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Deviant Behavior in Young People After COVID-19: The Role of Sensation Seeking and Empathy in Determining Deviant Behavior

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Abstract

Background: The COVID-19 pandemic significantly impacted adolescent development, increasing behavioral problems and emotional distress. This study aimed to examine the impact of sensation seeking, empathy, and COVID-19-related stressors on deviant behavior in adolescents. Methods: A cross-sectional study was conducted with 638 Italian adolescents and young adults (M = 18.8 years, SD = 3.51) recruited from schools, universities, and the general population in Tuscany and Emilia-Romagna. Participants completed validated measures assessing sensation seeking, empathy, COVID-19-related stress, and deviant behaviors. Multiple regression analyses examined predictors of deviant behavior, while mediation analyses tested whether empathy mediated the relationship between sensation seeking and deviant behavior. Results: Correlation analyses show a positive association between sensation seeking and deviant behavior and a weaker positive association with COVID-19 isolation. Conversely, affective empathy demonstrated negative correlations with both deviant behavior and sensation seeking. COVID-19 stress demonstrated differentiated effects: social isolation increased deviance, whereas fear of contagion was protective. Mediation analysis revealed that affective empathy partially mediated the relationship between sensation seeking and deviance. Conclusions: This study demonstrates that sensation seeking is a primary risk factor for deviant behavior in adolescents and young adults, while affective empathy acts as a protective mechanism that partially mediates this relationship. Furthermore, COVID-19-related stressors have shown complex effects, with social isolation amplifying the risk of deviance, while fear of contagion promotes more inhibited behavior. These findings underscore the importance of considering both stable personality traits and situational stressors when seeking to understand the pathways leading to adolescent behavioral problems during periods of social crisis.

Keywords: adolescents; sensation seeking; deviant behavior; COVID-19 stress; empathy

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1. Introduction

1.1. Adolescent and Young Adult Deviance as a Complex Developmental Phenomenon

Adolescence and young adulthood are developmental stages marked by profound biological, psychological, and social changes, often accompanied by an increased propensity for risk-taking and rule-breaking behaviors [1]. Youth deviance has long been recognized as a multifaceted phenomenon, shaped by the interplay of individual vulnerabilities, family dynamics, peer influences, and broader sociocultural conditions [1,2]. While occasional engagement in norm-breaking activities may reflect normative experimentation, persistent or severe deviant behaviors are associated with negative outcomes such as school dropout, substance use, and later criminal involvement [3,4]. Contemporary perspectives emphasize the heterogeneity of adolescent and young adult deviance, distinguishing between transient forms linked to developmental processes and more stable patterns associated with enduring traits and environmental risk factors [5]. Moreover, the developmental imbalance between heightened socio-emotional reactivity and still-maturing cognitive control, as outlined in the so-called dual systems model, helps explain why adolescents are particularly vulnerable to impulsive and risky behavior [6]. Understanding youth deviance, therefore, requires an integrative approach that accounts for both dispositional traits and contextual stressors.

1.2. Psychosocial and Trait-Based Predictors in the Pandemic Context

The outbreak of COVID-19 and the ensuing public health restrictions profoundly altered the daily lives of adolescents and young adults. Extended school closures, reduced peer interaction, and heightened uncertainty generated considerable psychosocial strain [7]. Meta-analyses and longitudinal studies consistently show that adolescents and young adults experienced increased emotional distress during the pandemic [8,9]. Alongside these difficulties, evidence points to higher irritability, impulsive and aggressive behaviors, and early substance use, suggesting broader challenges in behavioral adjustment under prolonged stress [10–12]. Given the developmental salience of peer relationships and the pursuit of autonomy, adolescents and young adults proved especially sensitive to restrictions on social interaction [13]. Grounded in developmental theory, we anticipated that distinct components of pandemic-related stress could relate differentially to deviant behavior: specifically, social isolation and disrupted peer interactions were expected to heighten risk-taking by weakening opportunities for normative peer regulation, whereas health-related concerns (e.g., fear of contagion) were expected to foster rule compliance and precautionary conduct [6,13]. Recent findings further suggest that pandemic-related stressors not only amplified pre-existing vulnerabilities but also heightened risk-taking and deviant behaviors [14]. Taken together, these observations highlight that the consequences of COVID-19 extend beyond emotional well-being to encompass wider patterns of behavioral dysregulation [15,16]. At the same time, adolescence and young adulthood are periods during which stable dispositional traits such as sensation seeking and empathy strongly influence behavior. Sensation seeking is conceptualized as a biologically rooted personality trait characterized by the pursuit of varied, novel, and intense experiences, often involving risk [17,18]. Longitudinal and genetically informed studies confirm its relative stability: individuals show consistent levels across adolescence and young adulthood, and genetically influenced changes in sensation seeking predict parallel increases in delinquent behavior [19]. Recent evidence confirms that sensation seeking plays a central role in predicting adolescent delinquency, even when accounting for broader personality dimensions, and is particularly influential in normative and minor forms of deviance [20]. The interaction between high sensation seeking and deviant peer affiliations further heightens vulnerability to delinquency, reflecting a "person x environment" effect [21]. Consistently, empirical and meta-analytic evidence links elevated sensation seeking with a range of

