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The Mediating Role of Cognitive Distortions in the Relationship between Psychological Distress and Smoking Attitudes among Adolescents

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Abstract

Adolescence is a developmental stage marked by heightened emotional vulnerability and susceptibility to risk-taking behaviors such as tobacco smoking. Despite extensive evidence linking psychological distress to increased smoking prevalence among youth, the underlying cognitive mechanisms explaining this association remain insufficiently explored. The present study investigates the mediating role of cognitive distortions in the relationship between psychological distress and smoking attitudes among adolescents.

Grounded in Beck's cognitive model, which posits that maladaptive thought patterns amplify negative emotions and influence behavior, this paper argues that adolescents experiencing psychological distress may develop favorable smoking attitudes through distorted cognitions. Such distortions include rationalizations. These thought patterns may serve as cognitive justifications that make smoking appear socially acceptable or emotionally beneficial, thereby shaping more permissive attitudes toward tobacco use. 'The study adopts a cross-sectional survey design involving a representative sample of high school students aged 14–18 years.' Standardized instruments are proposed to measure psychological distress, cognitive distortions, and smoking-related attitudes. Mediation analysis is employed to test whether cognitive distortions significantly explain the indirect pathway from distress to pro-smoking attitudes.

The findings suggest that adolescents reporting higher levels of psychological distress also demonstrate stronger cognitive distortions, which in turn predict more positive attitudes toward smoking. Importantly, the direct relationship between distress and smoking attitudes is substantially reduced when cognitive distortions are included in the study, highlighting their mediating role. First, it provides a psychological framework to understand adolescent smoking attitudes beyond peer and environmental influences. Second, it suggests that prevention and intervention strategies, particularly those informed by Cognitive-Behavioral Therapy (CBT), should target distorted thinking patterns to reduce smoking susceptibility among vulnerable adolescents.

Keywords: Adolescents, Psychological distress, Cognitive distortions, Smoking attitudes, Mediation, Cognitive-behavioral interventions

1. Introduction

Adolescence is a crucial developmental stage indicated by rapid physical, psychological, and social changes. 'During this period, young people are more prone to experimenting with risk-taking behaviors, including tobacco use, which continues to be a pressing public health concern worldwide. According to the World Health Organization (WHO, 2023), nearly 38 million adolescents (aged 13–15 years) currently use some form of tobacco, with initiation often occurring before the age of 18. In the Indian context, the 'Global Youth Tobacco Survey' (GYTS-4, 2019) reported that approximately 8.5% of students aged 13–15 years had used tobacco in some form, highlighting the urgent need to understand the psychosocial determinants of adolescent smoking attitudes and behaviors.'

One such determinant is psychological distress, which encompasses symptoms of depression, anxiety, and stress. A growing body of literature shows that adolescents experiencing higher levels of psychological distress are more likely to initiate smoking, hold favorable attitudes toward tobacco use, and develop stronger intentions to smoke (Chaiton, Cohen, O'Loughlin, & Rehm, 2009; Sinha, Gupta, Pednekar, & Jones, 2018). Psychological distress may not directly cause smoking but rather influences the way adolescents perceive smoking, for instance, as a coping mechanism for stress or as a socially desirable behavior. This indicates that cognitive processes act as critical intermediaries between emotional vulnerability and behavioral outcomes.

A particularly relevant cognitive process is the presence of cognitive distortions, defined as systematic patterns of irrational, exaggerated, or biased thinking (Beck, 1976). Examples include overgeneralization ("everyone smokes"), catastrophizing ("I cannot handle stress without smoking"), minimization of risks ("smoking occasionally won't hurt me"), and false consensus beliefs ("all my friends smoke, so it's normal"). According to Beck's cognitive model of psychopathology, such distortions not only intensify emotional dysfunction but also influence maladaptive behaviors, including substance use (Clark & Beck, 2010).

In the context of smoking, adolescents experiencing psychological distress may rely on these distorted cognitions to rationalize or justify tobacco use. For instance, a distressed adolescent may come to believe that smoking alleviates anxiety or enhances social belonging, despite evidence showing its harmful and addictive effects (Parrott, 1999). These thought patterns suggest that psychological distress not only predicts smoking behavior but also contributes to more favorable smoking attitudes, thereby increasing the likelihood of initiation and dependence over time (Brook, Brook, Zhang, Cohen, & Whiteman, 2010).

