



# The Association Between Personality Traits and Substance Use Among Advanced Level Students in Western Province, Sri Lanka: A Cross-sectional Study

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## Abstract

**Background:** While personality predominantly influences human cognition, emotion, and behavior, there is still an unresolved research gap concerning the association between personality and substance use within the Sri Lankan context.

**Methods:** This descriptive cross-sectional study aimed to investigate the association between personality traits and substance use among advanced-level students aged over 18 in Western province, Sri Lanka, in 2023. Data collection was carried out using self-administered paper-pencil questionnaires. The study variables were measured using the brief version of the Big Five Personality Inventory and the Alcohol, Smoking, and Substance Involvement Questionnaire. Data analysis involved the use of the chi-square test and Spearman correlation.

**Findings:** Of the 441 enrolled participants, 422 provided correct responses to the questionnaire. Among them, 154 (36.5%) reported substance use. The majority of students initiated substance use at the age of 17. The results reveal a significant association between the openness personality trait and substance use among advanced-level students in Western province. Additionally, there was a statistically significant positive correlation between the extroversion personality trait and amphetamine use among advanced-level students.

**Conclusion:** The findings highlight a significant association between specific personality traits, particularly openness and extroversion, and substance use among advanced-level students in Western province, Sri Lanka. These results emphasize the significance of considering personality factors in understanding and addressing substance use behaviors among youth populations. Further research and targeted interventions are necessary to delve deeper into these associations and develop effective prevention and intervention strategies.

**Keywords:** Substance use, Personality traits, Advanced level students

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## Introduction

Globally, the use of psychoactive drugs, known as “substance use,” has become a significant issue impacting not only the physical, mental, and social well-being of individuals but also the global development process.<sup>1</sup> Each substance, due to its psychoactive components, directly affects the central nervous system, leading to various negative social and health consequences.<sup>2</sup> Regardless of legality, individuals commonly engage in polydrug consumption.<sup>3</sup> These substances have been categorized into 7 classes: alcohol, cannabinoids, opioids, depressants, stimulants, and hallucinogens.<sup>4-7</sup> The global prevalence of psychoactive substance use is noteworthy, with reported users ranging from 155 to 250 million individuals aged 15 to 64.<sup>8,9</sup> Harmful alcohol consumption alone contributes to 3.3 million deaths annually worldwide.<sup>10</sup> Richesson and Hoenig highlighted that among individuals aged 12 and above, 58.7% engage in alcohol, tobacco, and illicit drug

use, with percentages such as 14.8% for cigarette smokers, 22.2% for binge alcohol users, and 21.4% for illicit drug users.<sup>11,12</sup> The United States incurs over \$600 billion in costs annually related to substance use. Continuous substance use can alter brain circuits, increasing cravings and impairing inhibitory mechanisms.<sup>13</sup> Personality traits also contribute to substance use initiation and maintenance.<sup>14,15</sup> Various studies have indicated that childhood experiences, parenting styles, religious beliefs, and cultural and social norms directly influence the formation of personality.<sup>16-18</sup> Consequently, personality plays a pivotal role in shaping individuals’ behavior and thinking patterns.<sup>19-22</sup> For instance, several studies demonstrated that self-reported stresses, health complaints, and prolonged exposure to unpleasant events act as reinforcing factors in initiating and maintaining substance use.<sup>23-25</sup> Thus, the ability to manage positive and negative situations is directly influenced by personality.<sup>19</sup> The primary aim of the



present study was to examine the association between the big 5 personality traits and substance use.<sup>26,27</sup> Goldberg made significant contributions in introducing the 5 different trait dimensions of personality, wherein individuals' attitudes vary depending on the level of each personality trait.<sup>28,29</sup> Extraversion, conscientiousness, neuroticism, agreeableness, and openness constitute the main personality traits encompassing a wide range of behavioral characteristics.<sup>30-33</sup> For example, conscientiousness reflects impulse control and persistence in goal-oriented behavior; high conscientiousness is associated with organized, achievement-striving, and self-disciplined characteristics, whereas low conscientiousness is associated with careless, impulsive, and undisciplined traits.<sup>27</sup> Similarly, agreeableness is linked to kindness and prosocial behaviors, extraversion to sociability and assertiveness, neuroticism to anxiety and emotional instability, and openness to imagination and curiosity about challenges and adventures.<sup>34-36</sup>