deviant or risky behaviors, including substance use, reckless driving, and aggression [22]. Empathy, the capacity to understand and share others' emotions, is likewise regarded as a dispositional socio-emotional competence [23]. Meta-analytic evidence has long supported the view that higher empathy is associated with lower levels of aggression and antisocial conduct, a finding consistently replicated across methods and samples [24]. Although less frequently examined as a stable trait, empathy consistently emerges as protective against externalizing conduct: adolescents and young adults with higher empathy display more prosocial behaviors and lower tendencies toward aggression and rule-breaking [23,25].

Consistently, reviews indicate that the negative association between empathy and aggression becomes more pronounced during adolescence and young adulthood, suggesting that empathic deficits are particularly relevant for understanding deviant behavior in this developmental period [26]. Neuroimaging and behavioral evidence further suggest that adolescents with conduct problems often show specific impairments in affective empathy, which are linked to atypical reward and punishment processing and callous-unemotional traits [27]. During the initial COVID-19 lockdown, diary studies documented declines in empathic concern and prosocial opportunities, suggesting that environmental stressors may dampen its expression even if the underlying disposition remains stable [28]. Longitudinal findings also show that empathy can moderate the effects of environmental factors: adolescents high in empathy benefit more from parental support in reducing aggression and delinquency, whereas those low in empathy may be less responsive to such socialization efforts [29]. Moreover, studies highlight that secure peer attachment predicts fewer conduct problems and emotional difficulties, with empathy mediating these associations and underscoring its central role in adolescent socio-emotional adjustment [30]. Building on this evidence, it is plausible that empathy not only serves as a protective correlate of adolescent and young adult adjustment but also functions as a socio-emotional mechanism that helps explain how dispositional tendencies such as sensation seeking translate into deviant behaviors.

On one hand, the trait-based nature of sensation seeking and empathy underscores their broad relevance to adolescent and young adult behavior. Sensation seeking has repeatedly been identified as a driver of deviant and risk-taking behaviors, whereas empathy tends to act as a protective factor [19,25]. On the other hand, the direct interplay between these traits and pandemic-related stress remains largely unexplored: while COVID-19 stress has been associated with declines in empathic concern and increases in maladaptive behaviors, few studies have directly tested whether sensation-seeking adolescents were particularly affected or whether empathy buffered these outcomes [21,28].

1.3. Study Objectives

Building on this literature, the present study sought to examine the combined role of trait-level dispositions and pandemic-related stress in predicting adolescent and young adult deviant behaviors. While sensation seeking has consistently been identified as a risk factor and empathy as a protective factor in youth adjustment, few studies have explored their joint contribution in the context of the COVID-19 pandemic. Even less attention has been devoted to their interplay, particularly the potential mediating role of empathy in the association between sensation seeking and deviance. The originality of this work lies in integrating stable dispositional traits with a context-specific stressor to understand pathways to deviance during a period of global disruption. Unlike previous research that primarily emphasized emotional distress, this study focuses on behavioral outcomes, highlighting how pandemic-related stress may operate alongside, but not fully explain, the influence of enduring personality dispositions.

Accordingly, we formulated the following hypotheses:

1. Bivariate associations: Sensation seeking, empathy, and COVID-19 stress (with its relationships, social isolation, and fear of contagion components) were each expected to show significant bivariate associations with deviant behavior. Specifically, sensation seeking and social isolation were hypothesized to correlate positively with deviance, whereas empathy and fear of contagion were expected to correlate negatively.
2. Unique contribution of pandemic stress: When examined simultaneously with trait-level variables, COVID-19-related stress was hypothesized to account for additional variance in deviant behavior, underscoring the contextual impact of situational stressors beyond dispositional tendencies.
3. Mediating role of empathy: Empathy was expected to partially mediate the relationship between sensation seeking and deviant behavior, consistent with its function as a socio-emotional protective mechanism.

