Adolescent Insomnia and The Big Five Personality

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Abstract: Insomnia is very common in adolescence, and it can be triggered by many factors. The study investigated the relevant between the big five personality traits and insomnia. A sample of 95 participants completed the Insomnia Severity Index (ISI), the NEO Five-Factor Inventory (NEO-FFI), and the Pittsburgh Sleep Quality Index (PSQI). Associations between personality traits and insomnia were analyzed with T-test and Correlation Matrix. The results showed that adolescents in the insomnia group scored higher on neuroticism and agreeableness that those in the healthy control group. And higher neuroticism and agreeableness were also associated with poorer sleep quality. Extraversion, openness, and conscientiousness were not associated with insomnia. The association between the Big Five personality and sleep problems may have implications for the management of insomnia, facilitating a more personalized approach to treatment. However, it should be noted that personality traits alone do not comprehensively account for the primary factors contributing to insomnia, necessitating further longitudinal studies to validate these current findings.

Keywords: Insomnia, Adolescence, The Big Five Personality, Sleep quality

1. Introduction

Insomnia is described by having trouble falling asleep and waking up easily at night, and having trouble to get back to sleep [1]. In several countries, about one-third of adults' report symptoms of insomnia, and studies have found that insomnia appears to be common in adolescents [2]. According to de Zambotti et al. [3], the prevalence of pubertal developmental insomnia is also relatively high, and studies have shown that many factors are associated with insomnia, such as school stress, electronic media use, and caffeine consumption. In addition to the influence of these social factors on sleep quality, personality traits also play the essential role in the predisposing factors of insomnia.

One of the most recognized personality trait models is the five-factor model, which includes: neuroticism, extraversion, openness, agreeableness, and conscientiousness [4,5,6]. According to McCrae, & Costa [5], Neuroticism is defined by traits such as insecurity, negative emotions, and self-awareness. Extroversion is characterized by being sociable, funny and friendly. Openness is characterized by imagination and creativity. Agreeableness is empathy and trust. Conscientiousness means due diligence, hard work, and self-discipline.

Some studies reported that the Big Five personality theory and the development of insomnia showed relevance. For example, there is a correlation between insomnia and neuroticism, with higher neuroticism associated with a tendency to sleep shorter [7]. People who consider themselves insomniacs may have more neurotic tendencies, suffer more stress, and are less able to regulate

behaviors that affect sleep quality [8,9]. For example, highly neurotic people have a harder time regulating their emotions, and they are more likely to use caffeine or alcohol to relieve stress and thus interfere with their sleep quality [9]. On the other hand, people with high conscientiousness show a better ability to regulate emotions, they are more self-disciplined, and they adopt healthier sleep habits to avoid insomnia [9, 10]. People with high conscientiousness may be more optimistic and think more holistically about the future, and this lifestyle may also lead to fewer symptoms of insomnia [9]. Extraversion has also been linked to sleep problems, and higher extraversion may lead to better sleep [7]. Similar to conscientiousness, people with high extroversion are more positive and optimistic, they do not dwell on negative events in the past, and therefore, in turn, they have better sleep quality [9].

Interestingly, the effects of openness and agreeableness on sleep do not seem to have been mentioned in most studies. However, Hintsanen et al. [7] mentioned that people with high agreeableness sleep longer. In this study, we used an open dataset from Kiss et al. [11] for replication analysis, we will examine the connection between Five-Factor personality traits and insomnia in adolescents.

2. Method

2.1. Participants

The study involved 95 adolescents, ranging in age from 16 to 19, and all participants were high school students in grades 10 to 12. They are recruited through schools and community events in the San Francisco Bay Area. All participants were healthy, had no serious mental illness, and were not currently using medications that can interfere with sleep. In order to control variables, 95 participants with insomnia symptoms were assigned to the insomnia group (47 participants), and those do not have insomnia symptoms were included in the healthy control group (48 participants). All adults agreed to participate; Underage participants are required to provide written consent and parental or legal guardian consent.

2.2. Materials

Personality was evaluated by self-report using the NEO Five-Factory Inventory. (NEO-FFI) [12], which includes 60 items with 12 items in each scale: Neuroticism, Extroversion, Openness, Agreeableness, and Conscientiousness. These items include self-descriptive statements, such as When I'm under a great deal of stress, sometimes I feel like I'm going to pieces. Participants use a 5-point Likert scale, from 0 (Strongly Disagree) to 4 (Strongly Agree), a high score indicates a higher degree of expression in the respective field.