A longitudinal study revealed that personality traits not only influence the initiation of substance use but also determine the type of substance used.<sup>37,38</sup> While certain personality traits act as buffers against engaging in negative behaviors, others may increase the likelihood of substance use. Neuroticism, for instance, exhibits the highest standard deviation (SD) compared to other traits, and individuals with high neuroticism and low conscientiousness are more prone to initiating illegal drug use.<sup>39</sup> Additionally, individuals may turn to substance use as a means to cope with negative emotions or peer pressure.<sup>23,40</sup> A cross-sectional study in the United States indicated that personality traits serve as risk factors for substance use, with neuroticism and extraversion traits showing a higher propensity for increased substance use in adolescence.<sup>41</sup> Similarly, individuals with extraversion traits tend to be sociable and outgoing, which may lead to engaging in collaborative negative behaviors such as drug and alcohol consumption.<sup>21,42</sup> Furthermore, a meta-analysis revealed a higher level of extraversion characteristics among smokers,<sup>43</sup> and multiple psychoactive substance users exhibited above-average values of neuroticism, psychoticism, and extraversion.<sup>44</sup> Trull and Sher conducted a longitudinal study investigating the relationship between personality traits and diagnostic statistical manual axis I disorders, indicating a strong correlation between substance use disorder and neurotic, introverted, and openness personality traits.<sup>45</sup> Accurate evaluation of personality traits is crucial because substance use triggers the pharmacological mechanism of the brain reward system, leading individuals from substance use to misuse, abuse, dependence, and eventually serious substance-related disorders.<sup>46-49</sup>

The current research is focused on examining the relationship between personality traits and substance use among advanced-level students in Western province, Sri

Lanka, an area known for high rates of substance-related offenses. Substance use frequently occurs during the crucial ages of 15-17 and reaches its peak between 18 and 25, with serious consequences such as suicidal thoughts reported among adolescents in the United States. Despite the vulnerability of advanced-level students to substance use, there is limited research available regarding the underlying causes of this susceptibility. This research gap serves as a motivation to investigate the impact of personality traits on substance use among this demographic, with the aim of providing valuable insights for preventive strategies.

## Methods

This cross-sectional study was conducted to examine the association between personality traits and substance use among advanced-level students in Western province in 2023. The study used a printed self-administered questionnaire and convenience sampling. The independent variable of the study was personality traits, while the dependent variable was substance use. The sample for the study was collected from advanced-level revision classes and included individuals who were over 18 years old, following the suggestions of the Ethical Review Committee. The inclusion criteria specified that only advanced-level students over 18 in Western province would be enrolled, while individuals with acute mental illnesses or under 18 would be excluded. The volunteer consent form outlined the exclusion criteria. Although no prior studies have explored this association in Western province, the expected prevalence (0.5) was used to calculate the sample size (384), adjusted to 441 with a 15% nonresponse rate using the denial formula.<sup>15</sup>

$$n = \frac{Z^2 P (1 - P)}{d^2}$$

$n$  = Sample size,

$Z$  = Statistic for a level of confidence; thus, the confidence level of this study is 95%, and the critical value is 1.96.

$P$  = Expected prevalence or proportion (0.5), as there are no studies conducted in Sri Lanka to assess the factors associated with substance use among advanced level students, maximum sample size was considered as 50%.

$d$  = Precision

Applying the values to the equation;

$$n = 1.96 \times 1.96 \times 0.5 \times 0.5 / 0.0025 = 384$$

According to the non-response rate of 15%, the final sample size was 441.