By testing these pathways in a large adolescent and young adult sample, the study aims to clarify how dispositional and situational factors converge to shape deviant behaviors, offering novel insights into developmental risk and resilience processes during an unprecedented global crisis.

2. Materials and Methods

2.1. Participants

638 adolescents and young adults (M = 18.8; SD = 3.51) took part in the study. Participants were recruited from schools, universities, and the general Italian population, particularly in Tuscany (Firenze, Grosseto, Siena) and Emilia-Romagna (Bologna, Cesena). The recruitment process took place in two distinct phases. First, several schools were randomly selected from the complete list of schools and universities located in the designated urban areas. Next, school principals and university course coordinators were contacted, and, together with the research team, the classes and groups to be included in the study were identified. Inclusion criteria included individuals aged between 14 and 26 who were high school students, university students, or members of the general population. Participation also required obtaining informed consent, with parental authorization for underage participants. Exclusion criteria included inadequate knowledge of the Italian language, or lack of informed consent (including parental authorization, where applicable).

2.2. Procedures

The surveys were conducted from April 2024 to March 2025 as part of a comprehensive research initiative that examined the psychological impact of the COVID-19 pandemic on adolescents and young adults (Project "Deviant behaviors and violence in young people after COVID-19: sign of the times or consequence of the pandemic?" funded by the national PRIN program: PROGETTI DI RICERCA DI RILEVANTE INTERESSE NAZIONALE – Bando 2022). The questionnaire was administered via an online platform, specifically Google Forms. To optimize consent procedures and participant engagement, the research team made in-person visits to the schools and classes involved in the project. Each participant was provided with a QR code to allow direct digital access to the questionnaire via personal or institutional electronic devices. Informed consent procedures varied depending on the participant's age and where they were recruited. For high school students, who were minors, we obtained parental consent before distributing the questionnaire. This was accomplished through signed authorization forms distributed by school administrators. For university students and adults from the general population, we collected informed consent digitally at the beginning of the questionnaire. Research staff were present onsite during data collection to supervise the procedure and answer any questions or concerns

participants may have had. Ethical approval was obtained from the CAREUS Ethics Committee (Comitato per la Ricerca Etica Nelle Scienze Umane e Sociali) of the University of Siena (Protocol No. 32/2024).

2.3. Measures

Prior to completing the psychological measures, participants completed a demographic questionnaire collecting information on age, gender identity, city of residence, family composition (living arrangement with parents), number of siblings, birth order, and socioeconomic status. Socioeconomic status was assessed through self-reported family income management on a 5-point scale ranging from "with great difficulty" to "very easily."

In this study, the following self-report instruments, which are part of a broader questionnaire, were administered. All measures were administered in a fixed order via Google Forms.

Empathy was assessed using the Basic Empathy Scale (BES) [31] validated in Italian by Albiero et al. [32], which measures the cognitive and affective components of empathy. Cognitive empathy refers to the ability to understand another person's emotions (e.g., "I can usually realise quickly when a friend is angry"), while the affective empathy subscale measures the emotional congruence with another person's emotions (e.g., "I get caught up in other people's feelings easily"). The scale consists of 20 items rated on a 5-point Likert scale, where 1 represents "strongly disagree" and 5 represents "strongly agree." The total score and the scores for the two subscales are calculated by adding up the items, with high scores indicating greater empathy. In the original study, the α for cognitive empathy was 0.79, while for affective empathy it was 0.85.

The Brief Sensation Seeking Scale (BSSS) [33] was used to measure sensation seeking, in particular four components: experience seeking, boredom susceptibility, thrill and adventure seeking, and disinhibition. The Italian version was validated by Primi et al. [34]. The scale consists of 8 items (e.g., "I like to do frightening things"), rated on a 5-point Likert scale, from 1 = strongly disagree to 5 = strongly agree. The total score is calculated through the sum of the items, with a maximum score of 40. The scale, both in the original and Italian versions, shows good internal consistency, with $\alpha = 0.76$ and $\alpha = 0.73$, respectively.

