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Personality Traits, Resilience, and Stress as Predictors of Nicotine Dependency Among Young Adults

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Abstract: Especially among young people, nicotine addiction still causes a significant public health concern. Within an Indian cohort of young adults, this study investigates the relationships among personality traits (neuroticism, conscientiousness), resilience, perceived stress, and nicotine dependency. Using the Fagerström Test for Nicotine Dependence (FTND), the predictive relevance of neuroticism, conscientiousness, resilience, and perceived stress on nicotine dependence was examined ex post facto. On a 250-person sample, descriptive and inferential statistical analyses were run. The results showed that whilst improved resilience and conscientiousness linked negatively with nicotine dependence, elevated neuroticism and perceived stress correlated favorably with nicotine dependence. While stress was the most strong favorable predictor of nicotine dependence, resilience turned out to be a vital defensive tool. These results emphasize the significance of focusing on psychological traits and stress management in treatments meant to reduce the nicotine habit in young people.

Keywords: *Nicotine Dependence, Young Adults, Personality Traits, Neuroticism, Conscientiousness, Resilience, Perceived Stress.*

1. Introduction

Nicotine addiction is a major public health concern, especially for young people. Though cessation is still difficult, tobacco use causes the deaths of around seven million people

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worldwide yearly (Chawla & Garrison, 2020). The most addictive component of tobacco, nicotine, keeps one dependent and is "as addictive as heroin, cocaine, and methamphetamine" (Bruijnzeel, 2019). Dependency on tobacco or e-cigarettes can develop even from very low levels (D'Souza & Markou, 2021). Teenagers and young adults have increased sensitivity; for example, female teenagers are more sensitive to the rewarding effects of nicotine than their male counterparts of the same age (Chawla & Garrison, 2020). Though most people want to stop smoking, less than 10% of smokers succeed in any one year (D'souza & Markou, 2021). About 38% of men use tobacco in India, where smoking rates form a major epidemic; 29% in urban areas, 43% in rural areas; Singh et al., 2023. The increasing incidence among young Indian people emphasizes the need to understand the factors influencing nicotine use.

For clarity, the following defines the key constructs in this work: A chronic condition marked by compulsive nicotine intake, tolerance, and withdrawal symptoms following cessation, nicotine dependence is defined by Bruijnzeel (2019). Resilience is the capacity of one to adapt to and recover from stress or adversity, therefore displaying good coping strategies and psychological fortitude (Yang et al., 2024; Galbraith et al., 2021). The degree to which people believe their life is erratic, uncontrollable, and overwhelming—that is known as perceived stress (Murphy, 2020). Personality traits of interest include conscientiousness (a tendency for self-discipline, organization, and goal-oriented behavior) and neuroticism (a predisposition to unpleasant emotions and emotional reactivity). While high conscientiousness is linked with improved self-control and accountability, high neuroticism is usually linked with increased emotional pain under demanding circumstances (Leventhal & Zvolensky, 2021).

Comprehensive research has looked at the physiological and psychological bases of nicotine addiction. In the brain, nicotine neurobiologically couples with nicotinic acetylcholine receptors (nAChRs) (Chawla & Garrison, 2020; D'Souza & Markou, 2021). Extensively found in the central and peripheral nervous systems, these ligand-gated receptors control many neurotransmitter pathways. Nicotine activates nicotinic acetylcholine receptors (nAChRs), which release dopamine in the mesocorticolimbic reward circuit and hence produce reinforcing positive effects (Chawla & Garrison, 2020). Nicotine affects glutamate, GABA, and other neurotransmitters, therefore producing nAChRs in almost all other neurotransmitter systems, either glutamatergic or GABAergic interactions (D'souza & Markou, 2021). Furthermore, influencing dependency are genetic factors; for example, mutations in the CHRNA5 gene, which

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codes for a nicotinic acetylcholine receptor subunit, have been repeatedly linked to higher vulnerability to smoking (Chawla & Garrison, 2020). All told, nicotine causes significant changes in receptors and increases in dopamine transmission that support addiction (Bruijnzeel, 2019).

