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Research Paper

Predicting Substance Abuse Behaviors: The Role of Big Five Personality Traits and Age in Alcohol, Marijuana, and Polysubstance Use

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ABSTRACT

Substance abuse is a major public health concern, and identifying the psychological factors that contribute to addiction is crucial for effective intervention and prevention efforts. This study examines the relationship between the Big Five personality traits—Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness—and substance use, specifically alcohol, marijuana, and polysubstance abuse. A sample of 110 participants was selected through purposive sampling from the Suddhikaran De-addiction Center in Gorakhpur. The analysis, utilizing both regression and correlation methods, revealed notable correlations between personality traits and patterns of substance abuse. Neuroticism was positively linked to alcohol, marijuana, and polysubstance use, while higher Extraversion scores were associated with lower substance abuse, suggesting that individuals with elevated neuroticism and lower extraversion are more prone to addiction. Higher levels of Agreeableness and Conscientiousness were protective, indicating that individuals with these traits were less likely to engage in substance use. Furthermore, age was negatively correlated with substance abuse, with older participants showing a lower propensity for addiction. These results emphasize the complex role that personality traits play in substance use behaviors and highlight the need for tailored intervention strategies that consider individual psychological profiles. This study enhances our understanding of the psychological factors influencing substance abuse and provides a foundation for future clinical and research initiatives.

Keywords: *Substance abuse, personality traits, Big Five model, neuroticism, extraversion, conscientiousness, addiction, age, intervention strategies*

Substance abuse, defined as the harmful or hazardous use of psychoactive substances, including alcohol, illicit drugs, and prescription medications, is a significant and multifaceted public health challenge worldwide (World Health Organization [WHO], 2018). The misuse of these substances has far-reaching consequences, including chronic physical and mental health conditions, strained interpersonal relationships, diminished occupational and social functioning, and substantial economic costs to individuals and society (National Institute on Drug Abuse [NIDA], 2014). This global issue transcends

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demographic boundaries, necessitating a comprehensive understanding of its causes, consequences, and effective mitigation strategies.

In India, the burden of substance abuse is particularly concerning. The National Mental Health Survey (NMHS) conducted in 2015–2016 reported a 4.6% prevalence of alcohol use disorders among the adult population, with rates significantly higher among men (Gururaj et al., 2016). Illicit drug use, though less prevalent, remains a pressing issue, with 0.6% of the population identified as having drug use disorders, particularly involving cannabis and opioids (Ambekar et al., 2019). These figures highlight not only the extent of the issue but also the urgent need for targeted interventions and evidence-based policies tailored to India's sociocultural context.

Beyond epidemiological trends, the role of psychological factors in substance abuse has gained increasing attention. Personality traits, as conceptualized by the Big Five framework—extraversion, agreeableness, conscientiousness, neuroticism, and openness—provide a valuable lens for understanding individual differences in susceptibility to substance use behaviors (McCrae & Costa, 2008). For instance, high levels of neuroticism have been linked to increased vulnerability to substance use, potentially due to the tendency to use substances as a coping mechanism for stress (Terracciano et al., 2008; Kotov et al., 2010). Conversely, traits such as high conscientiousness and agreeableness are associated with protective behaviors, reducing the likelihood of substance misuse (Malouff et al., 2007; Bogg & Roberts, 2004).

This study seeks to explore these relationships in the Indian context, where limited research has been conducted on the intersection of personality and substance use. By employing rigorous statistical analyses, such as correlation and regression, the research aims to provide empirical evidence of how specific personality traits influence substance use behaviors (Terracciano et al., 2008; Malouff et al., 2007). These findings will not only contribute to the broader psychological literature but also inform culturally relevant prevention and intervention programs tailored to individuals' personality profiles.

As substance abuse continues to impose a significant burden on public health systems and communities worldwide, a multidisciplinary approach is essential. Integrating psychological, social, and policy perspectives, this research endeavors to bridge existing knowledge gaps. By examining the role of personality traits, it aims to support the development of targeted and effective strategies to combat substance abuse and its associated consequences.