The COVID-19 Student Stress Questionnaire (CSSQ) [35] was used to assess stress factors related to the pandemic. The questionnaire consists of 7 items, rated on a 5-point Likert scale ranging from 0 ("Not at all") to 4 ("Extremely"). This tool assesses specific factors related to COVID-19, such as social isolation (e.g., "How do you perceive the condition of social isolation imposed during the period of COVID-19 pandemic?"), relationship difficulties with peers and teachers (e.g., "How do you perceive the relationships with your relatives during the period of COVID-19 pandemic?"), and specific fears related to the pandemic (e.g., "How do you perceive the risk of contagion during the period of COVID-19 pandemic?"). The total score ranges from 0 to 28, with higher scores indicating greater COVID-19-related stress. In the original study, the α ranged from 0.80 to 0.85.

Finally, the Deviant Behavior Variety Scale (DVBS) [36] was used to assess the deviant behavior of the study participants. The scale consists of 19 items corresponding to 19 different deviant behaviors, and participants were asked whether they had engaged in them in the past year (e.g., "During the last year, have you ever hit an adult (e.g., teacher, family, security guard, etc.)?"). Responses are on a dichotomous yes/no scale, and the total score is calculated from the sum of the yes responses, ranging from 0 to 19. The scale in its original version has demonstrated good internal consistency ($\alpha = 0.82$).

2.4. Statistical Analysis

Descriptive statistics were computed for all variables to characterize the sample and examine data distributions. For ordinal variables, median and interquartile range (IQR) were computed as the most appropriate measures of central tendency and dispersion for ordinal data. Spearman correlations were computed to examine the associations between empathy dimensions, sensation seeking, COVID-19 stress components, and deviant behavior outcomes. Subsequently, multiple linear regression analyses were conducted to assess the predictive capacity of empathy, sensation seeking, and COVID-19 stress variables on deviant behavior outcomes. The decision to use linear regression with ordinal predictors and outcome variables warrants methodological justification. While Likert-scale data are technically ordinal, they are frequently treated as continuous in psychological research when certain conditions are met. In the present study, this approach was deemed appropriate for several reasons. First, our sample size (N = 638) substantially exceeds the minimum requirements for stable parameter estimation in linear regression, providing adequate statistical power and reducing sensitivity to minor violations of assumptions. Second, all scales employed multi-point response formats (5-point Likert scales), which have been demonstrated to approximate interval-level properties with minimal bias in regression analyses [37,38]. Third, recent methodological work has shown that linear regression performs robustly with ordinal data when sample sizes are large and distributions are reasonably symmetric, conditions met in our dataset [37–39]. Rhemtulla et al. [37] demonstrated through extensive simulation that treating ordinal variables with five or more categories as continuous in regression models produces accurate parameter estimates and acceptable Type I error rates, particularly with samples exceeding 200 participants. Li [38] further confirmed that maximum likelihood estimation—the method underlying ordinary least squares regression—maintains adequate performance with ordinal data under similar conditions. Finally, our preliminary diagnostic checks confirmed that the assumptions necessary for valid inference (linearity of relationships, independence of observations, approximate normality of residuals, and homoscedasticity) were satisfactorily met in our data. Model assumptions were evaluated, including linearity of relationships, independence of observations, normality of residual distributions, and homoscedasticity of residual variance, before conducting regression analyses. To test the hypothesized mediation pathways, PROCESS Model 4 mediation analyses were performed using Hayes' macro to examine both direct and indirect effects of sensation seeking on deviant behavior through empathy components as potential mediators. Separate mediation models were estimated for cognitive empathy and affective empathy. Bootstrap procedures with 5000 resamples were employed to generate bias-corrected confidence intervals for indirect effects [40,41]. This approach is preferred over traditional methods (e.g., Sobel test) as it makes no assumptions about the shape of the sampling distribution of the indirect effect and provides more accurate Type I error rates and statistical power [42,43], enhancing the robustness of mediation estimates. Additional partial correlation analyses were conducted to control for COVID-19 stress variables when examining relationships between key study variables. Missing data were minimal: one participant (0.2%) did not provide information about siblings. All other demographic variables and all psychological measures were complete across all 638 participants. Given the negligible amount of missing data and that demographic variables were not included as predictors in our primary analyses, no imputation or case-wise deletion procedures were applied. All statistical analyses were conducted using SPSS version 29, with statistical significance set at $p < 0.05$ for all tests. A post hoc power analysis revealed that, with an effect size $f^2 = 0.228$, $\alpha = 0.05$, and N = 638, the statistical power of the multiple regression model was 99%, indicating excellent ability to detect the observed effects.

