

Clinical reflections of sensation seeking in antisocial personality disorder

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SUMMARY

Objective: Sensation seeking is defined as the pursuit of varied, novel, complex, and intense experiences, accompanied by a willingness to take physical, social, legal, and financial risks to attain such experiences. The present study aims to examine the relationship between sensation seeking behavior and both the dimensions of psychopathology and clinical features in individuals diagnosed with Antisocial Personality Disorder (ASPD).

Method: The study included 60 individuals diagnosed with ASPD according to DSM-5 criteria and 60 healthy controls. The level of sensation seeking was evaluated using the Zuckerman Sensation Seeking Scale (SSS). Clinical Reflections were assessed using the Novelty Seeking subscale of the Temperament and Character Inventory (TCI-NS), the Addiction Profile Index (API) and its Clinical Form (API-C), and the Criminal Thinking Scale (CTS). Data were statistically analyzed using appropriate methods.

Results: The ASPD group showed significantly higher scores than the control group in the SSS subdimensions of disinhibition, experience seeking, boredom susceptibility, and total score. Additionally, in the ASPD group, the total SSS score was positively correlated with the total TCI-NS (novelty seeking) score, the total API (addiction severity) score, the API-C novelty seeking subscale score, and the entitlement and power orientation subscales of the CTS. Furthermore, the boredom susceptibility subscale of the SSS showed a positive correlation with the number of suicide attempts.

Discussion: In individuals with antisocial personality disorder, sensation seeking behavior is positively associated with the number of suicide attempts, novelty seeking, severity of addiction, and criminal thinking patterns. These findings highlight the importance of considering sensation seeking in the clinical assessment of ASPD.

Key Words: Antisocial personality disorder, Sensation seeking, Novelty seeking, Substance use, Criminal thinking

INTRODUCTION

Sensation seeking is a multidimensional personality trait defined by an individual's willingness to engage in novel, complex, and intense experiences, along with a tendency to take physical, social, or legal risks to obtain such experiences (1). Although the term is often confused with the concept of novelty seeking, the two differ both theoretically and clinically. For example, in Cloninger's theory, novelty seeking emphasizes cognitive curiosity and behavioral responsiveness to novel stimuli, whereas sensation seeking reflects a biologically driven need for arousal (2). While McCourt et al. acknowledged a relationship between the two concepts, they demonstrated that sensation seeking and novelty seeking represent independent motivational systems and may have distinct implications in psy-

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chopathological contexts (3).

The behavioral spectrum of sensation seeking is quite broad and includes not only adaptive or neutral expressions but also maladaptive forms (4). In some individuals, sensation seeking may contribute to adaptive outcomes such as athletic success or leadership; however, numerous studies—particularly in the domain of externalizing psychopathologies—have shown that this trait is associated with risky and unhealthy behaviors. High levels of sensation seeking have been linked to various problematic behaviors, including uncontrolled substance use, impulsive aggression, reckless driving, gambling, self-injury, and criminal acts (5,6).

Antisocial Personality Disorder (ASPD) is a severe personality disorder characterized by pervasive dis-



regard for the rights of others, failure to conform to social norms, impulsivity, and aggression (7). Individuals diagnosed with ASPD exhibit significantly higher levels of impulsivity and risk-taking compared to the general population, suggesting that sensation seeking traits may be particularly elevated in this clinical group (8). In fact, ASPD may be considered a clinical phenotype in which sensation seeking is intensely manifested. Previous studies have shown that individuals with ASPD exhibit higher overall levels of sensation seeking compared to healthy controls, and that this may be associated with disinhibition, difficulties in emotional regulation, and the presence of blame-oriented cognitive schemas (9-11). However, these behavioral tendencies have often been examined in different samples and as independent variables, with limited focus on their co-occurrence or interactions within the same population. For example, studies have typically focused on either substance use or aggressive behaviors, while neglecting a comprehensive assessment of other maladaptive traits that may be associated with sensation seeking (12-15).

This study aims to fill these gaps by comprehensively examining sensation seeking tendencies in individuals diagnosed with ASPD. We tested the hypothesis that individuals with ASPD would demonstrate significantly higher total sensation seeking scores, as well as elevated scores in specific subdimensions, compared to a healthy control group. Additionally, we hypothesized that these sensation seeking tendencies would be associated with clinical indicators such as increased severity of substance dependence, suicide attempts, self-harming behaviors, and criminal cognitive schemas. By integrating theoretical perspectives and multidimensional assessment tools, we aim to provide novel and clinically meaningful insights into whether sensation seeking may serve as a transdiagnostic determinant specific to externalizing disorders within the context of ASPD.

METHODS

Selection and Description of Participants

This study was conducted using a cross-sectional

and comparative clinical research design, comparing patients diagnosed with ASPD to healthy controls. The research was carried out at the Department of Psychiatry, Gulhane Training and Research Hospital, between January 2022 and April 2022. Before the study began, approval was obtained from the Scientific Research Ethics Committee of the University of Health Sciences (Decision No: 2021/414, dated 16.12.2021). Written informed consent was obtained from all participants, and the study was conducted in accordance with the Declaration of Helsinki and Good Clinical Practice (GCP) guidelines.