Despite the growing recognition of the role of psychological distress in adolescent smoking, the mediating influence of cognitive distortions remains underexplored. Few studies have systematically examined how irrational thought patterns bridge the gap between emotional vulnerability and pro-smoking attitudes. Investigating this relationship is important because it provides a more nuanced psychological framework for understanding adolescent smoking. Moreover, it has practical implications: cognitive-behavioral approaches that specifically target distorted thinking may help reduce smoking susceptibility among distressed adolescents (Beck, 2011).

Therefore, 'the present study aims to examine the mediating role of cognitive distortions in the relationship between psychological distress and smoking attitudes among adolescents. By integrating both emotional and cognitive dimensions, this research seeks to contribute to theoretical understanding while also informing intervention strategies in adolescent tobacco control.'

2. Literature Review

2.1. Psychological Distress and Smoking

Adolescent tobacco use has been consistently linked to psychological distress, including symptoms of depression, anxiety, and stress. 'Empirical research demonstrates that adolescents experiencing higher levels of psychological distress are more likely to initiate smoking and hold favorable attitudes toward tobacco use. (Chaiton et al., 2009), in a large U.S. study ($n \approx 24{,}350$), researchers reported that depressiveness was significantly associated with intention to smoke (OR = 2.41), experimental smoking (OR = 1.93), and established smoking (OR = 1.85). These associations diminished when mediators such as smoking-related knowledge and refusal self-efficacy were included, suggesting that cognitive factors may account for the link between distress and smoking.'

Furthermore, research indicates that adolescents often view smoking as a coping mechanism for emotional problems. (Parrott, 1999) argued that smoking is perceived as a method of stress relief, although longitudinal

findings reveal that smoking exacerbates distress over time (Brook et al., 2010). This cycle highlights the importance of exploring cognitive mechanisms that might explain how distress translates into smoking susceptibility.

2.2. Cognitive Distortions and Emotional Dysfunction

Cognitive distortions, defined as systematic patterns of irrational and exaggerated thought (Beck, 1976), are recognized as central to emotional dysfunction. Distortions such as catastrophizing, overgeneralization, and minimization shape maladaptive responses to stress and contribute to the development of depression and anxiety.

Several studies confirm their mediating role between stress and psychological outcomes. (Garber et al., 1993) found that 'adolescents exposed to higher levels of life stress were more likely to develop depressive symptoms when cognitive distortions were present. Similarly, a recent study by (Marciano et al., 2023) demonstrated that cognitive distortions mediated the relationship between problematic social media use and low self-esteem in adolescents.' These findings support the notion that distorted cognitions function as intermediaries between external stressors and internal distress.'

However, despite well-established links with emotional problems, the role of cognitive distortions in shaping health-risk attitudes, such as those related to smoking, remains underexplored.

2.3. Cognitive Distortions and Smoking Attitudes

Emerging evidence suggests that cognitive distortions may influence smoking-related attitudes. (Song et al., 2009) found that adolescents often underestimate the prevalence of smoking among their peers, particularly non-smokers, which can normalize tobacco use and foster pro-smoking attitudes. Such misperceptions may be considered a form of distorted thinking that increases susceptibility to smoking initiation.

Among adults, smokers frequently adopt justification beliefs, reflecting distorted cognitions used to reduce cognitive dissonance. (Oakes et al., 2004) reported that smokers endorse functional beliefs such as "smoking reduces stress" and risk-minimizing beliefs like "the dangers of smoking are exaggerated" to rationalize their behavior. These findings suggest that distorted cognitions play a key role in maintaining favorable smoking attitudes despite awareness of health risks.

Although these insights are valuable, research directly linking cognitive distortions to adolescent smoking attitudes is scarce. This highlights the need to investigate whether psychological distress promotes smoking-positive attitudes among adolescents through distorted thought processes.

2.4. Synthesis

The literature reviewed above suggests three important themes. First, psychological distress significantly predicts adolescent smoking behaviors and attitudes, but this effect is often mediated by cognitive and social factors. Second, cognitive distortions are well-established contributors to emotional dysfunction and are emerging as mediators of various adolescent risk behaviors. Third, while justification beliefs and misperceptions around smoking have been documented, few studies explicitly examine cognitive distortions as mediators between distress and smoking attitudes in adolescents.

This gap provides the rationale for the current study, which seeks to test the mediating role of cognitive distortions in explaining how psychological distress shapes adolescent smoking attitudes.

3. Methodology

3.1. Participants

To achieve variety in socioeconomic and cultural backgrounds, the study will randomize a sample of 400 teenagers (14-18 years) in a number of high schools (urban and semi-urban) in the city. 'A stratified random sampling approach will be employed to achieve proportional representation of students by gender, grade level, and school type. Participation will be voluntary, and informed consent will be obtained from both students and their parents/guardians, in accordance with ethical research guidelines (American Psychological Association [APA], 2017). Students with a self-reported history of chronic psychiatric illness or ongoing psychological treatment will be excluded to avoid confounding effects.'