Psychologically, also very important elements are traits and stress. While increased conscientiousness may help to prevent impulsive smoking, elevated neuroticism may drive people to use nicotine as a self-medication for negative feelings (Leventhal & Zvolensky, 2021). As stress hormones and coping strategies cause cravings and smoking behaviors, perceived stress greatly encourages smoking (Murphy, 2020). Still, the results are equivocal: some studies show that highly conscientious smokers show more successful attempts at quitting, whereas high neuroticism is linked to more dependence. Research linking personality or stress with dependency is rare in India (Singh et al., 2023). Together, neurobiological and psychological theories suggest that individual traits and brain systems interact to produce nicotine dependency. The COVID-19 epidemic has underlined even more these elements. Particularly among young adults, the discomfort linked with lockdowns "significantly affected mental health and substance use patterns," says Hernandez-Fuentes et al. (2024, p. 2). Lockdowns caused anxiety and despair to intensify; one study found that depressed symptoms among university students increased by 30%. These pressures have been linked to changes in smoking behavior: some young adults increased tobacco intake because of isolation and boredom, whilst others reduced usage when limited to smoke-free surroundings (Hernandez-fuentes et al., 2024). The continuous frequency of increased stress and mental health needs in the post-pandemic era suggests that young people may be especially vulnerable to nicotine dependency (Yang et al., 2024).

Given these challenges, a study relating personality, resilience, and stress to nicotine use is desperately needed. This ex-post facto study fills in a major void, especially in the Indian context, by examining how neuroticism, conscientiousness, resilience, and perceived stress predict nicotine dependence.

1.1 *Research Objective*

To investigate the combined impact on nicotine dependency levels of personality traits, resilience, and perceived stress in young adults.

1.2 *Research Question*

- To what extent do conscientiousness and neuroticism predict nicotine dependency?

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- How are resilience, perceived stress, and nicotine dependency related?
- Do personality traits and resilience combine to lessen the consequences of stress on nicotine dependence?

2. Methodology

2.1 *Design*

Using an ex post facto correlational strategy, this study investigated naturally occurring individual variations free from experimental control. Following past observational studies, this non-experimental, cross-sectional study evaluated participants' current nicotine dependence levels and predictor variables (gender, personality, resilience, stress) to look at their associations.

2.2 *Participants*

Recruited by convenience selection from colleges and universities, two hundred fifty young people (ages ranging from 18 to 24, M ≈ 21 years, SD = 2; 51% female). Emails with announcements and a safe Google Forms link were used for recruitment. Participation was anonymous and voluntary; each person gave informed permission. For regression analysis, the last sample (N = 250) exceeded the accepted criteria of 10–20 cases per predictor (≥200 cases), so guaranteeing enough power for the planned research.

2.3 *Measures*

Nicotine Dependence: Nicotine dependence was assessed using the Fagerström Test for Nicotine Dependence (FTND). The FTND is a six-item questionnaire (e.g., time to first cigarette, cigarettes per day), yielding a total score from 0 (low dependence) to 10 (high dependence). Higher scores indicate greater nicotine dependence. Prior research has demonstrated that the FTND has good reliability (e.g., Pomerleau et al., 1994 found the FTND to be highly reliable).

Personality – Conscientiousness and Neuroticism. Personality traits were measured using a brief 10-item Big Five inventory (TIPI) (Gosling et al., 2003). This inventory includes two-item subscales for each Big Five dimension. In this study, the two items for Conscientiousness (e.g., “dependable, self-disciplined”) and the two items for Neuroticism (emotional instability; reverse-coded for neuroticism) were summed to form CON_SUM and NUE_SUM, respectively. Each subscale ranges from 2 to 14 (higher scores = higher trait level). While brevity limits internal consistency, the TIPI has been widely used in research and provides a quick assessment of each trait.

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Resilience: Resilience was measured with the Brief Resilience Scale (BRS) (Smith et al., 2008). The BRS consists of 6 items assessing the ability to "bounce back" from stress (e.g., "I tend to bounce back quickly after hard times"), rated on a 5-point scale. Scores were summed (range 6–30), with higher BRS_SUM indicating greater resilience. The BRS is unidimensional and reliable (Smith et al. found it to be "reliable" and valid for assessing bounce-back ability).

Perceived Stress: Perceived stress was assessed using the 10-item Perceived Stress Scale (PSS-10) (Cohen & Williamson, 1988). Respondents rated how often they felt or thought a certain way (e.g., "In the last month, how often have you felt nervous and stressed?") on a 5-point scale (0 = never to 4 = very often). The 10 items were summed to produce PSS_SUM (range 0–40), with higher scores indicating greater perceived stress. The PSS-10 is widely used and demonstrates good reliability (e.g., reported Cronbach's $\alpha \approx = .72$ in diverse samples.

Variables and Coding

In analyses, Gender (GEN) was coded as 0 = male and 1 = female. The continuous predictors were BRS_SUM, PSS_SUM, CON_SUM, and NUE_SUM. For the two-way ANOVA, each of CON_SUM and NUE_SUM was dichotomized at the sample median to form the Conscientiousness Group (Consc_Group: 0 = low, 1 = high) and the Neuroticism Group (Neuro_Group: 0 = low, 1 = high). The dependent variable was FTND_SUM (nicotine dependence score).