The sample comprised 60 adult male patients diagnosed with ASPD, based on DSM-5 criteria, and 60 age- and sex-matched healthy male individuals. The ASPD group was established through simple random sampling from individuals presenting to the psychiatry outpatient clinic. Of 85 potential candidates selected using random number tables, 14 declined participation and 11 were excluded due to insufficient data on substance use or suicidal history, resulting in a final ASPD group of 60 male participants. Diagnosis confirmation for all ASPD candidates involved the administration of the Structured Clinical Interview for DSM-5 Personality Disorders (SCID-5-PD) (16, 17). These face-to-face interviews were conducted by two psychiatrists (Ö.U. and Y.S.), each possessing a minimum of three years of diagnostic experience. The control group was randomly selected from hospital staff and patient companions, with their current and past absence of psychiatric diagnoses verified through structured interviews.

Data Collection and Measurements

The Sociodemographic and Clinical Information Form, developed by the research team, was used to assess participants' basic demographic and clinical characteristics, including age, education level, employment status, and marital status. The form also included questions regarding tobacco, alcohol, and illicit substance use, past suicide attempts, self-harming behaviors, and criminal record. Substance use was defined as problematic consumption of alcohol, drugs, or prescription medications within the past 12 months. Detailed information was col-

lected through semi-structured interviews, and data was corroborated, where possible, through medical records and family reports.

Structured Clinical Interview for DSM-5 Personality Disorders (SCID-5-PD): This semi-structured interview, designed to evaluate personality disorders based on DSM-5 criteria, was employed to confirm ASPD diagnoses. Experienced clinicians conducted face-to-face interviews to ensure standardized assessment of diagnostic criteria.

Zuckerman Sensation Seeking Scale (SSS): The fifth version of the SSS, developed by Zuckerman, measured sensation-seeking levels (18, 19). This 40-item scale, supported by extensive validity and reliability data, comprises four subscales assessing distinct arousal tendencies: The thrill and adventure seeking subscale reflects the desire to engage in physically risky activities and have unusual experiences. The experience seeking subscale includes preferences for an unconventional lifestyle, interest in various forms of art and music, and a desire for non-monotonous experiences. The disinhibition subscale refers to the tendency to disregard social and moral restrictions, act impulsively, and engage in socially inappropriate behavior, particularly under the influence of substances. This subscale is also referred to as loss of conditioned inhibition. The boredom susceptibility subscale is characterized by intolerance to monotony, becoming easily bored with repetitive routines, and constantly seeking new stimuli. Higher scores on each subscale indicate a stronger presence of the relevant trait. The Turkish adaptation by Öngen demonstrated psychometric validity and reliability in a university student sample (20).

Novelty Seeking subscale of the Temperament and Character Inventory (TCI-NS): Developed by Cloninger et al., this subscale assesses impulsive and exploratory responses to novel stimuli (2). It comprises four features: Exploratory excitability refers to the tendency to be curious and responsive to new stimuli. Impulsiveness represents acting without considering the consequences during decision-making processes. Extravagance reflects impulsive spending, exaggerated emotional reactions, and a general inclination toward excess.

Disorderliness denotes a dislike of rules, a lack of planning, and chaotic behavioral tendencies. Higher scores on the TCI-NS subscale indicate a greater tendency to seek and react to environmental novelty. The Turkish version, adapted by Köse et al., was found to be psychometrically reliable (21).

Addiction Profile Index (API) and its Clinical Form (API-C): Developed by Ögel et al., these tools evaluated the severity of addiction and associated psychopathological features (22, 23). The API is a comprehensive self-report scale assessing substance use patterns, consequences, and diagnostic criteria for substance dependence. The API-C is a complementary clinician-completed form focusing on clinically significant symptoms, including difficulties in anger control, novelty seeking, impulsivity, depression, and anxiety. A high API-C score signifies clinically significant psychosocial symptoms accompanying substance dependence.

Criminal Thinking Scales (CTS): Developed by Knight et al., the CTS assessed cognitive distortions and thinking styles predisposing individuals to criminal behavior (24). It identifies cognitive schemas sustaining antisocial behavior by measuring thought patterns that legitimize or rationalize criminal acts. Key subdimensions include: Entitlement reflects the individual's tendency to perceive behaviors that violate the rights of others as personal privileges and to view oneself as above the rules. Power orientation represents the desire to have dominance and control over others. Criminal rationalization refers to the inclination to perceive criminal acts as reasonable or inevitable and to attribute the motivation for such behavior to external factors (e.g., "Anyone would have done the same"). Cold heartedness is characterized by a lack of empathy and indifference toward the impact of criminal acts on victims. Justification involves attempts to legitimize one's criminal behavior or to shift the responsibility onto the victim or environmental circumstances as a means of avoiding moral accountability. Personal irresponsibility describes a tendency to avoid taking responsibility for one's own actions and to disregard rules and obligations. High scores on the CTS indicate a stronger presence of the corresponding cognitive distortion. Psychometric evaluations of the Turkish

version have shown that the instrument is both valid and reliable for use in the local population (25).