For data collection, a self-administered questionnaire was used, consisting of 3 sections: demographic factors, the World Health Organization's (WHO's) substance use scale, and the Big Five Personality Inventory. The questionnaire

has satisfactory reliability ( $\alpha=0.78$ ). The demographic section focused on gathering information about gender, age, religion, race, educational levels of both the father and mother, and family's monthly income. These factors aimed to explore any associations between demographic characteristics and substance use among advanced-level students in Western province. The Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST),<sup>50</sup> developed by the WHO, was used as a comprehensive tool to assess substance use among advanced-level students.<sup>51</sup> It covers alcohol, tobacco, and various psychoactive drugs across 10 categories, with the goal of identifying usage patterns and associated risks.<sup>40,52</sup> On the other hand, the Big Five Inventory was used to measure personality traits, including extraversion, agreeableness, conscientiousness, neuroticism, and openness. Originally consisting of 100 items, it was later condensed to a 10-item version for practicality<sup>53</sup> and to reduce participant burden.<sup>54</sup> The Big Five Inventory was administered using a 5-point Likert scale<sup>55</sup> and has strong reliability and validity, making it valuable for understanding the relationship between personality traits and substance use behaviors among advanced-level students.

### Data analysis

The data analysis for this study involved the use of Microsoft Excel 2019 and SPSS version 27. The Shapiro-Wilk test was used to assess the normality of the data distribution. Descriptive statistics, including frequencies, mean, and SD, were employed to provide a comprehensive description of the characteristics of the sample under investigation. In terms of inferential statistics, associations between categorical variables were examined using the Pearson chi-square test. Additionally, Spearman's correlation analysis was used to explore relationships between numerical values. These analytical approaches were selected to ensure a robust and systematic exploration of the data in accordance with established statistical methodologies in the field.

### Results

After filtering out incomplete data sheets, the study sample consisted of 422 participants. Among them, 222 individuals (53.3%) were male. In terms of religious affiliation, the majority identified as Buddhists, accounting for 388 participants (91.9%), while 411 (97.4%) identified themselves as Sinhala ethnically. Analysis of parental educational attainment revealed that a significant portion of the participants' fathers ( $n=224$ , 53.1%) and mothers ( $n=237$ , 56.2%) had completed education up to the advanced level. A smaller proportion of fathers ( $n=32$ , 7.6%) had attained a diploma level of education, while 14 (3.3%) had achieved a degree level. Similarly, among mothers, 46 (10.9%) held a diploma-level qualification, while 43 (10.2%) possessed a degree-level education

(Table 1). In terms of family income, the vast majority of participants ( $n=414$ , 98.1%) reported a low monthly family income, while only 8 individuals (1.9%) reported a middle-level income. Income levels were categorized based on the WHO standard estimation, developed from global developmental indicators.

Within the selected sample, 154 students (36.5%) reported having used at least 1 type of substance in their lifetime, while 268 students (63.5%) reported no lifetime substance use. Specifically, 89 students (21.1%) had used tobacco products, 115 (27.3%) had consumed alcoholic beverages, 50 (11.8%) had used cannabis, 19 (4.5%) had used amphetamines, 1 (0.2%) had used inhalants, 1 (0.2%) had consumed sedatives or sleeping pills, and 2 (0.5%) had used hallucinogens in Western province (Figure 1). Regarding the initiation of substance use, the majority of students ( $n=47$ , 30.7%) reported initiating substance use at the age of 17, with a mean age of initiation at 16.58 years ( $SD=2.03$ ; Figure 2).

The results indicated a significant association between openness and substance use among advanced-level

**Table 1.** Demographic characteristics of the participants

Demographic characteristics	Frequency (n=422)	Percent
<b>Gender</b>		
Male	225	53.3
Female	197	46.7
<b>Religion</b>		
Buddhist	388	91.9
Christian	24	5.7
Islam	9	2.2
Hindu	1	0.2
<b>Race</b>		
Sinhala	411	97.4
Tamil	2	0.5
Muslim	9	2.1
<b>Father's educational level</b>		
Never go to school	2	0.5
Up to grade 5	18	4.3
Up to O/L	129	30.6
Up to A/L	224	53.1
Diploma	32	7.6
Degree	14	3.3
Postgraduate	3	0.7
<b>Mother's educational level</b>		
Up to grade 5	4	0.9
Up to O/L	83	19.7
Up to A/L	237	56.2
Diploma	46	10.9
Degree	43	10.2
Postgraduate	9	2.1

students in Western province ( $\chi^2=19.923$ ,  $df=8$ ,  $P=0.01$ ,  $P<0.05$ ; Table 2). Furthermore, it was revealed that there was a significant association between conscientiousness and tobacco product use among advanced-level students in Western province ( $\chi^2=16.131$ ,  $df=8$ ,  $P=0.041$ ,  $P<0.05$ ).