3. Results

3.1. Sample Characteristics

The final sample consisted of 638 adolescents and young adults (M = 18.82, SD = 3.51). Gender distribution was relatively balanced, with 304 participants identifying as female (47.6%), 319 as male (50.0%), 6 as non-binary (0.9%), 1 as other gender (0.2%) and 8 participants (1.3%) who preferred not to disclose their gender identity. Participants were recruited from multiple cities in Italy: 27.1% (N = 173) from Siena, 26.8% (N = 171) from Bologna, 21.8% (N = 139) from Florence, 18.0% (N = 115) from Cesena, and 6.3% (N = 40) from Grosseto. Regarding family composition, the majority of participants (87.5%, N = 558) reported living with both parents, while 46 participants (7.2%) lived with only one parent and 34 participants (5.3%) reported alternative family arrangements. Most participants had siblings (77.9%, N = 496), with 339 participants (53.2%) having one sibling and 157 participants (24.6%) having multiple siblings; 22.1% (N = 141) reported being an only child (one participant did not provide this information). Among those with available birth order data (N = 498), 214 participants (43.0%) were first-born children, while 284 (57.0%) were later-born. Socioeconomic status, measured through self-reported family income management, revealed a predominantly middle-class sample, with participants most frequently reporting managing "easily" (37.6%, N = 240) or "quite easily" (23.5%, N = 150), while only a small minority reported significant financial difficulties (4.5%, N = reporting "with difficulty" or "with great difficulty"). Regarding psychological measures, descriptive statistics for the ordinal scales showed the following distributions: deviant behavior (DBVS) had a median of 2.00 (IQR = 3.00), indicating relatively low levels of reported deviant behaviors in the sample. For empathy measures, cognitive empathy (BES_cog) showed a median of 36.00 (IQR = 7.00), affective empathy (BES_aff) had a median of 39.00 (IQR = 11.00), and total empathy (BES_tot) showed a median of 75.00 (IQR = 15.00). Sensation seeking (BSSS) had a median of 26.00 (IQR = 9.00). For COVID-19 stress components, relationships and school life difficulties (CSSQ_rel) had a median of 5.00 (IQR = 6.00), isolation (CSSQ_is) showed a median of 3.00 (IQR = 3.00), fear of contagion (CSSQ_fr) had a median of 1.00 (IQR = 1.00), and total COVID-19 stress (CSSQ_tot) had a median of 9.00 (IQR = 9.00).

3.2. Correlation Analysis

The correlation analysis revealed several significant associations among empathy (BES), sensation seeking (BSSS), COVID-19 stress (CSSQ), and deviant behavior variables (DBVS).

With regard to the empathy variable, the most significant correlations were found for the affective component (BES_aff). In particular, a negative correlation was observed with BSSS ($\rho = -0.16$, $p < 0.001$) and with DBVS ($\rho = -0.15$, $p < 0.001$). On the contrary, BES_aff correlates positively with all variables related to COVID-19, but in particular with the fear of contagion subscale ($\rho = 0.25$, $p < 0.001$). The cognitive component of empathy (BES_cog) showed a significant positive correlation with COVID-19 isolation ($\rho = 0.11$, $p < 0.001$) but no significant association with deviant behavior. Both COVID-19 isolation (CSSQ_is, $\rho = 0.12$, $p < 0.001$) and DVBS ($\rho = 0.41$, $p < 0.001$) show a positive correlation with the BSSS (Table 1). These findings indicate that affective empathy may serve as a protective factor against deviant behavior, while sensation seeking represents a risk factor. Furthermore, it appears that isolation during the pandemic may have acted as a catalyst for deviant behavior.

Table 1. Correlations between empathy, sensation seeking, COVID-19 stress factors, and deviant behavior.

	BSSS	CSSQ_rel	CSSQ_is	CSSQ_fr	CSSQ_tot	DBVS
BES_cog	0.05	0.08	0.11 **	0.07	0.11 **	–0.06
BES_aff	–0.15 **	0.19 **	0.14 **	0.25 **	0.22 **	–0.15**
BES_tot	–0.09	0.17 **	0.14 **	0.21 **	0.21 **	–0.14 **
BSSS	1	0.01	0.12 **	–0.10	0.04	0.41 **

Note. BES_cog = Basic Empathy Scale cognitive empathy; BES_ aff = Basic Empathy Scale affective subscale; BES_tot = total score of Basic Empathy Scale; BSSS = total score of Brief Sensation Seeking Scale; CSSQ_rel = COVID-19 Student Stress Questionnaire relationship and school life subscale; CSSQ_is = COVID-19 Student Stress Questionnaire isolation subscale; CSSQ_fr = COVID-19 Student Stress Questionnaire fear subscale; DBVS= total score of Deviant Behavior Variety Scale; ** $p < 0.001$