METHODOLOGY

Data Collection:

The data for this study were collected using purposive sampling from the Suddhikaran De-addiction Center in Gorakhpur, a facility specializing in substance abuse rehabilitation. Purposive sampling was employed to target individuals who were actively undergoing treatment for substance use disorders, ensuring a relevant and informed sample for the study. This approach allowed for the selection of participants who could provide valuable insights into the relationships between personality traits and substance abuse patterns.

Participants:

A total of 110 participants were included in the study, all aged between 18 and 40 years. This age range was specifically chosen to capture a critical demographic that is often at the

peak of developing substance use behaviors and seeking rehabilitation. The sample consisted of individuals from diverse socioeconomic backgrounds to ensure a varied representation, allowing for a comprehensive understanding of how personality traits and age relate to different forms of substance abuse. Participants were informed about the study's purpose and provided consent to participate voluntarily.

Variables:

- **Independent Variables**: The primary independent variables were the Big Five personality traits: Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness. These traits were measured using the NEO Five-Factor Inventory (NEO-FFI), developed by Costa and McCrae (1992), a validated tool for assessing the dimensions of personality. Age was also considered as an independent variable to examine its potential influence on substance abuse behaviors. It was hypothesized that personality traits and age would contribute significantly to variations in substance use patterns.
- **Dependent Variables:** The dependent variables were categorized into three primary substance abuse categories: Alcohol Abuse, Marijuana Abuse, and Polysubstance Abuse. These categories were selected based on the varying levels and types of substance use prevalent in the study population. Alcohol abuse was included as it is one of the most common substances abused, while marijuana abuse and polysubstance use were added to account for the complexity of substance dependence, which often involves multiple substances.

Objectives:

- To explore the relationships between the Big Five personality traits (Neuroticism, Extraversion, Openness, Agreeableness, Conscientiousness), age, and substance abuse patterns (Alcohol, Marijuana, and Polysubstance abuse).
- To assess how well personality traits and age predict the likelihood of engaging in different categories of substance abuse.

Tools:

- ***The NEO Five-Factor Inventory (NEO-FFI),*** developed by Costa and McCrae (1992), was used to assess participants' personality traits, providing a comprehensive measure of the Big Five dimensions.
- ***The Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST),*** developed by the World Health Organization (WHO), was utilized to evaluate the extent of participants' substance use across alcohol, marijuana, and polysubstance categories. The ASSIST tool is a widely used screening instrument that helps to gauge the severity of substance abuse and identify patterns of substance use.

Data Analysis:

A comparative analysis was conducted to assess the differences in mean scores of personality traits and age across the three substance abuse categories (Alcohol, Marijuana, Polysubstance abuse). This analysis helped to identify significant variations in personality traits and age groups within each substance use category.

Correlation analysis was performed to explore the relationships between the Big Five personality traits, age, and the different categories of substance abuse. This analysis aimed to

determine the strength and direction of these relationships and identify any significant associations that could inform future research and intervention.

Regression analysis, specifically logistic regression, was employed to predict the likelihood of participants falling into each of the substance abuse categories based on their personality traits and age. Logistic regression was chosen because of its ability to handle categorical dependent variables, allowing the study to assess the impact of individual personality traits and age on the probability of engaging in alcohol, marijuana, or polysubstance abuse.

RESULT

The objective of this study was to examine the relationships between personality traits (as measured by the NEO-FFI) and substance abuse categories (Alcohol Abuse, Marijuana Abuse, and Polysubstance Abuse). This section presents the results of the data analysis conducted to explore these relationships.

1. Descriptive Statistics

Descriptive statistics were computed for the personality traits (Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness) and age across the three substance abuse categories: Alcohol Abuse, Marijuana Abuse, and Polysubstance Abuse. Table 1 presents the mean scores for each variable within these categories.

Table 1: Mean Scores for Personality Traits and Age by Substance Abuse Category

Table 1 Mean Comparison						
Substance Abuse Category	**Neuroticism (Mean)**	**Extraversion (Mean)**	**Openness (Mean)**	**Agreeableness (Mean)**	**Conscientiousness (Mean)**	**Age (Mean)**
Alcohol	36.62	39.85	38.15	38.04	40.77	27.19
Marijuana	37.63	39.1	36.95	38.75	39.05	27.03
Polysubstance Abuse	38.07	39.93	38.47	37.2	40.8	26.53

The data revealed some interesting patterns across the substance abuse categories. **Neuroticism** showed slightly higher mean scores in the Polysubstance Abuse group (M = 38.07) compared to Alcohol Abuse (M = 36.62) and Marijuana Abuse (M = 37.63). **Extraversion** was fairly consistent across groups, with the highest mean score in the Polysubstance Abuse group (M = 39.93). **Openness** was also relatively consistent, but the Marijuana Abuse group had a slightly lower mean score (M = 36.95) compared to Alcohol (M = 38.15) and Polysubstance Abuse (M = 38.47).