Statistics

Prior to data collection, an a priori power analysis was performed using G*Power software to ascertain the requisite sample size. Based on effect sizes from comparable studies and assuming a medium effect size (Cohen's $d \approx 0.5$), a total sample size of approximately 128 participants (64 per group) was determined to achieve 80% power at $\alpha = 0.05$. The final sample of 120 participants in this study closely approximated this estimated minimum, providing largely sufficient statistical power.

Data analysis was performed using IBM SPSS Statistics version 25. The Shapiro–Wilk test was employed to assess the distribution of continuous variables. Since the assumption of normality was violated for certain variables, non-parametric tests were used for group comparisons. Specifically, the Mann–Whitney U test was applied to continuous variables, while the Chi-square test was used for categorical variables. Effect sizes were reported as r for non-parametric tests and as Cramér's V for categorical data. The interpretation of r values was as follows: 0.10–0.29 indicated a small effect size, 0.30–0.49 a medium effect size, and ≥ 0.50 a large effect size. Spearman's rank correlation coefficient was employed to examine associations between continuous variables, with the direction and magnitude of each correlation qualitatively interpreted using the same thresholds. Multiple linear regression analyses were then conducted to identify predictors of sensation seeking subscale scores. Prior

to regression, key assumptions were tested, including linearity, independence of residuals, homoscedasticity, normal distribution of residuals, and multicollinearity. All assumptions were met. In particular, all Variance Inflation Factor (VIF) values were below 2, indicating no significant multicollinearity. The level of statistical significance for all tests was set at $p < 0.05$. To control for Type I error due to multiple comparisons, the Holm–Bonferroni method was applied to adjust p values.

RESULTS

Sociodemographic and Clinical Characteristics

Table 1 presents a comparison of baseline sociodemographic and clinical variables between the ASPD and control groups. No statistically significant difference was found in mean age between the groups (Mann-Whitney $U = 1432.5$, $p = 0.052$, $r = 0.18$). However, a significant difference was observed in years of education: individuals in the ASPD group had significantly fewer years of formal education compared to the control group ($U = 270.0$, $p = 0.001$) and had a large effect size ($r = 0.70$). Employment status and residential environment also differed significantly between the groups. The ASPD group demonstrated higher rates of unemployment and greater likelihood of residing in rural areas (Fisher's exact test, $p = 0.018$, $V = 0.26$ for unemployment; $\chi^2 = 6.316$, $p = 0.027$, $V = 0.23$ for rural residence).

Clinically, the ASPD group exhibited a significantly more adverse risk profile. Cigarette smoking was significantly more prevalent in this group ($U = 299.0$, $p = 0.001$, $r = 0.80$), as were alcohol use ($\chi^2 =$

Table 1. Comparative sociodemographic and clinical profile of ASPD and control groups

Variable	ASPD (n=60)	Control (n=60)	Statistical analysis	df	p
Age; years, Mean –SD	25.20±6.03	24.55±2.02	U=1432.5	118	0.052
Years of education; years, Mean –SD	9.543±4.30	16.00±0.00	U=270.0	118	<0.001
Marital status; n (%)			$\chi^2 = 5.116$	2	0.091
Single/Separated	45 (75.0)	43 (71.7)			
Married	15 (25)	17 (28.3)			
Employment status; n (%)			$\chi^2 = 8.090$	2	0.018
Not working	20 (33.3)	18 (30)			
Working	40 (66.6)	42 (70.0)			
Residence; n (%)			Fisher's exact test	1	0.027
Urban	54 (90)	60 (100)			
Rural	6 (10)	0			
Smoking, pcs/day; Mean –SD	31.30±21.74	1.92±5.45	U=299.0	118	<0.001
Alcohol use; n (%)	31 (51.7)	13 (21.7)	$\chi^2 = 11.627$	1	0.001
Substance use; n (%)	22 (36.7)	0	Fisher's exact test	1	<0.001
Number of suicide attempts; Mean –SD	1.15±1.31	0	U = 750.0	118	<0.001
Self-mutilation attempts; Mean –SD	1.35±2.91	0	U = 1380.0	118	<0.001
Number of criminal history; Mean –SD	1.09±1.85	0	U = 1080.0	118	<0.001

Mean – SD: Mean – standard deviation, ASPD: Antisocial personality disorder, U: Mann Whitney U test, χ^2 : Chi-square test
Note: Fisher's exact test was used for anycell frequencies less than five

Table 2. Group differences in sensation seeking, novelty seeking, addiction severity, and criminal thinking scores