3.3. Regression Analysis

A multiple linear regression was conducted to examine the predictive relationships between sensation seeking (BSSS), affective empathy (BES_aff), COVID-19 stress components (CSSQ_is and CSSQ_fr), and self-reported deviant behavior (DBVS) (Table 2). Variables in the multiple regression model were selected based on their significant correlations with deviant behavior shown in the bivariate analysis (Table 1) and support from the literature for their predictive role. The overall model was statistically significant, $F(4, 633) = 36.053$, $p < 0.001$, accounting for 18.6% of the variance in deviant behavior (R^2; = 0.186, adjusted $R^2 = 0.180$). Sensation seeking emerged as the strongest predictor ($\beta = 0.317$, $t = 8.542$, $p < 0.001$), with higher levels associated with increased deviant behavior. Affective empathy demonstrated a significant negative relationship with deviant behavior ($\beta = -0.127$, $t = -3.397$, $p = 0.001$), confirming its protective role. Among the COVID-19 stress variables, isolation showed a positive association with deviant behavior ($\beta = 0.158$, $t = 3.908$, $p < 0.001$), while fear of contagion exhibited a negative relationship ($\beta = –0.159$, $t = –3.900$, $p < 0.001$).

Table 2. Multiple linear regression predicting deviant behavior.

	B	SE	β	*t*	*p*	95% CI Lower	95% CI Upper
Constant	1.266	0.71		1.77	0.07	–0.13	2.67
BSSS	0.14	0.01	0.31	8.54	<0.001	0.10	0.17
BES_aff	–0.47	0.01	–0.12	–3.39	<0.001	–0.07	–0.02
CSSQ_is	0.20	0.05	0.15	3.90	<0.001	0.10	0.30
CSSQ_fr	–0.38	0.09	–0.15	–3.90	<0.001	–0.57	–0.19

Note. BES_aff = Basic Empathy Scale affective subscale; BSSS = total score of Brief Sensation Seeking Scale; CSSQ_is = COVID-19 Student Stress Questionnaire isolation subscale; CSSQ_fr = COVID-19 Student Stress Questionnaire fear subscale.

These findings suggest that sensation seeking and pandemic-related isolation serve as risk factors for deviant behavior, while affective empathy and fear of contagion function as protective factors. The opposing effects of different COVID-19 stress dimensions highlight the complexity of pandemic impacts on behavioral outcomes, with health-related concerns potentially promoting prosocial compliance. At the same time, social isolation may increase vulnerability to antisocial conduct.

3.4. Mediation Model

To examine the mechanisms linking sensation seeking to deviant behavior, we tested a mediation model in which affective empathy (BES_aff) was included as a mediator (Table 3). A mediation analysis with cognitive empathy was not performed as it didn't

show a significant link to deviant behavior. The results showed that sensation seeking (BSSS) was significantly and negatively associated with affective empathy (β = –0.18, SE = 0.05, t = –3.90, p < 0.001, 95% CI [–0.27, –0.09]), suggesting that adolescents with higher tendencies toward novelty and stimulation reported lower levels of affective empathy. In turn, affective empathy was negatively related to deviant behavior (DBVS; β = –0.05, SE = 0.01, t = –3.77, p < 0.001, 95% CI [–0.08, –0.02]), indicating that reduced empathic concern predicted greater engagement in deviant conduct. Beyond this indirect pathway, sensation seeking exerted a strong and positive direct effect on deviant behavior (β = 0.16, SE = 0.02, t = 9.54, p < 0.001, 95% CI [0.12, 0.19]). The bootstrap analysis with 5000 samples confirmed the presence of a small but significant indirect effect through affective empathy (β = 0.009, SE = 0.004, 95% CI [0.003, 0.018]), supporting partial mediation. Taken together, these findings suggest that while sensation seeking directly increases adolescents' likelihood of engaging in deviant behaviors, affective empathy plays a modest yet significant role in shaping this association by acting as a protective socio-emotional mechanism (Figure 1).

Table 3. Mediation analysis of the effect of sensation seeking on deviant behavior through affective empathy.