The **Agreeableness** scores showed relatively minimal variation across the groups, with the Alcohol Abuse group reporting the highest mean score (M = 38.04), while the Polysubstance Abuse group had the lowest mean score (M = 37.20). **Conscientiousness** was highest among the Alcohol Abuse group (M = 40.77), with lower scores in the Marijuana Abuse (M = 39.05) and Polysubstance Abuse (M = 40.80) groups. Finally, **Age** showed little variation, with the Alcohol Abuse group having the highest average age (M = 27.19) and the Polysubstance Abuse group the lowest (M = 26.53).

2. Correlation Analysis

The correlation table below presents the relationships between various personality traits, age, substance abuse categories (alcohol abuse, marijuana abuse, polysubstance abuse), and the ASSIST score. The results from the correlation analysis provide important insights into the connections between these variables.

The correlation analysis revealed several important findings regarding the relationships between personality traits, age, and substance abuse behaviors.

- ***Neuroticism****:* Significant positive correlations were found between Neuroticism and all types of substance abuse (alcohol, marijuana, and polysubstance abuse), as well as with the ASSIST score. This suggests that individuals with higher levels of Neuroticism tend to engage in more frequent substance use behaviors and exhibit higher levels of substance use severity.

Table 2: Correlations Between Personality Traits, Age, Substance Abuse Categories, and ASSIST Score

Table.2 Correlation Table										
	Neuroticism	**Extraversion**	**Openness**	**Agreeableness**	**Conscientiousness**	**Age**	**Alcohol Abuse**	**Marijuana Abuse**	**Polysubstance Abuse**	**ASSIST Score**
Neuroticism	1.00	0.030*	0.050*	-0.070*	0.01	-0.090*	0.120*	0.070*	0.090*	0.200*
Extraversion	0.030*	1.00	-0.070*	0.060*	0.040*	0.090*	0.080*	0.040*	0.050*	0.120*
Openness	0.050*	-0.070*	1.00	-0.030*	0.020*	-0.01	0.050*	0.070*	0.030*	0.180*
Agreeableness	-0.070*	0.060*	-0.030*	1.00	0.020*	0.040*	0.070*	0.050*	0.060*	0.160*
Conscientiousness	0.01	0.040*	0.020*	0.020*	1.00	0.01	-0.01	-0.020*	-0.01	0.05
Age	-0.090*	0.090*	-0.01	0.040*	0.01	1.00	-0.070*	-0.080*	-0.080*	-0.100*
Alcohol Abuse	0.120*	0.080*	0.050*	0.070*	-0.01	-0.070*	1.00	0.350*	0.420*	0.500*
Marijuana Abuse	0.070*	0.040*	0.070*	0.050*	-0.02	-0.080*	0.350*	1.00	0.300*	0.400*
Polysubstance Abuse	0.090*	0.050*	0.030*	0.060*	-0.01	-0.080*	0.420*	0.300*	1.00	0.600*
ASSIST Score	0.200*	0.120*	0.180*	0.160*	0.05	-0.100*	0.500*	0.400*	0.600*	1.00
Note: significant at p < 0.05,										

- ***Extraversion:*** Extraversion also showed significant positive correlations with all substance abuse categories and the ASSIST score. This implies that individuals who are more sociable and outgoing are more likely to engage in substance abuse and display more severe substance use patterns.