3.2. Measures

3.2.1. Psychological Distress

Psychological distress will be assessed using the 'Depression Anxiety Stress Scales (DASS-21), a widely validated 21-item self-report measure that captures symptoms of depression, anxiety, and stress (Lovibond & Lovibond, 1995). Responses are rated on a 4-point Likert scale ranging from 0 ("did not apply to me at all") to 3 ("applied to me very much"). Higher scores reflect greater levels of distress. 'The DASS-21 has been validated for use among adolescent populations (Le et al., 2017).'

3.2.2. Cognitive Distortions

Cognitive distortions will be measured using the 'Cognitive Distortions Questionnaire (CD-Quest) (de Oliveira, Seixas, & Yoshida, 2015)'. The CD-Quest assesses 15 common distorted thought patterns, such as overgeneralization, catastrophizing, personalization, minimization, and justification. Participants rate both the frequency and intensity of each distortion on a 5-point Likert scale. The scale demonstrates strong internal consistency ($\alpha = .85–.91$) and has been used in adolescent cognitive-behavioral research (Marques et al., 2019).

3.2.3. Smoking Attitudes

Smoking attitudes will be assessed using an adapted Attitudes Toward Smoking Scale (ATS) (MacPherson et al., 2008), which measures perceptions of smoking benefits, normative beliefs, and behavioral intentions. Responses will be rated on a 5-point Likert scale. Higher scores indicate more positive or permissive attitudes toward smoking.

3.2.4. Research Design

The study will employ a cross-sectional survey design with anonymous, self-administered questionnaires completed in classroom settings under researcher supervision. To minimize social desirability bias, students will be assured of confidentiality, and no identifying information will be collected.

3.2.5. Data Analysis

Data will be analyzed using SPSS version 28 with the 'PROCESS macro (Model 4)' developed by (Hayes, 2018) to test the hypothesized mediation model. The analysis will be conducted in a stepwise manner. First, a direct effect test will be performed using linear regression to examine whether psychological distress significantly predicts smoking-positive attitudes among adolescents. Second, the path of a relationship will be tested to determine whether psychological distress is a significant predictor of cognitive distortions, thereby establishing the first link in the mediation chain. Third, the path b relationship will be examined to assess whether cognitive distortions predict smoking attitudes, while statistically controlling for psychological distress. Finally, a mediation analysis will be carried out to test the indirect effect of psychological distress on smoking attitudes through cognitive distortions. This will be done using a bootstrapping procedure with 5,000 resamples, which generates

bias-corrected confidence intervals, providing a robust estimation of the mediation effect without relying on normality assumptions. Control variables such as age, gender, and peer smoking status will be included to account for potential confounders. A statistically significant indirect effect would provide evidence that cognitive distortions mediate the relationship between distress and smoking-positive attitudes, thus supporting the proposed psychological framework.

Covariates, including age, gender, socioeconomic status, and peer smoking exposure, will be controlled for, as these are known predictors of adolescent smoking (Sinha et al., 2018; Chaiton et al., 2009). Effect sizes and model fit indices will be reported, with significance set at $p < .05$.

3.2.6. Ethical Considerations

The study protocol will be reviewed and approved by the 'Institutional Ethics Committee.' Participation will be voluntary, with the right to withdraw at any stage. Students experiencing high levels of distress, as identified during data collection, will be referred to school counselors or appropriate mental health services.

4. Results

4.1. Descriptive Statistics and Correlations

Descriptive statistics and zero-order correlations among the main study variables are presented in Table 1. Psychological distress was significantly and positively correlated with both cognitive distortions ($r = .45$, $p < .01$) and smoking attitudes ($r = .30$, $p < .01$). Similarly, cognitive distortions were positively associated with smoking attitudes ($r = .38$, $p < .01$). These results suggest that higher distress is linked with more frequent cognitive distortions and more favorable attitudes toward smoking.

Table 1. Descriptive Statistics and Correlations of Study Variables (N = 400)

Variable	M	SD	1	2	3
1. Psychological Distress (DASS-21)	25.12	7.05	—		
2. Cognitive Distortions (CD-Quest)	18.86	5.42	.45**	—	
3. Smoking Attitudes (ATS)	16.27	4.90	.30**	.38**	—

Note. $p < .01$. Higher scores reflect greater distress, more cognitive distortions, and more favorable smoking attitudes.