Path	B	SE	*t*/z	*p*	95% CI
BSSS → BES_aff	–0.18	0.05	–3.9	<0.001	[–0.27, –0.09]
BES_aff → DVBS	–0.05	0.01	–3.77	<0.001	[–0.08, –0.02]
BSSS → DVBS (direct effect)	0.16	0.02	9.54	<0.001	[0.12, 0.19]
BSSS → BES_aff → DVBS (indirect effect)	0.009	0.004	2.25	0.025	[0.003, 0.018]

Note. B = unstandardized regression coefficient; SE = standard error; CI = confidence interval. Indirect effect tested with 5000 bootstrap samples

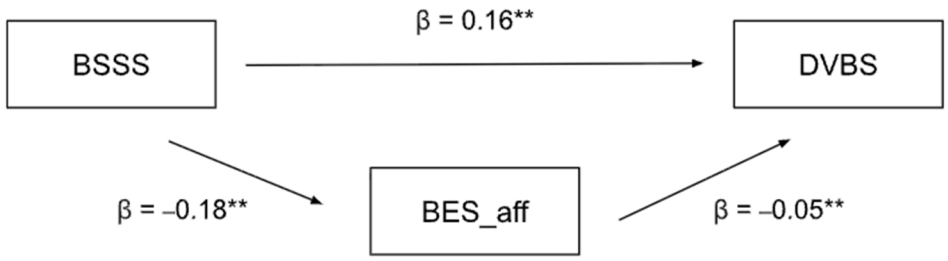

Figure 1. Path model. BSSS = Brief Sensation Seeking Scale; DVBS = Deviant Behavior Variety Scale; BES_ aff = Basic Empathy Scale affective subscale. ** p < 0.01.

3.5. Partial Correlation Analysis

To further examine the relationships between key variables while controlling for potential confounding effects, Spearman partial correlation analyses were conducted using residualized variables (Table 4). When controlling for COVID-19 isolation and fear of contagion, the relationship between sensation seeking (BSSS) and self-reported deviant behavior (DVBS) remained significant (ρ = 0.375, p < 0.001), indicating that the association between sensation seeking and deviant behavior persists even after accounting for pandemic-related stressors. Similarly, the negative correlation between affective empathy (BES_aff) and deviant behavior was maintained when controlling for the same COVID-19 variables (ρ = −0.127, p = 0.001). These findings suggest that the protective effect of affective empathy and the risk-enhancing effect of sensation seeking on deviant behavior are robust and independent of COVID-19 stress experiences.

Table 4. Partial correlations between key variables controlling for COVID-19 stress.

	ρ	*p*
BES_aff - DVBS	–0.12 **	<0.001
BSSS - DVBS	0.37 **	<0.001

Note. BSSS = Brief Sensation Seeking Scale; DVBS = Deviant Behavior Variety Scale; BES_ aff = Basic Empathy Scale affective subscale. Partial correlations were computed using Spearman's method controlling for COVID-19 isolation and fear of contagion. ** $p < 0.01$

4. Discussion

This study examined the relationships between sensation seeking, empathy, and COVID-19–related stress and deviant behaviors in adolescents and young adults. Several main findings emerged. Sensation seeking was the strongest predictor of deviance, whereas affective empathy functioned as a protective factor. Pandemic-related stress showed differentiated effects: social isolation increased deviance, while fear of contagion was associated with lower deviance. Importantly, mediation analyses revealed that affective empathy partially accounted for the link between sensation seeking and deviance, although the indirect effect was small. Finally, partial correlations confirmed that the associations of sensation seeking and affective empathy with deviant behavior remained significant when controlling for pandemic stress, underscoring the robustness of these dispositional effects.

These findings reinforce well-established evidence that sensation seeking represents a central risk factor for maladjustment in adolescents and young adults [17–20]. What is novel here is that its predictive power persisted even when COVID-19 stressors were taken into account, suggesting that dispositional tendencies exert an influence on deviance above and beyond situational adversity. The results concerning affective empathy also confirm previous work linking higher empathic concern with fewer externalizing problems [24,25]. Extending this literature, our findings indicate that affective empathy not only correlates with reduced deviance but also partially mediates the relationship between sensation seeking and deviant behavior. This suggests that affective empathy may function as a socio-emotional mechanism that shapes how dispositional tendencies translate into conduct. In line with previous research on the role of affective and cognitive empathy [44–46], our results revealed that the ability to understand the mental states, thoughts, and emotions of other people by taking their perspective is not associated with deviance, whereas lower affective empathy emerges as the key correlate of deviance. Although the mediation effect was modest, it highlights an avenue for preventive interventions: strengthening empathic capacities may mitigate the behavioral risks associated with high sensation seeking. The differentiated impact of COVID-19 stress adds nuance to the growing literature on the pandemic's psychosocial consequences [8–10]. Consistent with our theoretical rationale, isolation heightened the likelihood of deviance, potentially by depriving adolescents and young adults of normative social engagement and increasing the appeal of risk behaviors. By contrast, fear of contagion was linked to lower deviance, possibly reflecting heightened compliance with social norms and health-protective behaviors. These dual effects emphasize that pandemic-related stress cannot be treated as a homogeneous construct: some stressors may exacerbate risk, while others may inadvertently reinforce prosocial restraint.