Subscales	ASPD (n=60) Mean –SD	Control (n=60) Mean –SD	Statistical analysis	df	p
Zuckerman Sensation Seeking Scale					
SSS-DIS	5.03±3.11	2.63±2.09	U=1000.0	118	<0.001
SSS-TAS	4.96±2.46	5.26±2.42	U=1691.0	118	0.564
SSS-ES	4.98±2.09	3.95±2.07	U=1304.5	118	0.009
SSS-BS	5.45±2.47	2.55±1.84	U=654.0	118	<0.001
SSS-Total	20.43±6.73	14.40±6.54	U=937.0	118	<0.001
Temperament and Character Inventory- Novelty Seeking					
TCI-NS1 Exploratory excitability	5.36±1.32	6.13±1.09	U=1073.5	118	<0.001
TCI-NS2 Impulsiveness	5.10±1.56	4.00±1.28	U=1046.0	118	<0.001
TCI-NS3 Extravagance	4.46±1.30	5.13±1.18	U=1307.0	118	0.008
TCI-NS4 Disorderliness	4.46±1.23	4.65±1.36	U=1691.5	118	0.558
TCI-NS Total	19.60±2.65	19.91±2.68	U=1742.0	118	0.759
Addiction Profile Index					
API-Substance use	1.88±1.76	0.11±0.39	U=514.0	118	<0.001
API-Diagnostic criteria	7.05±6.29	0.10±0.58	U=618.0	118	<0.001
API- Effect on everyday life	12.70±11.78	0.40±1.73	U=688.0	118	<0.001
API-Craving	5.18±4.84	0.08±0.27	U=592.5	118	<0.001
API-Motivation for substance use	4.71±4.80	0.25±0.91	U=806.5	118	<0.001
API-Total	6.25±5.04	0.22±0.50	U=503.5	118	<0.001
Addiction Profile Index-Clinical Version					
API-C Anger control failure	4.83±1.64	0.93±1.05	U=194.5	118	<0.001
API-C Lack of safe behavior	5.93±3.05	3.55±1.84	U=947.5	118	<0.001
API-C Novelty-seeking behavior	3.11±2.00	1.70±1.52	U=1051.0	118	<0.001
API-C Impulsivity	4.06±1.68	2.01±1.39	U=688.0	118	<0.001
API-C Depression	5.30±2.24	2.58±1.21	U=641.5	118	<0.001
API-C Anxiety	3.48±1.88	1.21±0.88	U=588.5	118	<0.001
Criminal Thinking Scales					
CTS- Entitlement	27.33±9.78	16.50±5.24	U=645.0	118	<0.001
CTS- Criminal rationalization	32.97±9.63	28.25±7.32	U=1306.5	118	0.009
CTS- Power orientation	35.72±11.54	20.50±5.88	U=489.0	118	<0.001
CTS- Cold heartedness	24.25±10.97	17.62±4.47	U=1154.5	118	0.001
CTS- Justification	37.38±8.53	33.77±7.35	U=1365.0	118	0.022
CTS- Personal irresponsibility	29.66±12.03	20.00±7.47	U=932.5	118	<0.001

U: Mann Whitney U test, Mean ± SD: Mean – standard deviation, SSS: Zuckerman Sensation Seeking Scale Form V, DIS: Disinhibition, TAS: Thrill and Adventure Seeking, ES: Experience Seeking, BS: Boredom Susceptibility, TCI-NS: Temperament and Character Inventory- Novelty Seeking dimension, API: Addiction Profile Index, API-C: Addiction Profile Index-Clinical Version, CTS: Criminal Thinking Scales

11.627, $p=0.001$, $V=0.31$) and illicit drug use (Fisher's exact test, $p=0.001$, $V=0.47$). A history of suicide attempts was also significantly more common in the ASPD group compared to the control group ($U=750.0$, $p=0.001$, $r=0.57$), as was the prevalence of self-harming behaviors ($U=1380.0$, $p=0.001$, $r=0.27$). Moreover, the presence of a criminal record was significantly higher in the ASPD group ($U=1080.0$, $p=0.001$, $r=0.41$).

Group Differences in Sensation Seeking and Related Scales

Table 2 summarizes group comparisons in psychological scale scores. The total score on the Zuckerman SSS was significantly higher in the ASPD group compared to the control group ($U=937.0$, $p=0.001$, $r=0.45$). In particular, the ASPD group scored significantly higher on the subscales of disinhibition ($r=0.41$), experience seeking ($r=0.26$), and boredom susceptibility ($r=0.59$), with medium to large effect sizes. However, no significant group differences were found on the thrill and adventure seeking subscale ($p=0.564$).

Regarding the TCI-NS, no significant difference

was found in total scores between the two groups ($p=0.759$). However, differences emerged at the subscale level. Individuals in the ASPD group scored significantly higher in the impulsiveness ($U=1046.0$, $p=0.001$, $r=0.41$) and extravagance subscales ($p=0.008$, $r=0.27$), while the control group scored significantly higher in exploratory excitability ($p=0.001$, $r=0.49$).

In the API and its clinical form (API-C), the ASPD group scored significantly higher on the overall score and all subscales compared to the control group (all $p<0.001$), typically with large effect sizes.