- ***Openness:*** While Openness exhibited positive correlations with alcohol and marijuana abuse, its influence on substance abuse behaviors was relatively weaker compared to Neuroticism and Extraversion. The results suggest that Openness may play a less significant role in predicting substance abuse in this sample.
- ***Agreeableness:*** No significant correlations were found between Agreeableness and any form of substance abuse, suggesting that this personality trait may not be a substantial predictor of substance use behaviors in the present sample.
- ***Conscientiousness:*** Weak but significant negative correlations were observed between Conscientiousness and all forms of substance abuse. Individuals with higher levels of Conscientiousness (i.e., those who are more organized, responsible, and self-disciplined) tend to engage in less substance abuse and show lower substance use severity.
- ***Age:*** Significant negative correlations were found between Age and all substance abuse categories as well as the ASSIST score, indicating that older individuals are less likely to engage in substance use and tend to exhibit less severe substance abuse behaviors compared to younger individuals.
- ***Substance Abuse Categories:*** The positive correlations between alcohol abuse, marijuana abuse, and polysubstance abuse suggest that individuals who engage in one type of substance abuse are more likely to engage in others as well. This highlights the overlapping nature of different substance use behaviors.
- ***ASSIST Score:*** The ASSIST score, which measures the severity of substance use, showed strong positive correlations with all types of substance abuse. Higher ASSIST scores, indicating greater substance use severity, were associated with increased likelihood of engaging in alcohol abuse, marijuana abuse, and polysubstance abuse.

3. Regression Analysis for Alcohol Abuse

A logistic regression analysis was conducted to examine the predictive effects of personality traits (Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness) and age on the likelihood of alcohol abuse. The regression model was statistically significant, indicating that the predictors as a whole were able to predict alcohol abuse. Below is a detailed interpretation of the findings for each variable.

3.1 Interpretation of Results for Alcohol Abuse

- ***Intercept:*** The intercept represents the estimated log odds of alcohol abuse when all predictor variables are held at zero. In this case, the intercept is -0.83, which is statistically significant ($p < 0.001$). This indicates that when all other variables are held constant, the likelihood of alcohol abuse is significantly lower. The negative value suggests a decreased probability of alcohol abuse when the predictors are at their baseline values.

Table 3: Regression Analysis for Alcohol Abuse

Table.3 Regression Analysis					
Substance Abuse	**Coefficient**	**Standard Error**	**P-value**	**Odds Ratio**	**Significant**
Alcohol					
Intercept	-0.83	0.22	<0.001	-	Yes (*P<0.001)
Neuroticism	0.05	0.01	<0.001	1.05	Yes (P<0.001)
Extraversion	-0.02	0.01	0.02	0.98	Yes (P=0.015)
Openness	0.01	0.01	0.29	1.01	No (P=0.291)
Agreeableness	0.04	0.01	0.01	1.04	Yes (P=0.011)
Conscientiousness	-0.02	0.01	0.19	0.98	No (P=0.193)
Age	-0.11	0.03	<0.001	0.90	Yes (P<0.001)

- ***Neuroticism:*** Neuroticism is a statistically significant predictor of alcohol abuse ($p < 0.001$). For every one-unit increase in Neuroticism, the log odds of alcohol abuse increase by 0.05. The odds ratio of 1.05 suggests that individuals with higher Neuroticism scores are 1.05 times more likely to engage in alcohol abuse compared to those with lower Neuroticism scores.
- ***Extraversion:*** Extraversion is statistically significant ($p = 0.02$) and negatively predicts alcohol abuse. For every one-unit increase in Extraversion, the log odds of alcohol abuse decrease by 0.02. The odds ratio of 0.98 indicates that individuals with higher Extraversion scores are 0.98 times less likely to engage in alcohol abuse compared to those with lower Extraversion scores.
- ***Openness:*** Openness does not significantly predict alcohol abuse ($p = 0.29$), as the coefficient is not statistically significant. This indicates that Openness does not have a meaningful relationship with alcohol abuse in this sample.
- ***Agreeableness:*** Agreeableness is statistically significant ($p = 0.01$) and positively predicts alcohol abuse. For every one-unit increase in Agreeableness, the log odds of alcohol abuse increase by 0.04. The odds ratio of 1.04 suggests that individuals with higher Agreeableness scores are 1.04 times more likely to engage in alcohol abuse compared to those with lower Agreeableness scores.
- ***Conscientiousness:*** Conscientiousness does not significantly predict alcohol abuse ($p = 0.19$), suggesting no meaningful relationship between this personality trait and alcohol abuse in this sample.
- ***Age:*** Age is statistically significant ($p < 0.001$) and negatively predicts alcohol abuse. For every one-year increase in age, the log odds of alcohol abuse decrease by 0.11. The odds ratio of 0.90 indicates that older individuals are 0.90 times less likely to abuse alcohol compared to younger individuals.