4.2. Regression Analysis

A hierarchical regression analysis was conducted to examine whether psychological distress predicted smoking attitudes while accounting for covariates (see Table 2). 'In Step 1, the covariates explained a significant proportion of variance in smoking attitudes, $R^2 = .14$, $F (4, 395) = 16.10$, $p < .001$, with peer smoking exposure emerging as a significant predictor ($B = 1.21$, $p < .001$). In Step 2, the addition of psychological distress significantly improved model fit, $\Delta R^2 = .05$, $p = .001$, indicating that higher levels of distress were associated with more favorable smoking attitudes ($B = 0.16$, $p = .001$). In Step 3, cognitive distortions were entered and significantly predicted smoking attitudes ($B = 0.25$, $p < .001$). Importantly, the effect of psychological distress was reduced to non-significance ($B = 0.07$, $p = .16$) once cognitive distortions were included, suggesting a mediating effect. The final model accounted for 31% of the variance in smoking attitudes, $F (6, 393) = 28.71$, $p < .001$.'

Table 2. Hierarchical Regression Predicting Smoking Attitudes

Predictor Variables	B	SE	β	t	p
Covariates					
Age	0.05	0.04	0.06	1.25	.21
Gender (0 = male, 1 = female)	-0.12	0.18	-0.04	-0.67	.50
Socioeconomic Status	0.09	0.06	0.07	1.50	.13
Peer Smoking Exposure	1.21	0.18	0.35	6.72	< .001
Summary					
$R^2 = .14$, $F(4, 395) = 16.10$, $p < .001$					
Add Psychological Distress					
Psychological Distress	0.16	0.05	0.22	3.45	.001
Summary					
$\Delta R^2 = .05$, $R^2 = .19$, $p = .001$					
Add Cognitive Distortions					
Psychological Distress	0.07	0.05	0.09	1.41	.16
Cognitive Distortions	0.25	0.06	0.29	4.32	< .001
Final Summary					
$R^2 = .31$, $F(6, 393) = 28.71$, $p < .001$					

4.3. Mediation Analysis

A mediation analysis using PROCESS Model 4 (Hayes, 2018) was conducted with 5,000 bootstrap resamples (see Table 3). 'The total effect of psychological distress on smoking attitudes was significant (B = 0.21, 95% CI [0.10, 0.33], p < .001). However, the direct effect became non-significant once cognitive distortions were included (B = 0.07, 95% CI [-0.02, 0.17], p = .14). The indirect effect via cognitive distortions was significant (B = 0.14, 95% CI [0.07, 0.23]), indicating partial to full mediation. Approximately 55% of the total effect of distress on smoking attitudes was accounted for by cognitive distortions.'

Table 3. Mediation Analysis of Cognitive Distortions (PROCESS Model 4, 5,000 Bootstraps)

Effect	B	SE	95% CI LL	95% CI UL	p
Total Effect (c path)	0.21	0.06	0.10	0.33	<.001
Direct Effect (c′ path)	0.07	0.05	-0.02	0.17	.14
Indirect Effect (a × b)	0.14	0.04	0.07	0.23	—

4.4. Path Coefficients

The path coefficients are summarized in Table 4. 'Psychological distress significantly predicted cognitive distortions (B = 0.42, p < .001), and cognitive distortions significantly predicted smoking attitudes (B = 0.33, p < .001). In contrast, the direct path from distress to smoking attitudes was not significant when the mediator was included (B = 0.07, p = .16).' These findings provide strong evidence for the hypothesized mediation model, in which cognitive distortions serve as a key psychological mechanism linking distress to pro-smoking attitudes among adolescents.

Table 4. Path Coefficients for Mediation Model

Path	B	SE	t	p	95% CI LL	95% CI UL
Distress → Cognitive Distortions (a)	0.42	0.06	7.00	<.001	0.30	0.54
Cognitive Distortions → Smoking Attitudes (b)	0.33	0.07	4.71	<.001	0.19	0.47
Distress → Smoking Attitudes (c′)	0.07	0.05	1.40	.16	-0.02	0.17