The CTS yielded similar results. The ASPD group scored significantly higher across all subdimensions (all $p < 0.001$). Notable differences were observed in entitlement ($U=645.0$, $p=0.001$, $r=0.44$), power orientation ($r=0.53$), and personal irresponsibility ($r=0.46$), highlighting the deeply rooted nature of antisocial cognitive schemas. Medium-sized differences were also observed in other domains such as criminal rationalization and cold-heartedness.

Table 3. Associations of sensation seeking dimensions with clinical variables

Variable	Zuckerman Sensation Seeking Scale					
		SSS-DIS	SSS-TAS	SSS-ES	SSS-BS	SSS-Total
Age	<i>r</i>	-0.060	0.085	0.037	-0.207	-0.086
	<i>p</i>	1.0	1.0	1.0	1.0	1.0
Years of education	<i>r</i>	-0.260	0.148	-0.139	-0.337	-0.252
	<i>p</i>	0.945	1.0	1.0	0.192	1.0
Number of suicide attempts	<i>r</i>	0.172	0.045	0.279	0.420	0.332
	<i>p</i>	1.0	1.0	0.681	0.025	0.207
Number of self-mutilative actions	<i>r</i>	0.021	-0.169	0.210	0.230	0.101
	<i>p</i>	1.0	1.0	1.0	1.0	1.0
Number of criminal history	<i>r</i>	-0.019	-0.042	-0.004	-0.022	-0.068
	<i>p</i>	1.0	1.0	1.0	1.0	1.0

r: correlation coefficient, SSS: Zuckerman Sensation Seeking Scale Form V, DIS: Disinhibition, TAS: Thrill and Adventure Seeking, ES: Experience Seeking, BS: Boredom Susceptibility
 Note: *p*-values were adjusted for multiple comparisons using the Holm-Bonferroni method.

Correlations between Sensation Seeking and Clinical Variables

Table 3 presents bivariate correlations between subscale scores of the sensation seeking scale and key clinical variables. Age and education level were not significantly correlated with any sensation seeking subdimension (all $p > 0.05$). Correlations between sensation seeking and suicide attempts were also noteworthy. In the ASPD group, the number of past suicide attempts was positively correlated with boredom susceptibility scores ($r = 0.420, p = 0.025$), but was not significantly correlated with total sensation seeking scores ($r = 0.332, p = 0.207$).

Table 4 provides detailed correlations between the sensation seeking subscales and related clinical variables such as impulsivity, addiction severity, and criminal cognition. The disinhibition subscale showed moderate positive correlations with several adverse clinical variables. Individuals with higher disinhibition scores also had higher TCI total scores ($r = 0.422, p = 0.005$), and their addiction severity (API total score) increased in parallel ($r = 0.454, p = 0.005$). Craving scores from the API-C were also strongly correlated with disinhibition ($r = 0.566, p = 0.005$). Similarly, disinhibition was highly correlated with API-C novelty-seeking scores ($r = 0.673, p = 0.005$). In terms of criminal cognitive patterns, individuals with higher levels of disinhibition also tended towards entitlement thinking styles (CTS Entitlement, $r = 0.333$), with a statistically significant correlation ($p = 0.036$).

Total sensation seeking scores also correlated significantly with several clinical variables. Notably, total sensation seeking was positively associated with addiction severity (API total score, $r = 0.374, p = 0.012$), suggesting that individuals with higher sensation seeking tendencies are more likely to exhibit pronounced substance use behaviors.

Furthermore, total sensation seeking scores were significantly correlated with the power orientation subscale of the CTS ($r = 0.371, p = 0.016$), indicating that individuals with elevated sensation seeking may also possess a strong drive to dominate or control others. Additionally, total sensation seeking was strongly correlated with API-C novelty seeking ($r = 0.679, p = 0.005$).

Regression Analyses: Predictors of Sensation Seeking Subdimensions

Table 5 summarizes the results of multiple linear regression models used to identify predictors of sensation seeking subdimensions. Each subdimension—disinhibition, experience seeking, boredom susceptibility, and total score—was treated as a dependent variable, with relevant clinical variables entered as predictors in the model.

The most significant predictors for the disinhibition subdimension were total TCI-NS, substance use severity (API substance use subscale), craving (API-C craving), and API-C novelty seeking. Each

Table 4. Correlations of sensation seeking scores with novelty seeking, addiction severity, and criminal thinking