Additionally, there was a significant association between openness and tobacco product use among advanced-level students in Western province ( $\chi^2=16.681$ ,  $df=8$ ,  $P=0.034$ ,  $P<0.05$ ). Moreover, a significant association was found between openness and alcohol use among advanced-level students in Western province ( $\chi^2=21.698$ ,  $df=8$ ,  $P=0.006$ ,  $P<0.05$ ). Similarly, openness was significantly associated with cannabis use among advanced-level students in Western province ( $\chi^2=23.697$ ,  $df=8$ ,  $P=0.003$ ,  $P<0.05$ ). Furthermore, openness demonstrated a significant association with amphetamine use among advanced-level students in Western province ( $\chi^2=26.488$ ,  $df=8$ ,  $P=0.001$ ,  $P<0.05$ ). Additionally, agreeableness exhibited a significant association with inhalant use among advanced-level students in Western province ( $\chi^2=27.198$ ,  $df=8$ ,  $P=0.001$ ,  $P<0.05$ ). Lastly, neuroticism showed a significant association with inhalant use among advanced-level students in Western province ( $\chi^2=31.536$ ,  $df=8$ ,  $P=0.000$ ,  $P<0.05$ ).

The results of the Shapiro-Wilk test indicated that the data were not normally distributed. Therefore, the Spearman correlation analysis was used to examine the relationship among the selected variables. The findings revealed a statistically significant positive correlation between extroversion and amphetamine use among advanced-level students in Western province ( $rs=0.109$ ,

$P=0.025$ ).

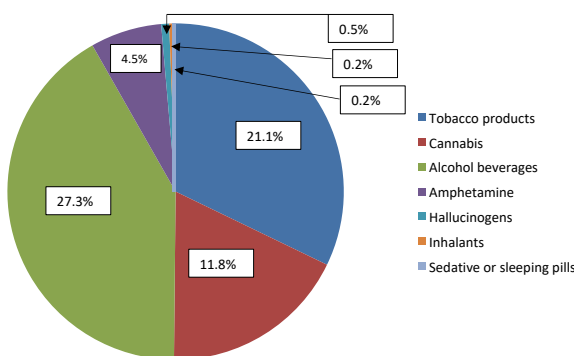
**Discussion**

The multifaceted consequences of substance use have emerged as a significant global concern affecting individuals of all ages. This section discusses the influence of personality traits on substance use and how this hazard has spread among the young generation in Sri Lanka.<sup>56</sup> Personality traits are unique to individuals and are considered relatively stable throughout life. According to Goldberg’s interpretation,<sup>30,57</sup> extraversion, neuroticism, openness, conscientiousness, and agreeableness are some of the primary personality traits. Empirical evidence suggests that individuals’ behaviors are directly linked to their personality.<sup>12</sup> Substance use can be seen as one of the dangerous negative behaviors that may arise as a result of specific personality traits.<sup>58,59</sup> Reviewing previous studies, 1 study conducted with a sample of 100 substance abusers across 5 different substances revealed that abusers who used marijuana and hallucinogens exhibited characteristics associated with the openness personality trait, while abusers who used stimulants exhibited characteristics associated with the extraversion personality trait.<sup>60</sup> Consistent with these findings, the results of the present study indicated that advanced-level students who used substances showed significant characteristics associated with the openness personality trait (Table 2). On the other hand, amphetamine can be identified as a highly addictive substance among the young generation in Sri Lanka. Due to various misconceptions surrounding this stimulant, many schoolchildren are inclined to use it. In exploring the influence of personality on amphetamine use, the present study found a positive correlation between the extraversion personality trait and amphetamine users. Traits associated with extraversion, such as a preference for socializing, are commonly observed during the post-adolescent period,<sup>61-63</sup> which may be one of the factors triggering substance use