2.4 *Data Analysis*

Before hypothesis testing, data were screened for accuracy and missing values. Univariate outliers ($z > |3|$) were checked, but none required exclusion. The distributions of all continuous variables were examined: skewness values ranged from about –0.15 to +0.19, and kurtosis from –0.36 to +0.09. These fell well within acceptable bounds ($|skewness| < 2$, $|kurtosis| < 7$), suggesting approximate normality for each measure. Levene's test was conducted for each independent-samples t-test to evaluate homogeneity of variance; for example, Levene's $F(1,248) = 0.04$, $p = .849$ for gender differences in FTND, indicating equal variances. Multicollinearity among predictors was assessed via tolerance and Variance Inflation Factor (VIF). All tolerance values exceeded .99, and all VIF values were ≈1.00 (well below 5), indicating negligible collinearity.

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3. Results

Descriptive statistics (means, standard deviations, skewness, kurtosis) were computed for all variables. Inferential analyses included (a) independent-samples t-tests (e.g., comparing FTND_SUM by gender), (b) a 2×2 ANOVA testing main effects and interaction of Consc_Group and Neuro_Group on FTND_SUM, and (c) a multiple linear regression predicting FTND_SUM from GEN, BRS_SUM, PSS_SUM, CON_SUM, and NUE_SUM. Alpha was set at .05 for significance. All analyses were performed in SPSS 26.0 (IBM).

Descriptive Statistics

Descriptive statistics for the study variables are provided in Table 1. The mean score for nicotine dependence, as measured by the FTND_SUM, was 3.96 (SD = 1.94), indicating a moderate level of nicotine dependence in the sample. The mean resilience score (BRS_SUM) was 19.66 (SD = 3.82), while the mean score for perceived stress (PSS_SUM) was 19.16 (SD = 6.24). Conscientiousness, measured by the BFI-10 (CON_SUM), had a mean of 9.90 (SD = 1.89), and neuroticism (NUE_SUM) had a mean of 8.34 (SD = 2.60). Skewness and kurtosis values for all variables were within acceptable ranges for normality (|skewness| < .20, |kurtosis| < .40).

Table 1: *Means, Standard Deviations, Skewness, and Kurtosis for Study Variables (N = 250)*

Variable	M	SD	Skewness	Kurtosis
FTND (Nicotine Dependence)	3.96	1.94	0.11	–0.13
BRS (Resilience)	19.66	3.82	–0.11	0.09
PSS (Perceived Stress)	19.16	6.24	–0.15	0.03
Conscientiousness (BFI-10)	9.90	1.89	0.19	–0.36
Neuroticism (BFI-10)	8.34	2.60	0.01	–0.35

Note. FTND = Fagerström Test for Nicotine Dependence; BRS = Brief Resilience Scale; PSS = Perceived Stress Scale; BFI-10 = Big Five Inventory-10. Skewness and kurtosis values between -1 and +1 suggest acceptable normality.

Independent Samples t-Test: Gender Differences

An independent-samples t-test was conducted to compare nicotine dependence (FTND_SUM) between males and females (see Table 2). Levene's test confirmed equal variances ($F(1,248) = 0.04$, $p = .849$). Males had a significantly higher mean FTND_SUM (M = 4.43, SD = 1.98) than females (M = 3.51, SD = 1.80). This difference was statistically

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significant, t(248) = 3.85, p < .001, indicating higher nicotine dependence among men. The effect size was moderate (Cohen's d = 0.49). These results are summarized in Table 2.

Table 2: *Independent Samples t-Test for Gender Differences in Nicotine Dependence*

Gender	n	M	SD
Female	128	3.51	1.80
Male	122	4.43	1.98

t(248) = 3.85, p < .001; Cohen's d = 0.49.

Two-Way ANOVA: Neuroticism × Conscientiousness

A two-way ANOVA examined the effects of neuroticism group (low vs. high) and conscientiousness group (low vs. high) on FTND_SUM. Mean FTND_SUM was higher in the high-neuroticism group (M ≈ 4.26) than in the low-neuroticism group (M ≈ 3.65), and lower in the high-conscientiousness group (M ≈ 3.53) than in the low-conscientiousness group (M ≈ 4.38). The ANOVA revealed significant main effects for both factors (Table 3). Specifically, the main effect of Neuro_Group was significant, F(1,246) = 9.40, p = .002, η_p^2 = .037, reflecting greater nicotine dependence in the high-neuroticism group. The main effect of conscientiousness Group was also significant, F(1,246) = 20.28, p < .001, η_p^2 = .076, indicating lower dependence in the high-conscientiousness group. The interaction between Neuro_Group and Consc_Group was not significant, F (1,246) = 1.13, p = .289, η_p^2 = .005, suggesting the effects of neuroticism and conscientiousness on FTND_SUM were additive rather than interactive. Table 3 reports the ANOVA summary.