Precisely, the Insomnia Severity Index (ISI) [13] was employed to assess the severity of insomnia symptoms, encompassing 7 items in total. The responses were graded on a 5-point Likert scale, ranging from 0 (minimal severity) to 4 (maximal severity). The score could potentially vary from 0 to 28, where higher scores correspond to more severe insomnia symptoms. A score of 0-7 signifies the absence of insomnia symptoms, 8-14 hints at subthreshold insomnia, 15-21 denotes moderate insomnia, and 22-28 indicates severe insomnia.

The Pittsburgh Sleep Quality Index [14] is utilized for evaluating the occurrence of sleep disruptions within the preceding month. The questionnaire contains 19 items, with answers for each item selected on a scale of 0 to 3, with 3 indicating the highest severity. The final score was summed from 19 items to produce a score ranging from 0 to 21, and the higher scores present people had worse sleep quality since last month.

2.3. Procedure

All participants were assessed through a simple telephone screening, and diagnostic interviews were completed to assess participants with insomnia symptoms. After the interview, the participants completed these questionnaires through self-report.

2.4. Statistic analysis

For statistical analysis, we provide descriptive statistics to reveal the mean, standard deviation for each scale. We then used the between-subject t-test to assess differences between groups (control group and insomnia group) for each variable. And we also used Pearson r correlation test to assess differences between each variable. All analyses were performed using Jamovi [15, 16]

3. Results

Table 1 and Table 2 list the characteristics of the study sample. T-test analysis was employed to compare the disparity between the healthy control group (N=48) and the insomnia group (N=47). A significant distinction was detected in insomnia severity scores between the healthy control group (M=3.96, SD=3.09) and the insomnia group (M=9.96, SD=4.55); t(93)= -7.525, p< .001. Additionally, a significant disparity was observed in poor sleep quality between the healthy control group (M= 3.88, SD=2.02) and the insomnia group (M=7.49, SD=2.64); t(93)= -7.499, p< .001. Participants in the insomnia group showed higher neuroticism scores (M= 19.64, SD=6.17) than those in the healthy control group (M=17.27, SD=4.13), t(93)= -2.201, P= 0.030. Participant in the insomnia group also showed higher agreeableness levels (M=29.19, SD=7.12) than those in the healthy control group (M=24.63, SD=4.86), t(93)= -3.659, p< .001.

Table 3 displays Pearson r correlations among the variables. In the context of this research, we note a positive correlation between the ISI scores and agreeableness, r(93)= 0.466, p< .001; while PSQI scores were positively correlated with neuroticism, r(93)= 0.231, p= 0.024 and agreeableness, r(93)= 0.330, p= 0.001. However, there was no correlation reveals on extraversion, openness, and conscientiousness between insomnia and sleep quality.

4. Discussion

This study investigated whether insomnia in adolescence is associated with the Big Five personality factors. Individuals with insomnia symptoms usually show differences in personality traits. Teens with insomnia symptoms reported more difficulty sleeping, poorer sleep quality, and higher scores for neuroticism and agreeableness. Females with insomnia showed more sleep problems, they showed worse sleep quality, and they also scored higher on agreeableness.

First, the insomnia group demonstrated elevated levels of neuroticism, which is consistent with previous studies [7, 8, 9]. Psychological factors, such as increased neuroticism, are associated with a heightened likelihood of sleep disruptions and deteriorated sleep quality. Hintsanen et al. [7] also observed that individuals with high neuroticism tend to have shorter sleep durations, while another group might sleep for longer periods, but their sleep quality is inadequate, necessitating additional sleep to compensate for the poor quality.

In particular, agreeableness was found to be positively correlated with insomnia symptoms. In the data set, adolescents in the insomnia group had higher levels of agreeableness compared to healthy controls. This means that higher agreeableness is associated with higher insomnia severity. In addition, higher agreeableness was also associated with poorer sleep quality, which was not mentioned in the previous literature.

Previous studies have shown associations between conscientiousness, extroversion, and openness to sleep, but in this study, none of them were linked to insomnia [7, 9, 10]. However, the insomnia group showed a higher mean relative to the healthy control group.