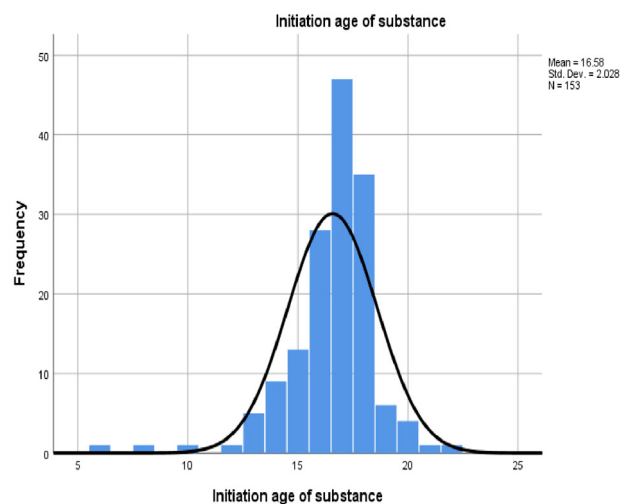
**Table 2.** The association between openness personality trait and substance use

	Value	df	Asymptotic significance (2-sided)
Pearson chi-square	19.923 <sup>a</sup>	8	.011
Likelihood ratio	20.705	8	.008
Linear-by-linear association	3.324	1	.068
No. of valid cases	422		

<sup>a</sup> Seven cells (38.9%) have an expected count of less than 5. The minimum expected count is 1.09.



**Figure 1.** Prevalence of substance use among advanced-level students in selected tuition classes in Western province



**Figure 2.** Initiation age of substance use among advanced-level students

initiation among young individuals. According to the National Dangerous Drug Control Board (NDDCB, 2022), substance-related arrests in Sri Lanka increased by 13% in 2022 compared to the previous year, with 57% of cases reported in Western province.<sup>64</sup> The present study reported that 36.5% of advanced-level students in Western province use substances, and the majority of them initiate substance use at the age of 17 (Figure 2). The period from early adolescence (12-14 years) to late adolescence (15-17 years) is considered a risk period for initiating substance use<sup>65,66</sup>. Hence, identifying these factors provides a valuable avenue for developing more effective therapeutic plans<sup>52</sup> and preventive guidelines to address this issue globally.

### Conclusion

A significant number of students reported lifetime substance use, with tobacco products being the most commonly used substance. Other substances, including alcohol, cannabis, amphetamines, inhalants, sedatives or sleeping pills, and hallucinogens, were also reported, though in smaller numbers. The findings suggest that a considerable number of advanced-level students in the Western province are inclined to use substances. The study reveals an association between personality traits and substance use among advanced-level students in Western province. The results indicated that substance use was significantly influenced by the personality traits of openness and extraversion among advanced-level students.

### Future Recommendation

As mentioned above, conducting a longitudinal study would enhance the comprehensiveness of the findings compared to a cross-sectional study when investigating the relationship between personality traits and substance use. By increasing the sample size, future findings will become more reliable. Researchers can also consider conducting this study in various settings, such as rehabilitation centers, hospitals, and schools, involving clinical field experts who can directly engage participants in relevant intervention sessions, awareness programs, and training sessions. Additionally, researchers can conduct follow-up studies after implementing awareness sessions and intervention programs to analyze their effectiveness. Furthermore, future researchers can explore the relationship between personality types and substance use by employing different personality typologies.

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### Authors' Contribution

**Conceptualization:** Akila Randika Jayamaha, Dilantha Deva Adithiya, Janitha Charuni Thennakoon.

**Data curation:** Janitha Charuni Thennakoon.

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**Resources:** Janitha Charuni Thennakoon.

**Software:** Akila Randika Jayamaha, Janitha Charuni Thennakoon.

**Supervision:** Akila Randika Jayamaha, Dilantha Deva Adithiya.

**Validation:** Ranil Kumaranayake, Kanchana Nawagamuwa.

**Visualization:** Janitha Charuni Thennakoon.

**Writing—original draft:** Janitha Charuni Thennakoon.

**Writing—review & editing:** Akila Randika Jayamaha, Dilantha Deva Adithiya, Janitha Charuni Thennakoon.

### Competing Interests

The authors have no conflict of interest to declare.

### Ethical Approval

This was a cross-sectional study, and the ethical approval was granted from the Ethical Review Committee at KIU, Sri Lanka (KIU/ER/22/050). Informed consent was obtained from the participants. The confidentiality of the participants was protected in this study.

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