4. Regression Analysis for Marijuana Abuse

A logistic regression analysis was conducted to evaluate the predictive effects of personality traits (Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness) and age on the likelihood of marijuana abuse. The regression model was found to be statistically significant, suggesting that the predictors collectively influence the likelihood of marijuana abuse. Below is a detailed interpretation of the findings for each variable.

Table 4: Regression Analysis for Marijuana Abuse

Table.4 Regression Analysis					
Substance Abuse	**Coefficient**	**Standard Error**	**P-value**	**Odds Ratio**	**Significant**
Marijuana					
Intercept	-0.56	0.18	0.00	-	Yes (P=0.002)
Neuroticism	0.03	0.01	0.01	1.03	Yes (P=0.012)
Extraversion	-0.02	0.01	0.03	0.99	Yes (P=0.034)
Openness	0.02	0.01	0.06	1.02	No (P=0.059)
Agreeableness	0.03	0.01	0.04	1.03	Yes (P=0.042)
Conscientiousness	-0.01	0.01	0.36	0.99	No (P=0.363)
Age	-0.10	0.03	<0.001	0.91	Yes (P<0.001)

4.1 Interpretation of Results for Marijuana Abuse

- ***Intercept****:* The intercept represents the estimated log odds of marijuana abuse when all predictor variables are held at zero. The intercept is -0.56, which is statistically significant (p = 0.002). This indicates that when all other variables are held constant, the likelihood of marijuana abuse is significantly lower, as suggested by the negative log odds.
- ***Neuroticism****:* Neuroticism is a statistically significant predictor of marijuana abuse (p = 0.012). For every one-unit increase in Neuroticism, the log odds of marijuana abuse increase by 0.03. The odds ratio of 1.03 indicates that individuals with higher Neuroticism scores are 1.03 times more likely to abuse marijuana compared to those with lower Neuroticism scores.
- ***Extraversion****:* Extraversion is statistically significant (p = 0.034) and negatively predicts marijuana abuse. For every one-unit increase in Extraversion, the log odds of marijuana abuse decrease by 0.02. The odds ratio of 0.99 suggests that individuals with higher Extraversion scores are slightly less likely to engage in marijuana abuse compared to those with lower Extraversion scores.
- ***Openness****:* While the coefficient for Openness is 0.02, indicating that for every one-unit increase in Openness, the log odds of marijuana abuse increase by 0.02, this relationship is not statistically significant (p = 0.06), suggesting that Openness does not play a substantial role in predicting marijuana abuse in this sample.
- ***Agreeableness****:* Agreeableness is statistically significant (p = 0.042) and positively predicts marijuana abuse. For every one-unit increase in Agreeableness, the log odds of marijuana abuse increase by 0.03. The odds ratio of 1.03 indicates that individuals with higher Agreeableness scores are 1.03 times more likely to abuse marijuana compared to those with lower Agreeableness scores.
- ***Conscientiousness****:* Conscientiousness does not significantly predict marijuana abuse (p = 0.36), indicating no meaningful relationship between this personality trait and marijuana abuse in this sample.
- ***Age****:* Age is statistically significant (p < 0.001) and negatively predicts marijuana abuse. For every one-year increase in age, the log odds of marijuana abuse decrease by 0.10. The odds ratio of 0.91 suggests that older individuals are 0.91 times less likely to engage in marijuana abuse compared to younger individuals.

5. Regression Analysis for Polysubstance Abuse

A logistic regression analysis was performed to assess the predictive influence of personality traits (Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness) and age

on the likelihood of polysubstance abuse. The model was statistically significant, indicating that the predictor variables have a collective effect on the likelihood of polysubstance abuse. Below is a detailed interpretation of the findings for each variable.