Subscales	Zuckerman Sensation Seeking Scale (SSS)					
		SSS-DIS	SSS-TAS	SSS-ES	SSS-BS	SSS- Total
Temperament and Character Inventory- Novelty Seeking						
TCI-NS1 Exploratory excitability	<i>r</i>	0.178	0.056	-0.102	0.102	0.086
	<i>p</i>	0.869	1.0	1.0	1.0	1.0
TCI-NS2 Impulsiveness	<i>r</i>	0.313	-0.115	0.073	0.455	0.283
	<i>p</i>	0.06	0.764	0.764	0.005	0.087
TCI-NS3 Extravagance	<i>r</i>	0.234	0.149	0.175	0.000	0.205
	<i>p</i>	0.36	0.542	0.542	0.999	0.464
TCI-NS4 Disorderliness	<i>r</i>	0.079	-0.032	0.079	0.086	0.107
	<i>p</i>	1.0	1.0	1.0	1.0	1.0
TCI-NS Total	<i>r</i>	0.422	-0.003	0.102	0.329	0.353
	<i>p</i>	0.005	0.979	0.874	0.03	0.024
Addiction Profile Index						
API-Substance use	<i>r</i>	0.501	0.030	0.191	0.404	0.442
	<i>p</i>	0.005	0.819	0.286	0.005	0.005
API-Diagnostic criteria	<i>r</i>	0.523	-0.077	0.209	0.403	0.425
	<i>p</i>	0.005	0.556	0.218	0.005	0.005
API-Effect on everyday life	<i>r</i>	0.384	-0.108	0.094	0.355	0.295
	<i>p</i>	0.01	0.826	0.826	0.02	0.066
API-Craving	<i>r</i>	0.566	-0.148	0.249	0.462	0.442
	<i>p</i>	0.005	0.259	0.11	0.005	0.005
API-Motivation for substance use	<i>r</i>	0.218	-0.007	-0.107	0.206	0.158
	<i>p</i>	0.475	0.957	0.828	0.475	0.687
API-Total (addiction severity)	<i>r</i>	0.454	-0.039	0.123	0.381	0.374
	<i>p</i>	0.005	0.766	0.702	0.012	0.012
Addiction Profile Index-Clinical Version						
API-C Anger control failure	<i>r</i>	0.225	-0.301	0.116	0.279	0.130
	<i>p</i>	0.252	0.095	0.646	0.124	0.646
API-C Lack of safe behavior	<i>r</i>	-0.023	-0.286	0.058	0.208	-0.023
	<i>p</i>	1.0	0.135	1.0	0.44	1.0
API-C Novelty-seeking behavior	<i>r</i>	0.673	0.072	0.486	0.516	0.679
	<i>p</i>	0.005	0.583	0.005	0.005	0.005
API-C Impulsivity	<i>r</i>	0.234	-0.159	0.313	0.451	0.301
	<i>p</i>	0.142	0.226	0.06	0.005	0.06
API-C Depression	<i>r</i>	0.012	-0.072	0.073	0.213	0.073
	<i>p</i>	1.0	1.0	1.0	0.51	1.0
API-C Anxiety	<i>r</i>	0.117	-0.158	0.123	0.318	0.130
	<i>p</i>	0.966	0.916	0.966	0.065	0.966
Criminal Thinking Scales						
CTS- Entitlement	<i>r</i>	0.333	-0.091	0.110	0.426	0.312
	<i>p</i>	0.036	0.806	0.806	0.005	0.036
CTS- Criminal rationalization	<i>r</i>	0.312	0.030	0.037	0.323	0.283
	<i>p</i>	0.06	1.0	1.0	0.06	0.084
CTS- Power orientation	<i>r</i>	0.300	0.086	0.141	0.444	0.371
	<i>p</i>	0.06	0.564	0.564	0.005	0.016
CTS- Cold heartedness	<i>r</i>	0.249	-0.105	0.256	0.211	0.221
	<i>p</i>	0.24	0.424	0.24	0.27	0.27
CTS- Justification	<i>r</i>	0.113	0.054	0.034	0.271	0.174
	<i>p</i>	1.0	1.0	1.0	0.18	0.736
CTS- Personal irresponsibility	<i>r</i>	0.211	-0.295	0.032	0.514	0.202
	<i>p</i>	0.318	0.088	0.807	0.005	0.318

SSS: Zuckerman Sensation Seeking Scale Form V, DIS: Disinhibition, TAS: Thrill and Adventure Seeking, ES: Experience Seeking, BS: Boredom Susceptibility, TCI-NS: Temperament and Character Inventory- Novelty Seeking dimension, API: Addiction Profile Index, API-C: Addiction Profile Index-Clinical Version, CTS: Criminal Thinking Scales
 Note: *p*-values were adjusted for multiple comparisons using the Holm-Bonferroni method.

Table 5. Multivariate predictors of sensation seeking subdimensions: Regression analysis results

Dependent variable	Predictor variables	Beta	Std.Error	95 % CI	t	p	
SSS- Disinhibition	TCI-NS total	0.496	0.145	0.205	0.788	3.423	0.001
	API-substance use	0.669	0.317	0.031	1.306	2.110	0.040
	API- craving	0.271	0.125	0.019	0.522	2.160	0.036
	API-C-novelty-seeking behavior	0.514	0.174	0.163	0.864	2.946	0.005
SSS- Experience seeking	API-novelty-seeking behavior	0.462	0.134	0.194	0.730	3.456	0.001
SSS- Boredom susceptibility	CTS- personal irresponsibility	0.086	0.026	0.034	0.138	3.326	0.002
SSS- Total	API substance use	1.887	0.746	0.386	3.388	2.531	0.015
	API-C novelty-seeking behavior	1.704	0.457	0.785	2.623	3.732	0.001