There are some limitations to this study. First of all, our sample data was obtained in the form of a questionnaire self-report, which means that the data itself is not an objective assessment, especially the participant's self-report of neuroticism. Second, because the participants were adolescents, personality traits were not fully defined. Studies have shown that personality structure can still change in adulthood [17]. In addition, the sample of participants was not particularly large, which could have influenced the results. In future studies, we can still consider controlling more variables to get the final results. In conclusion, this study revealed the effects of neuroticism and agreeableness on adolescent sleep problems.

5. Conclusion

Using samples from public datasets, this study employed T-test (Table 1) , Group Descriptives(Table 2), and a Correlation Matrix (Table 3) to demonstrate the association between specific personality traits and insomnia symptoms. Specifically, it was found that adolescents with insomnia exhibited significantly higher scores in neuroticism and agreeableness compared to those without insomnia. However, no significant associations were observed between extraversion, openness, conscientiousness, and insomnia symptoms. Further studies could consider alternative methodologies or larger sample sizes to further explore the relationship between personality traits and insomnia.

Table 1: T-test

		Statistic	df	p		Effect Size
ISI_total	Student's t	-7.525 [a]	93.0	< .001	Cohen's d	-1.544
PSQI_total	Student's t	-7.499 [a]	93.0	< .001	Cohen's d	-1.539
NEO_neuroticism	Student's t	-2.201 [a]	93.0	0.030	Cohen's d	-0.452
NEO_extraversion	Student's t	-0.529	93.0	0.598	Cohen's d	-0.109
NEO_openness	Student's t	-1.887	93.0	0.062	Cohen's d	-0.387
NEO_agreeableness	Student's t	-3.659 [a]	93.0	< .001	Cohen's d	-0.751
NEO_Conscientiousness	Student's t	-1.620 [a]	93.0	0.109	Cohen's d	-0.333

Note. H_a μ Control ≠ μ Insomnia
[a] Levene's test is significant (p < .05), suggesting a violation of the assumption of equal variances

Table 2: Group Descriptives

Group Descriptives						
	Group	N	Mean	Median	SD	SE
ISI_total	Control	48	3.96	4.00	3.09	0.447
	Insomnia	47	9.96	9.00	4.55	0.664
PSQI_total	Control	48	3.88	4.00	2.02	0.291
	Insomnia	47	7.49	7.00	2.64	0.386

Table 2: (continued).

	Group	N	Mean	Median	SD	SE
NEO_neuroticism	Control	48	17.27	18.00	4.13	0.597
	Insomnia	47	19.64	18.00	6.17	0.900
NEO_extraversion	Control	48	28.52	28.50	3.61	0.521
	Insomnia	47	29.02	29.00	5.44	0.794
NEO_openness	Control	48	25.13	25.00	3.99	0.576
	Insomnia	47	26.87	26.00	4.99	0.728
NEO_agreeableness	Control	48	24.63	24.00	4.86	0.702
	Insomnia	47	29.19	30.00	7.12	1.038
NEO_Conscientiousness	Control	48	29.08	29.00	4.00	0.577
	Insomnia	47	30.89	31.00	6.60	0.963

Table 3: Correlation Matrix

		ISI_total	PSQI_total	NEO_neuroticism	NEO_extraversion	NEO_openness	NEO_agreeableness	NEO_Conscientiousness
ISI_total	Pearson's r	—						
	df	—						
	p-value	—						
PSQI_total	Pearson's r	0.708***	—					
	df	93	—					
	p-value	< .001	—					
NEO_neuroticism	Pearson's r	0.170	0.231*	—				
	df	93	93	—				
	p-value	0.100	0.024	—				
NEO_extraversion	Pearson's r	0.040	0.025	-0.088	—			
	df	93	93	93	—			
	p-value	0.701	0.812	0.396	—			
NEO_openness	Pearson's r	0.092	0.013	0.068	0.097	—		
	df	93	93	93	93	—		
	p-value	0.373	0.900	0.515	0.352	—		

Table 3: (continued).

NEO_agreeableness	Pearson's r	0.466***	0.330***	0.042	0.156	0.205*	—
	df	93	93	93	93	93	—
	p-value	< .001	0.001	0.686	0.132	0.046	—
NEO_Conscientiousness	Pearson's r	0.116	0.026	-0.299**	0.327**	0.086	0.192	—
	df	93	93	93	93	93	93	—
	p-value	0.262	0.800	0.003	0.001	0.407	0.063	—

Note. * p < .05, ** p < .01, *** p < .001

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