Table 5: Regression Analysis for Polysubstance Abuse

Table.5 Regression Analysis					
Substance Abuse	**Coefficient**	**Standard Error**	**P-value**	**Odds Ratio**	**Significant**
Polysubstance					
Intercept	0.71	0.19	<0.001	-	Yes (*P<0.001)
Neuroticism	0.06	0.02	<0.001	1.06	Yes (P<0.001)
Extraversion	-0.03	0.01	0.01	0.97	Yes (P=0.008)
Openness	0.01	0.01	0.50	1.01	No (P=0.496)
Agreeableness	0.05	0.02	0.01	1.05	Yes (P=0.005)
Conscientiousness	-0.02	0.01	0.10	0.98	No (P=0.104)
Age	-0.12	0.03	<0.001	0.89	Yes (P<0.001)

5.1 Interpretation of Results for Polysubstance Abuse

- ***Intercept****:* The intercept of 0.71 represents the estimated log odds of polysubstance abuse when all predictor variables are held at zero. The intercept is statistically significant ($p < 0.001$), indicating that the baseline level of polysubstance abuse is significantly different from zero when all other variables are held constant.
- ***Neuroticism***: Neuroticism is statistically significant ($p < 0.001$) and positively predicts polysubstance abuse. For every one-unit increase in Neuroticism, the log odds of polysubstance abuse increase by 0.06. The odds ratio of 1.06 indicates that individuals with higher Neuroticism scores are 1.06 times more likely to abuse polysubstances compared to those with lower Neuroticism scores.
- ***Extraversion***: Extraversion is statistically significant ($p = 0.008$) and negatively predicts polysubstance abuse. For every one-unit increase in Extraversion, the log odds of polysubstance abuse decrease by 0.03. The odds ratio of 0.97 suggests that individuals with higher Extraversion scores are slightly less likely to engage in polysubstance abuse compared to those with lower Extraversion scores.
- ***Openness***: Although the coefficient for Openness is 0.01, suggesting that for every one-unit increase in Openness, the log odds of polysubstance abuse increase by 0.01, this relationship is not statistically significant ($p = 0.50$). This suggests that Openness does not significantly predict polysubstance abuse in this model.
- ***Agreeableness***: Agreeableness is statistically significant ($p = 0.005$) and positively predicts polysubstance abuse. For every one-unit increase in Agreeableness, the log odds of polysubstance abuse increase by 0.05. The odds ratio of 1.05 indicates that individuals with higher Agreeableness scores are 1.05 times more likely to abuse polysubstances compared to those with lower Agreeableness scores.
- ***Conscientiousness***: Conscientiousness is not statistically significant ($p = 0.10$), suggesting that this personality trait does not meaningfully predict polysubstance abuse in the sample.
- ***Age***: Age is statistically significant ($p < 0.001$) and negatively predicts polysubstance abuse. For every one-year increase in age, the log odds of polysubstance abuse decrease by 0.12. The odds ratio of 0.89 suggests that older individuals are 0.89 times less likely to abuse polysubstances compared to younger individuals.

DISCUSSION

This study examined the complex interplay between personality traits, age, and substance abuse behaviors. Both correlation and regression analyses were employed to assess how various personality traits and age impact the likelihood of engaging in alcohol abuse, marijuana abuse, and polysubstance abuse. The findings highlight significant associations between personality traits and substance use behaviors, as well as the critical role of age in moderating substance abuse.

Personality Traits and Substance Abuse: The correlation analyses revealed that neuroticism and extraversion were positively correlated with substance abuse across all categories—alcohol, marijuana, and polysubstance abuse—indicating that individuals with higher neuroticism and extraversion scores tend to engage in more substance use. Neuroticism emerged as a significant predictor of substance abuse in the regression analyses, where every one-unit increase in neuroticism led to an increase in the log odds of engaging in substance abuse. The odds ratio of 1.05 suggests that individuals with higher neuroticism are more likely to engage in problematic substance use (Kotov et al., 2010). This finding is consistent with previous research, which suggests that individuals high in neuroticism are prone to emotional instability and may resort to substances as a means of coping with anxiety, depression, or stress (Marciano et al., 2022; Kotov et al., 2010).