Taken together, the present findings underscore the need for integrative models that consider both stable dispositional traits and context-specific stressors. The originality of this study lies in demonstrating that sensation seeking and empathy remain robust predictors of deviance even during a period of global disruption, while pandemic-related stress exerts additional, heterogeneous influences. This multidimensional approach highlights the interplay between enduring traits and situational contexts in shaping pathways of risk and resilience.

Beyond their theoretical relevance, these findings also carry practical implications for prevention, education, and policy. Prevention programs may benefit from targeting sensation-seeking adolescents through constructive channels for novelty and stimulation, while fostering empathic concern as a protective factor. Educational interventions could integrate socio-emotional learning curricula to strengthen empathy and peer-related competencies, thereby buffering against deviant conduct. At the policy level, attention should be given to the social costs of prolonged isolation, with initiatives aimed at ensuring safe opportunities for social engagement even under restrictive conditions.

In addition, the present results align with international research, which similarly identifies sensation seeking as a risk factor and empathy as protective across different cultural settings [47–50]. By situating our findings within this broader evidence base, the study contributes to a cross-cultural understanding of youth deviance, showing that the interplay of dispositional traits and contextual stressors is not limited to the Italian context but resonates with global patterns.

Beyond the psychological and educational implications, the findings also assume an interdisciplinary perspective. Identifying sensation seeking as a predictor of deviance risk, together with institutional responsibility for prevention and the use of validated psychometric instruments, underscores the medico-legal significance of these results, including their relevance for forensic (expert) evaluations.

Limitations and Future Directions

Several limitations warrant consideration. First, the cross-sectional design precludes causal inferences about the observed associations; although the findings are consistent with theoretical models emphasizing dispositional risk and protective factors, longitudinal research is essential to clarify temporal ordering and to establish whether empathy indeed mediates the pathway from sensation seeking to deviance. Second, reliance on self-report measures may introduce bias due to social desirability or limited introspective accuracy; future research should integrate multi-informant reports and behavioral assessments to increase validity. Third, the sample was drawn from central Italy, which may limit generalizability to other cultural contexts; cross-cultural replications are necessary to test the robustness of these findings. Finally, although the mediation model provides initial evidence for the role of empathy, the effect size was small, and additional mechanisms, such as parental monitoring, peer dynamics, or other socio-emotional skills, should be examined in future models. Future research should therefore prioritize longitudinal and cross-cultural designs, which are indispensable for confirming causal mechanisms and enhancing the external validity of findings. Moreover, investigations that explore the interplay of multiple dispositional and contextual factors and assess the effectiveness of interventions aimed at strengthening empathy and reducing the negative impact of social isolation will further advance our understanding of pathways of risk and resilience.

5. Conclusions

This study provides evidence that the combined influence of dispositional traits and pandemic-related stress shapes adolescent deviant behavior. Sensation seeking emerged as a robust risk factor, while affective (but not cognitive) empathy played a protective role and partially mediated the link between sensation seeking and deviance. COVID-19 stress contributed in distinct ways, with isolation heightening risk and fear of contagion appearing protective. These findings underscore the importance of integrating stable personality dispositions with situational stressors when examining pathways to maladaptive behavior. By highlighting both risk-enhancing and protective mechanisms, this study contributes to a more nuanced understanding of adolescent development in contexts of social disruption.

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Abbreviations

The following abbreviations are used in this manuscript:

BES	Basic Empathy Scale
BSSS	Brief Sensation Seeking Scale
CSSQ	COVID-19 Student Stress Questionnaire
DVBS	Deviant Behavior Variety Scale
IQR	Interquartile range
BES_cog	Subscale cognitive empathy
BES_aff	Subscale affective empathy
BES_tot	Total score of Basic Empathy Scale
CSSQ_rel	Subscale relationships and school life difficulties
CSSQ_fr	Subscale fear of contagion
CSSQ_is	Subscale isolation
CSSQ_tot	Total score COVID-19 Student Stress Questionnaire
SE	Standard error
CI	Confidence interval

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