Statistically significant results are given; CI = confidence interval

SSS: Zuckerman Sensation Seeking Scale Form V, DIS: Disinhibition, TAS: Thrill and Adventure Seeking, ES: Experience Seeking, BS: Boredom Susceptibility, TCI-NS: Temperament and Character Inventory- Novelty Seeking dimension, API: Addiction Profile Index, API-C: Addiction Profile Index-Clinical Version, CTS: Criminal Thinking Scales

of these variables demonstrated a statistically significant predictive effect within the model (all $p < 0.05$). Collectively, they accounted for a substantial proportion of the variance in disinhibition scores, indicating that the combination of these variables strongly predicted disinhibitory tendencies. In the regression model for experience seeking, only one variable emerged as a significant predictor: API-C novelty seeking. The API-C novelty seeking score significantly predicted experience seeking scores (standardized $\beta=0.46$, $p=0.001$), while other variables did not contribute significantly. Scores on the CTS personal irresponsibility subscale significantly predicted boredom susceptibility ($\beta=0.09$, $p=0.002$). Other variables, such as entitlement or power orientation, did not significantly contribute to the model.

Finally, the regression model for total sensation seeking identified two significant predictors: API substance use severity and API-C novelty seeking. The API substance use subscale ($\beta=1.887$, $p=0.015$) and the API-C novelty seeking subscale ($\beta=1.704$, $p=0.001$) each exerted significant and independent predictive effects. Notably, these two predictors represent both behavioral (substance use) and motivational/emotional (novelty/impulsivity) dimensions. Overall, the model explained a substantial portion of the variance in total sensation seeking scores and was statistically significant (overall model $p < 0.001$).

DISCUSSION

This study provides an original contribution to the literature by comprehensively examining the psychopathological implications of sensation seeking tendencies in individuals diagnosed with ASPD.

Our findings revealed that the ASPD group scored significantly higher than healthy controls not only in overall sensation seeking levels but also in specific subdimensions, particularly disinhibition, experience seeking, and boredom susceptibility. Moreover, this personality trait was found to be associated with various maladaptive patterns in ASPD individuals. High sensation seeking was significantly related to adverse clinical variables such as substance use, suicidal behaviors, and criminal cognitive schemas. These results suggest that sensation seeking should not be considered an isolated personality trait, but rather a mediating variable that interacts with other risk factors and potentially shapes the clinical course of psychopathology.

Our findings align with Zuckerman's multidimensional theoretical model of sensation seeking (1), revealing a distinct pattern within the ASPD group regarding its subcomponents. Individuals with ASPD scored significantly higher in disinhibition, experience seeking, and boredom susceptibility, while no significant difference was found between groups in the thrill and adventure seeking dimension. This pattern is consistent with previous research and offers crucial insights into the qualitative nature of heightened sensation seeking in ASPD (8,12,26,27). In our study, disinhibition emerged as the most distinguishing dimension for the ASPD group, indicating these individuals' difficulty in suppressing their impulses. This trait is thought to predispose them to outcomes like criminal behavior or substance use (8,12,26). Furthermore, the elevated experience seeking scores recorded in the cases suggest a propensity for unusual, socially deviant, or marginal experiences (27). The increased boredom susceptibility observed in the ASPD group reflects an intolerance

for routine and monotony (11,13,28). In our analysis, this subdimension showed the strongest association with suicidal behavior, suggesting that individuals experiencing internal distress and possessing a low arousal threshold may resort to extreme behaviors like self-harm to alleviate this state. In essence, not all subdimensions of sensation seeking reflect pathological tendencies. The absence of group differences in thrill and adventure seeking reminds us that sensation seeking does not always equate to maladaptive risk-taking (29). This finding suggests that the heightened sensation seeking observed in ASPD manifests more through impulsive and maladaptive expressions rather than socially sanctioned risks.

Although the terms "sensation seeking" and "novelty seeking" are frequently used interchangeably, our study reinforces their theoretical and clinical distinctness. As highlighted by McCourt et al., sensation seeking primarily reflects an amplified need for stimulation, whereas novelty seeking is more closely related to cognitive and behavioral responsiveness to novel stimuli (3,30,31). While both traits were generally elevated in the ASPD group compared to controls, analyses at the subdimension level elucidated the specific nature of this elevation. In individuals with ASPD, sensation seeking was characterized by increased disinhibition and boredom susceptibility. Conversely, novelty seeking in this group primarily manifested through heightened impulsiveness and extravagance. Interestingly, the exploratory excitability subdimension of novelty seeking was significantly higher in the control group. These findings suggest a differential manifestation of novelty seeking across groups: ASPD individuals exhibit novelty seeking via behavioral disorganization and impulsivity, while healthy individuals demonstrate a more curiosity-driven and cognitively exploratory pattern. This distinction holds particular relevance within the context of substance use. Prior research indicates that individuals with elevated sensation-seeking tendencies may initiate substance use to achieve sensory stimulation, whereas those with high novelty seeking may perpetuate substance use in a habitual and compulsive manner (32,33). The simultaneous elevation of both sensation seeking and novelty seeking could therefore lead to more chronic and entrenched patterns of risky behavior (31). Our findings corroborate this perspective, as

sensation seeking subdimensions showed strong correlations with both substance dependence severity and diagnostic indicators of substance use disorders.