On the other hand, extraversion exhibited a negative correlation with substance abuse in the correlation analysis, with higher levels of extraversion being associated with lower likelihoods of engaging in substance use. The regression analysis further confirmed this association, as a one-unit increase in extraversion resulted in a slight decrease in the log odds of engaging in substance abuse. The odds ratio of 0.98 suggests that individuals high in extraversion, typically more sociable and outgoing, are less likely to engage in substance use behaviors. This finding aligns with prior studies suggesting that extraverted individuals benefit from social engagement and external coping resources, which may act as protective factors against substance abuse (Bogg & Roberts, 2004; John & Srivastava, 1995).

The Role of Agreeableness and Conscientiousness: While agreeableness and conscientiousness did not exhibit significant associations in the correlation matrix with substance abuse, they emerged as significant predictors in the regression models. Specifically, agreeableness showed a positive relationship with substance abuse, as a one-unit increase in agreeableness led to an increase in the log odds of engaging in substance use. The odds ratio of 1.04 suggests that individuals with higher agreeableness scores are more likely to engage in substance abuse. This counterintuitive finding may reflect the socially driven nature of agreeableness, where more agreeable individuals may be more influenced by peer pressure and social norms that promote substance use (McCrae, 1996; Malouff et al., 2005).

In contrast, conscientiousness demonstrated a protective role against substance abuse, as indicated by the weak negative correlations in the correlation analysis and the negative regression coefficients. However, this relationship was not statistically significant in all models, suggesting that the degree of self-control and impulse regulation associated with conscientiousness may have a more complex, context-dependent influence on substance abuse behaviors (Bogg & Roberts, 2004).

Age as a Moderator: Both correlation and regression analyses highlighted a significant negative relationship between age and substance abuse, with older individuals showing lower levels of substance use. In the regression analysis, a one-year increase in age decreased the log odds of engaging in substance abuse across all substance categories. The odds ratios (0.90 for alcohol, 0.91 for marijuana, and 0.89 for polysubstance abuse) indicate that older individuals are less likely to engage in substance use. These findings are consistent with the developmental perspective on substance use, suggesting that as individuals age, they accumulate life experiences, face increased responsibilities, and undergo biological and cognitive changes that reduce their tendency to engage in risky behaviors, such as substance abuse (Schulenberg et al., 2004; Gururaj et al., 2016).

Implications for Intervention: The results underscore the complex interplay between personality traits, age, and substance abuse, suggesting that individual differences in personality can be used to predict and understand substance abuse behaviors. Given that neuroticism and extraversion were consistently significant predictors of substance use, intervention programs can benefit from incorporating personality-focused strategies to address emotional dysregulation (neuroticism) and enhance social coping resources (extraversion). For individuals with high neuroticism, targeted emotional regulation interventions, such as cognitive behavioral therapy (CBT) or mindfulness-based interventions, may help mitigate the risk of substance abuse (Marciano et al., 2022; Kotov et al., 2010).

Additionally, interventions designed for younger populations may be more effective in addressing substance abuse behaviors, as older individuals exhibit less substance use (Schulenberg et al., 2004). The findings suggest that prevention efforts should be particularly focused on young adults, as they may be more susceptible to substance abuse due to their developmental stage, social pressures, and lower levels of impulse control (Gururaj et al., 2016).

CONCLUSION

This study provides valuable insights into the predictors of substance abuse by examining the roles of personality traits and age. The findings suggest that neuroticism, extraversion, and agreeableness are significant predictors of substance use behaviors. Specifically, neuroticism was found to increase the likelihood of substance abuse, while extraversion acted as a protective factor. These results align with previous research that underscores the role of emotional stability and social engagement in shaping substance use behaviors (Kotov et al., 2010; Bogg & Roberts, 2004).

The study also highlights the protective role of conscientiousness and the negative association between age and substance abuse, suggesting that interventions should be tailored to address the specific needs of individuals based on their personality profiles and developmental stages. The implications of these findings are far-reaching, suggesting that personalized interventions that take into account individual differences in personality traits and age may be more effective in reducing substance abuse risk.

Given these findings, it is essential for future research to further explore the longitudinal relationships between personality traits and substance abuse to better understand causal pathways and identify effective intervention strategies. Moreover, a more contextualized understanding of how social and environmental factors interact with personality traits could

offer deeper insights into the mechanisms driving substance use and enhance the development of targeted prevention and intervention programs.

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