Table 3: *Two-Way ANOVA on Nicotine Dependence by Neuroticism and Conscientiousness Groups*

Source	SS	df	MS	F	p	η_p^2
Neuroticism (Neuro_Group)	29.58	1	29.58	9.40	.002	.037
Conscientiousness (Consc_Group)	63.85	1	63.85	20.28	<.001	.076
Neuro×Consc interaction	3.55	1	3.55	1.13	.289	.005
Error	774.32	246	3.15			

η_p^2 = partial eta squared.

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Multiple Regression: Predicting Nicotine Dependence

A simultaneous multiple regression was performed to predict FTND_SUM from gender (GEN), resilience (BRS_SUM), stress (PSS_SUM), conscientiousness (CON_SUM), and neuroticism (NUE_SUM). The overall model was significant, $F(5,244) = 113.10$, $p < .001$, with an R^2 of .699 (adjusted $R^2 = .692$), indicating that the predictors jointly explained about 69.9% of the variance in nicotine dependence.

Regression coefficients are shown in Table 4. Gender was a significant predictor: B = –1.01, SE = 0.14, t = –7.44, $p < .001$. Since gender was coded 0 = male, 1 = female, the negative coefficient indicates that females scored about 1 point lower on FTND_SUM than males, controlling for other variables (standardized $\beta = –.262$). Resilience (BRS_SUM) also had a negative association with nicotine dependence: B = –0.17, SE = 0.018, t = –9.34, $p < .001$ ($\beta = –.330$), meaning higher resilience predicted lower FTND_SUM. Conversely, Perceived Stress (PSS_SUM) was positively related: B = 0.20, SE = 0.011, t = 17.78, $p < .001$ ($\beta = .627$), indicating that greater stress was associated with higher dependence. Conscientiousness (CON_SUM) was a significant negative predictor: B = –0.22, SE = 0.036, t = –6.15, $p < .001$ ($\beta = –.216$), and Neuroticism (NUE_SUM) was a significant positive predictor: B = 0.19, SE = 0.026, t = 7.33, $p < .001$ ($\beta = .259$). All predictors remained significant in the model. Collinearity diagnostics showed tolerance > .99 and VIF ≈ 1.00 for each predictor, indicating no multicollinearity issues.

Table 4: *Regression Analysis Predicting Nicotine Dependence (FTND_SUM)*

Predictor	B	SE	β	t	p	VIF
(Constant)	4.62	0.59	–	7.81	<.001	–
Gender	–1.01	0.136	–0.262	–7.44	<.001	1.00
BRS_SUM	–0.17	0.018	–0.330	–9.34	<.001	1.01
PSS_SUM	0.20	0.011	0.627	17.78	<.001	1.01
CON_SUM	–0.22	0.036	–0.216	–6.15	<.001	1.00
NUE_SUM	0.19	0.026	0.259	7.33	<.001	1.01

Note. $R^2 = .699$, Adjusted $R^2 = .692$, $F(5,244) = 113.10$, $p < .001$. VIF = variance inflation factor.

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4. Discussion

Hypothesis 1: The Relationship Between Neuroticism, Stress, Resilience, Conscientiousness, and Nicotine Dependence

The findings largely support the first hypothesis, which proposed that neuroticism and stress would have a positive correlation with smoking, while resilience and conscientiousness would show a negative correlation. In line with this, higher levels of neuroticism and stress were associated with greater nicotine dependence, while higher resilience and conscientiousness were linked to lower nicotine dependence. Specifically, higher perceived stress (β = .627) and neuroticism (β = .259) were both positive predictors of nicotine dependence, while higher resilience (β = –.330) and conscientiousness (β = –.216) were negative predictors, confirming the expected relationships.

Hypothesis 2: Differences in Nicotine Dependence Between High and Low Neuroticism

The second hypothesis predicted that participants with high neuroticism would exhibit significantly higher nicotine dependence than those with low neuroticism. This hypothesis was supported by the two-way ANOVA, which revealed that participants in the high-neuroticism group exhibited significantly higher nicotine dependence (M ≈ 4.26) than those in the low-neuroticism group (M ≈ 3.65). Additionally, the multiple regression analysis indicated that neuroticism was a significant positive predictor of nicotine dependence (β = .259), further confirming this relationship.