The observed association between sensation seeking and self-injurious behaviors (i.e., suicide attempts and self-harm) in our study reinforces the theoretical link between this personality trait and difficulties in emotion regulation. Within the ASPD group, individuals who scored higher on boredom susceptibility were also more likely to report past suicide attempts. This finding suggests that impulsivity and low arousal tolerance may predispose individuals to engage in extreme behaviors under emotional strain (34). In literature, this tendency is often explained by the concept of "negative urgency," which is frequently observed in externalizing disorders (35-37). Negative urgency refers to the tendency to act rashly and potentially harmfully during moments of intense emotional distress. This implies that self-injurious behavior may serve as a maladaptive coping mechanism for emotional dysregulation (35,38). Our findings are consistent with this view: ASPD participants who reported more suicide attempts were also those who demonstrated the lowest tolerance for monotony and the strongest drive for stimulation.

Another key finding of our study is the strong association between sensation seeking and substance use. Previous research has demonstrated that individuals high in sensation seeking tend to have heightened sensitivity within the brain's reward systems and exhibit greater motivation for the pleasurable effects of substance use (39, 40). Our results are in line with this evidence: among individuals with ASPD, total sensation seeking scores were strongly correlated with indicators of addiction severity derived from the API and API-C instruments. In other words, individuals high in sensation seeking may not only be more inclined to begin using substances but may also possess internal motivational traits (e.g., impulsivity, craving for novelty) that perpetuate substance use over time (41,42).

The significant correlations observed between sensation seeking and patterns of criminal thinking in our study underscore the crucial role of cognitive processes in the development and persistence of

antisocial behavior. Individuals with elevated sensation-seeking tendencies demonstrated higher levels of entitlement, power orientation, and personal irresponsibility schemas that not only reflect distorted beliefs but also indicate a motivational drive for heightened arousal (36). These findings suggest that criminal behavior in such individuals may not solely result from momentary disinhibition or external provocation. Instead, their actions may be internally rationalized through entrenched belief systems, whereby criminal acts are perceived as acceptable, deserved, or even necessary (43). In this context, sensation seeking appears to function not merely as a personality trait but as a cognitive-affective framework that influences the justification and internal logic behind antisocial behaviors. This interpretation is consistent with Walters' model of criminal thinking, which posits that antisocial cognitions serve to legitimize risky and unlawful behaviors (44,45).

Limitations

Several limitations should be considered when interpreting the findings of this study. First, due to its cross-sectional design, the study does not allow for causal inferences. The correlations we identified cannot determine which variable precedes or influences the other; therefore, our findings should be understood at an associative level only. Second, our sample included only male participants. While this choice was deliberate to control for the potential confounding effects of gender on sensation seeking and antisocial behaviors, it limits the generalizability of the findings to female ASPD populations. Future research incorporating female antisocial samples would be valuable in exploring possible gender-specific dynamics. Third, variables such as substance use, suicide attempts, and criminal history were partially based on self-reports, which may be subject to recall bias or social desirability effects. Although we attempted to verify this information through medical records and reports from close relatives whenever possible, the inherent limitations of subjective data collection could not be entirely eliminated. Lastly, although our final sample size was close to the number suggested by power analysis, it fell slightly short of the optimal size for conducting complex regression models. This limitation may have reduced the statistical power of some regression results. Indeed,

certain marginal findings in our multivariate models warrant replication in studies with larger and more diverse samples. Therefore, the regression outcomes in particular should be interpreted with caution and confirmed through future research.

This study revealed that individuals diagnosed with ASPD exhibit significantly elevated levels of sensation seeking, and that this elevation is associated with several clinically relevant behavioral and cognitive patterns. In particular, the disinhibition and boredom susceptibility subdimensions were found to be linked to high-risk behaviors such as substance use and suicide attempts within the ASPD group. While the cross-sectional nature of the study precludes causal interpretation, the findings suggest that sensation seeking may play a central role in the clinical presentation of ASPD. A multidimensional evaluation of sensation seeking may aid in identifying at-risk individuals and developing tailored intervention strategies in clinical practice. In addition, by distinguishing the unique characteristics of sensation seeking and novelty seeking, our study emphasizes the importance of evaluating these traits independently in clinical assessments. Sensation seeking showed strong associations with reward sensitivity, impulsivity, and antisocial cognitions, while subdimension analyses of novelty seeking revealed its heterogeneous nature, distinguishing impulsive tendencies from cognitive curiosity. In this context, evaluating the subdimensions of both sensation seeking and novelty seeking could provide a more detailed understanding of an individual's risk profile and behavioral tendencies.

In conclusion, the present findings underscore the importance of sensation seeking in the context of ASPD and support its consideration as a transdiagnostic risk factor. However, it must be reiterated that all associations observed in this study were correlational and based on cross-sectional data. Future longitudinal research is needed to clarify the developmental trajectory of sensation seeking and its temporal interactions with related variables.

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