of Conceptual Model Variables

On	Through	Indirect Effects	Direct Effects	Explained Variance
Bedtime Procrastination				0.23
	Conscientiousness	* -0.18	* -0.16	
	Self-Compassion	-	* -0.15	
Self-Compassion				0.35
	Conscientiousness	-	*0.59	

Discussion

The current research aimed to determine the relationship between personality traits and bedtime procrastination in students with the mediating role of self-compassion. The results showed that characteristics of neuroticism, extroversion, and conscientiousness have a significant relationship with bedtime procrastination, but openness to experience and agreeableness do not have a significant relationship with bedtime procrastination, even without considering the mediating role of self-compassion. These results are in line with the results of Herzog-krzywoszanska et al and Zhou based on the relationship between conscientiousness and bedtime procrastination, but they are different from Herzog-Krzywoszanska's results in terms of the relationship with neuroticism and from Zhou's results in terms of agreeableness and bedtime procrastination (Herzog-Krzywoszanska et al., 2021; Zhao et al., 2024). In explaining this finding, it can be acknowledged that people suffering from neuroticism tend to experience more negative emotions such as hostility, moodiness, and nervousness(Zhao et al., 2024).In reality, neuroticism is a coping mechanism for individuals to externalize symptoms associated with this trait and manifest them as bedtime procrastination, In other words, this characteristic causes these people to become prone to sudden and disproportionate arousal due to emotional stimuli and slow reduction of arousal (Herzog-Krzywoszanska et al., 2021). In relation to extroversion, it can be explained that these people may not procrastinate because they are active and decisive people who enjoy taking control of the situation and satisfy their need for different and frequent stimuli through external interactions, so environmental stimuli do not cause them to procrastinate (Kim et al., 2017). In the field of conscientiousness, it can also be said that these people can perform their duties effectively and on time due to their high discipline and can control their behavior, so they don't have the desire to participate in activities that postpone going to bed (for example, hobbies) thus prevent bedtime procrastination (Herzog-Krzywoszanska et al., 2021).

Also, the results showed that neuroticism, extroversion, and conscientiousness have a significant relationship with all components of self-compassion. Openness to experience does not have a significant relationship with the components

of self-judgment, isolation, and over-identification, but it is correlated with other components. Agreeableness does not have a significant relationship with the self-judgment component alone. Also, neuroticism had a significant negative relationship with the overall score of self-compassion, and extroversion and conscientiousness had a significant positive relationship with self-compassion, but openness to experience and agreeableness did not have a significant relationship with the overall score of compassion. These results are in line with the results of Neff based on the relationship between neuroticism, extroversion, and conscientiousness with self-compassion and different from the results of Neff, Mahbod, and Khorami in terms of openness to experience and agreeableness because Neff has shown that these two characteristics are related to self-compassion and also differ from Mahbod and Khorami's results regarding the relationship between conscientiousness and self-compassion. After all, they believe that disciplined people become stricter with themselves so, it makes them not to be kind to themselves (Mahbod & Khormai, 2019; Neff et al., 2007). In explaining this finding, it can be stated that individuals with traits related to neuroticism are less equipped with positive psychological functions, such as self-compassion, due to their engagement in negative emotions. In various situations, they experience emotional reactions, especially negative emotions, leading to a cycle of negative emotions, ultimately leading to rumination (Razvani & Sajjadian, 2018). In the case of extraversion, these people are involved in external world events so, extraverted individuals use self-compassion to connect with others and engage in a space where they can find their experiences as part of a greater human experience (Thurackal et al., 2016).On the other hand, conscientiousness, related to personal integrity and discipline, can be enhanced by self-compassion through increasing self-care behaviors, Individuals who often pursue long-term goals and do not prioritize immediate gratification in their plans and desires can benefit from self-compassion

(Kim et al., 2017). Moreover, openness to experience allows individuals to view the challenges on the path to new and novel values as opportunities rather than threats. This trait encourages individuals to explore their capabilities, not view their weaknesses and confrontations as threats, and use elements such as insight, mindfulness, active imagination, attention to inner feelings, and independence in judgment. Instead of showing compassion towards themselves, they can use these elements to cope with their weaknesses and challenges (Mahbod & Khormai, 2019; Razvani & Sajjadian, 2018). Also, agreeableness, characterized by friendliness and the ability to get along and cooperate with others, benefits from self-compassion by demonstrating kindness and moderation in relationships and emotions (Neff et al., 2007).