Hypothesis 3: Predictors of Nicotine Dependence

The third hypothesis predicted that high neuroticism and stress would positively predict nicotine dependence, while high resilience would negatively predict nicotine dependence. The regression analysis confirmed this hypothesis, as stress (β = .627) and neuroticism (β = .259) were significant positive predictors of nicotine dependence, while resilience (β = –.330) was a significant negative predictor. These findings suggest that individuals with higher levels of neuroticism and stress are more likely to exhibit higher nicotine dependence, while those with higher resilience are less likely to do so.

5. Interpretation and Implications

Resilience emerged as a significant protective factor: individuals with greater capacity to rebound from stress reported lower FTND_SUM scores (β = –.330, $p < .001$), indicating

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resilience-building programs (e.g., mindfulness training, stress inoculation) may reduce smoking initiation and maintenance among young adults (Smith et al., 2008) Conversely, perceived stress was the strongest positive predictor of nicotine dependence ($\beta = .627$, $p < .001$), suggesting that stress-management interventions—such as brief web-based coping skills modules—could meaningfully lower smoking rates in this demographic (Rigotti, 2009) Conscientiousness also conferred protection ($\beta = –.216$, $p < .001$), consistent with evidence that high self-regulation deters engagement in health-risk behaviors like smoking (Terracciano & Costa, 2004) The gender disparity, with males exhibiting greater dependence, may reflect targeted marketing strategies and sociocultural norms that normalize smoking among young men; accordingly, gender-tailored messaging could enhance cessation outreach (Perkins et al., 2010)

This pattern of findings aligns with prior meta-analyses: low conscientiousness robustly predicts heightened tobacco use (Bogg & Roberts, 2004), whereas neuroticism's influence is more nuanced, often linked to relapse more than initiation (Terracciano et al., 2008). Our study extends the literature by demonstrating the additive and independent roles of resilience and stress in nicotine dependence—an interplay echoed in qualitative reports where stress coping and "bounce-back" capacity jointly determine smoking trajectories (Cheung et al., 2022). Furthermore, mobile and web-based cessation programs have proven beneficial for young adults (SMS and app-based), supporting the deployment of resilience-enhancing digital interventions (Abroms et al., 2017).

6. Conclusion

This study underscores the complex interplay between personality traits, resilience, and stress in predicting nicotine dependence among young adults. The results confirm the hypothesized positive correlation between neuroticism and perceived stress with nicotine dependence, and the negative correlation between resilience and conscientiousness with nicotine dependence. These findings suggest that resilience-building interventions and stress management programs may play a crucial role in reducing nicotine dependence, particularly in vulnerable populations. Moreover, the study provides insight into the psychological mechanisms that contribute to smoking behavior, emphasizing the need for targeted, personality-based interventions. Future research should consider longitudinal designs to explore causal

relationships and further investigate the impact of resilience-enhancing strategies on smoking cessation.

6.1 *Limitations*

First, the cross-sectional, ex post facto design precludes causal inference; longitudinal studies are needed to clarify temporal dynamics among stress, resilience, and smoking (Goriounova & Mansvelder, 2012) Second, reliance on self-report measures may introduce social-desirability bias, particularly in reporting sensitive behaviors like smoking (Cohen et al., 1983) Third, the use of convenience sampling from college populations limits generalizability to non-student or socioeconomically diverse young adults. Fourth, the brief personality inventory (10-item TIPI) may lack the internal consistency of longer measures, potentially attenuating trait–behavior associations (Rammstedt & John, 2007) Finally, unmeasured variables (peer influence, comorbid mental health conditions) could confound observed relationships.

6.2 *Future Research*

Prospective longitudinal designs should assess how resilience and stress trajectories predict smoking onset and cessation in young adulthood (Rigotti, 2009) Experimental trials of resilience-building interventions (e.g., smartphone apps delivering just-in-time coping prompts) are warranted to evaluate causal effects on nicotine dependence (Heffner et al., 2016) Person-centered approaches (e.g., latent profile analysis) could delineate subgroups with distinct risk/protective profiles for more tailored interventions (Lim & Yoon, 2025) Finally, exploration of policy levers—including tobacco taxation, age-of-sale restrictions, and campus smoke-free initiatives—may elucidate how structural factors interact with individual traits to influence smoking among emerging adults (WHO EMRO, 2023).

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