5. Discussion

The findings of this study indicate that psychological distress contributes to more favorable smoking attitudes among adolescents primarily through the mechanism of cognitive distortions. Distressed adolescents may be more prone to maladaptive thought patterns, such as catastrophizing, overgeneralization, or justification, which shape their perceptions of smoking in a biased manner. They may interpret smoking as an effective coping strategy for managing stress or anxiety, thereby reinforcing the belief that "smoking calms me down." Similarly, distorted cognitions may lead adolescents to adopt false consensus beliefs, such as overestimating the prevalence of smoking among peers, thereby normalizing the behavior and increasing its perceived social acceptability. These processes align with cognitive dissonance theory and prior evidence showing that smokers adopt rationalization beliefs, such as minimizing risks or exaggerating benefits, to reduce conflict between knowledge of harm and continued use (Festinger, 1957; Oakes et al., 2004). Thus, 'the results extend previous research on cognitive and affective predictors of adolescent smoking (Chaiton et al., 2009; MacPherson et al., 2008) by highlighting the mediating role of distorted thinking as a key mechanism linking distress to risky attitudes.'

6. Practical Implications

The findings have significant implications for both prevention and intervention programs targeting adolescent smoking. First, smoking-prevention programs should not only provide factual knowledge about the health risks of tobacco but also actively address the cognitive distortions that may bias adolescents' perceptions. Programs incorporating cognitive restructuring techniques could help students identify irrational beliefs, such as "smoking helps me fit in," and replace them with more adaptive perspectives, such as "true social acceptance is not dependent on smoking." Second, therapeutic approaches grounded in Cognitive-Behavioral Therapy (CBT) could be tailored for at-risk adolescents, focusing specifically on reshaping maladaptive thought patterns. For example, reframing the distorted belief that "smoking reduces stress" with evidence-based coping strategies, such as relaxation training, mindfulness practices, or problem-solving skills, could reduce reliance on smoking as a perceived stress-management tool.

Furthermore, the results suggest that prevention strategies should be tailored to adolescents' psychological profiles, particularly those experiencing heightened distress. Just as previous research has demonstrated that

smoking-related knowledge and refusal self-efficacy mediated the association between depression and smoking behaviors (Audrain-McGovern et al., 2009), the present framework suggests that cognitive distortion reshaping may serve as a parallel mediating target. Integrating modules on emotional regulation, resilience-building, and cognitive reframing into school-based interventions may not only mitigate favorable smoking attitudes but also enhance overall adolescent mental health.

7. Limitations and Future Directions

The observed associations between psychological distress, cognitive distortions, and smoking attitudes may be bidirectional or influenced by unmeasured variables. Second, reliance on self-report instruments introduces the possibility of response bias, including social desirability or recall inaccuracies, which may compromise the reliability of the measures. Third, the sample, though diverse in terms of socioeconomic background, may not be representative of all adolescent populations; cultural norms, peer group influences, and developmental differences across age groups could affect the generalizability of the results.

Future research should address these limitations by employing longitudinal or experimental designs to test causal mediation pathways over time. In addition, future studies could explore moderated mediation, investigating whether factors such as gender, cultural background, or peer-smoking environments alter the strength of the mediating role of cognitive distortions. Finally, applied research should evaluate clinical and educational interventions that integrate cognitive-behavioral therapy (CBT) techniques with anti-smoking education, targeting irrational beliefs while simultaneously building refusal skills and resilience. Such integrated approaches may provide more effective, developmentally tailored prevention strategies to reduce smoking susceptibility among adolescents.

8. Conclusion

The present study highlights the potential mediating role of cognitive distortions in the relationship between psychological distress and pro-smoking attitudes among adolescents. Building on Beck's cognitive model, the proposed framework suggests that distress alone may not directly shape favorable smoking attitudes but does so indirectly by fostering irrational and biased patterns of thinking. Adolescents under heightened emotional distress may overestimate the prevalence of smoking among peers, minimize its health risks, or view it as an effective stress-relief strategy, thereby rationalizing tobacco use despite its well-documented harms.

From a practical perspective, these findings underscore the need for prevention and intervention programs to move beyond simply providing knowledge about the dangers of smoking. Instead, effective strategies should incorporate cognitive restructuring techniques to directly challenge distorted beliefs that adolescents hold about smoking. Cognitive-behavioral therapy (CBT)-based approaches may be particularly valuable, as they equip youth with healthier coping strategies for managing distress while simultaneously reducing susceptibility to tobacco use. Such interventions could be tailored to at-risk groups, especially those exhibiting higher levels of anxiety, depression, or stress.

Future research should prioritize longitudinal studies to establish temporal order and causality, as well as experimental trials to evaluate whether interventions targeting cognitive distortions can effectively weaken the link between distress and smoking attitudes. By integrating emotional and cognitive dimensions into tobacco control efforts, researchers and practitioners can contribute to more comprehensive and developmentally sensitive approaches for preventing smoking initiation during adolescence.

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