The results of the current study demonstrated that self-kindness and mindfulness have a negative relationship with bedtime procrastination; self-judgment and over-identification have a positive relationship and common humanity and isolation don't have a relation with procrastination. The results were consistent with Ain Einabad's study in terms of the relationship between self-judgment and over-identification with procrastination, but in terms of the relationship between self-judgment and procrastination, it was inconsistent with Einabad's research and in terms of the relationship of the total self-compassion score with bedtime procrastination, it was inconsistent with Sirois's research (Einabad, 2017; Sirois et al., 2019). In explaining this finding, it can be stated that self-compassion, through its connection to self-regulation processes such as goal-setting, action, continuous behavior monitoring, and emotion regulation, enhances self-regulated health behaviors, including sleep-related behaviors (Sirois et al., 2019). Therefore, bedtime procrastination decreases when individuals forgive and treat themselves kindly for past events. This is achieved through realistic judgment rational self-assessment, and mindfulness, which strengthens our executive attention control and helps maintain focus on the

current task while disregarding distracting factors, such as sleep-related planning (Teoh & Wong, 2023). People who are kind to themselves are more active in health behaviors such as sleep-related behaviors, because maintaining peace is one of the most important issues for them, on the contrary, people with self-judgment characteristics are more active in self-criticism, health-related behaviors are considered negative for them and procrastinated behavior is seen more in them Also, the characteristic of over-identification causes an unhealthy lifestyle because negative emotions are very active in these people (Gedik, 2019).

Also The results showed that among the five dimensions of personality traits, only conscientiousness has a significant relationship with bedtime procrastination through self-compassion mediation. In order to explain this finding, it can be stated that self-compassion causes emotional stability in these people, and that is due to more conscientious behavior in conscientious people, as a result, a person who has emotional stability, when he is with stimuli Faces mixed, unpredictable, and uncertain Uses a mix of positive and negative emotions to make the right decision to cope with the situation(Özer, 2022).Therefore, self-compassion, which is one of the factors of creating healthy behaviors, has an effect on their evaluations through the development of emotional and cognitive skills, and by creating the ability to maintain peace in them, it helps them to perform the best behavior, and thus avoids bedtime procrastination in Conscientiousness people(Abdollahi et al., 2020; Brown et al., 2021).

The current study has several limitations. First, the study sample consisted of a homogeneous group of university students, and caution should be exercised when generalizing the findings to other populations. It is recommended that similar research be conducted in different communities to enhance the generalizability of the results. Second, the findings of this study are based on cross-sectional data, which can pose a risk to causal inference. Future studies could employ

longitudinal designs to explore causality more effectively. Additionally, researchers can investigate other influential factors and potential mediators, as limited research has been conducted in this area. Furthermore, this research focused on a specific set of psychological variables without considering a broader range of related psychological factors. It is suggested that future research explore a wider spectrum of variables that may contribute to the research domain.

Conclusion

In conclusion, this study emphasizes the valuable role of individuals' personality traits, which are among the most stable dimensions of humanity, and positive psychological functioning, such as self-compassion. The results of this study can be used in developing effective educational and therapeutic approaches to improve and enhance individuals' mental health and quality of life. This can be achieved by making individuals more receptive to public health messages, promoting adaptation, and increasing their understanding of self-compassion. Furthermore, it can contribute to improving individuals' lifestyles. The study's results have added to the research literature by demonstrating that self-compassion can benefit important health behaviors and reduce harmful health behaviors.

Ethical considerations

All study subjects gave informed consent to participate in the study.

Code of ethics

This article is taken from the master's thesis in clinical psychology with the thesis code 22852513708378524013162728402.

Authors' contributions

Z. M, M. A, was involved with methodology; Z. M did data collection; M. A, Z. M, S.B did the writing; Z, M, M. A, were involved with the original draft; M. A., Z. M, did data analysis; S. B, did the supervision; Z. M, M. A, S.B, Formal Analysis, Writing – Review and Editing, Supervision. All the authors read and approved the final manuscript and were responsible for any questions related to the article.

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