Contribution of Reward Sensitivity Towards Anhedonia Among College Students

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Abstract

Anhedonia is characterized by a diminished ability to experience pleasure and joyfor stimuli that normally elicit such responses. Reward sensitivity, which suggests an individual'sresponsiveness to positive stimuli reflects the capacity to regulate responses to negative orconflicting cues and are critical constructs in understanding motivational and affective processes. Anhedonia is hypothesized to be caused by blunted reward sensitivity. The present study intended to see the relationships between anhedonia and reward-sensitivity in the non-clinical youth. In the present study, the researcher used Snaith-Hamilton Pleasure Scale (SHAPS), and the Behavioral Activation System (BAS) scales. Data was collected from 267 college students between the ages of 18 and 25 was analyzed using Pearson's correlation and multiple regression analysis. The results revealed a significant negative correlation between reward responsiveness and anhedonia. Additionally, fun-seeking was also found to be correlated negatively with anhedonia and drive was also found to be negatively correlated with anhedonia. The findings suggest that higher sensitivity to rewards contributes negatively to experience diminished pleasure. Individuals inclined toward seeking novel and enjoyable experiences may report fewer anhedonic symptoms. Thus, higher reward responsiveness and fun-seeking tendencies appear to buffer against anhedonic symptoms.

Keywords: Anhedonia, reward sensitivity, BIS/BAS, youth mental health, depression risk

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Anhedonia (Agrawal et al., 2012; Fawcett et al., 1983) stated that as a psychological condition that decrease the pote3ntiality of the human being to experience pleasure, and joy in the presence of stimuli that normally elicit these responses. Among individuals with mental disorders, those who have experienced childhood trauma were more likely to report symptoms of anhedonia (Sweeney et al*.,* 2015). In fact, Harkness and Monroe (2002) affirmed that "individuals with a history of childhood maltreatment are significantly more likely to be diagnosed with the 'endogenous' subtype of depression, which is characterized primarily by severe anhedonia, than those without". Reward sensitivity refers to an individual's responsiveness to positive stimuli. It reflects the capacity to regulate responses to negative or conflicting cues and are critical constructs in understanding motivational and affective processes. More recently, studies (Huh et al., 2020) have indicated that "people differ in sensitivity and responsiveness of two fundamental motivational systems that are thought to determine behavioral response in threatening situations, the BIS/BAS. The BIS/BAS are a part of Gray's Reinforcement Sensitivity Theory (Gray & McNaughton, 2000)". This model defines three motivational systems namely, "the Behavioral Activation System (BAS), the Fight-Flight-Freeze system (FFFS) and the Behavioral Inhibition/Regulation System (BIS). Out of these three systems, the BAS is responsible for organizing behaviors in response to appetitive rewards or relief from punishment, thereby increasing the propensity to engage in ongoing behavior".

Kong et al*.,* (2022) affirmed that "the neural mechanism of anhedonia is mainly related to the abnormal neural circuits of the reward system, involving the prefrontal lobe, amygdala and striatum". The "developmental trauma model" (McLaughlin & Sheridan, 2016) suggest that the

neural development related to reward and fear processing is affected differentially by abuse and neglect leading to different symptom manifestations. Cohen, McNeil and Menon (2020) found that neglect has a relationship with anhedonia as indicated by the levels of anticipatory positive affect (APA) which is also called anticipatory anhedonia (Shankman et al*.,* 2014). As reward learning and APA are intertwined (Correa & Salamone, 2012), it is proposed that APA pathway being unique for neglect may be explained by deficits in learning.

Present studies suggest various issues related to disturbances in reward sensitivity and achievement-based decision-making in anhedonia (Kong et al., 2022), but studies involving precise contributorsare lacking. Moreover, only a few studies focus upon objective measures which limits the input for treatment procedures. If researchers are carried out to investigate the contribution of reward sensitivity to anhedonia, those can address the void in explaining the symptoms of depression in anhedonia that involves reduced pleasure and motivation. Anhedonia is not addressed by conventional therapeutic means and results in poor outcomes. Therefore, targeted research is quite essential to strengthen the base for effective interventions. These studies may explain how reward sensitivity contributestowards anhedonia with the implications ofappropriate therapeutic mechanisms.

Review of Literature

The Reinforcement Sensitivity Theory (RST) posits that the BAS regulates approach behaviors toward rewarding stimuli, while the BIS governs avoidance of punishment (Gray, 1987). A decrease in BAS sensitivity has been linked to a higher risk of affective disorders, particularly depression (Bijttebier et al., 2009; Katz et al., 2020). Dysfunctions in dopaminergic reward pathways and prefrontal regions, which play a crucial role in approach motivation, have also been implicated in depression (Davey et al., 2008). Behavioral therapies such as Behavioral

Activation Therapy (BAT) aim to enhance approach motivation and have shown positive outcomes through reward-based mechanisms (Nagy et al., 2020; Dobson & Ottenbreit, 2014).

According to American Psychiatric Association (2013), anhedonia, as the reduced ability to experience pleasure. It is a key feature of depressive disorders and has been found to correlate negatively with BAS sensitivity even in healthy individuals (Germans & Kring, 2000). In clinical samples, improvements in BAS components, particularly reward responsiveness, are associated with reduced anhedonic symptoms following treatment (Allen et al., 2019). This supports the view that anhedonia reflects deficits in the brain's reward system, particularly within the frontal-striatal circuit (Liu et al., 2011). Importantly, research on non-clinical samples also shows that variations in BAS sensitivity are related to subclinical anhedonia, indicating its potential as an early risk marker for depression (Liu et al., 2016; Luking et al., 2015).

Studies examining specific BAS components suggest more nuanced relationships. For example, Kuan et al. (2024) found that social anhedonia mediated the relationship between BAS and depressive symptoms among Chinese adolescents, with reward responsiveness and drive predicting depressive symptoms through anhedonia, while fun-seeking did not. These findings highlight the importance of studying distinct BAS dimensions within non-clinical populations.

Behavioral research further supports that individuals with higher anhedonia show reduced motivation for high-effort rewards and lower reward sensitivity (Slaney et al., 2023). Neuroimaging evidence also indicates disrupted connectivity between the nucleus accumbens and prefrontal regions among trauma-exposed individuals with high anhedonia (Olson et al., 2018). These neural and behavioral patterns emphasize the heterogeneous nature of anhedonia across populations.

Finally, evidence from non-clinical and high-risk groups demonstrates that anhedonic traits can exist independently of diagnosed depression, representing a potential vulnerability factor (Chentsova-Dutton & Hanley, 2010; Liu et al., 2016). By distinguishing between clinical and non-clinical findings, it becomes clear that reward sensitivity deficits may operate along a continuum, from mild variations in pleasure experience to severe motivational impairments in clinical depression.

Objectives:

- To find out the relationship between *anhedonia and reward sensitivity among non-clinical youth.*
- To observe whether *dimensions of reward sensitivity have and negative contribution towards anhedonia.*

Hypotheses

H_1: There is a significant relationship between anhedonia and reward sensitivity among non-clinical youth.

H_2: Dimensions of reward sensitivity will contribute negatively towards anhedonia.

Method

Sample

The sample for the present study consisted of 267 college students from the Delhi-NCR region, aged between 18 and 25 years. The sample included 65 males and 102 females, all of whom were enrolled in various undergraduate programs. Participants were recruited using convenience sampling. They are spread over 23 colleges from different streams like arts, science, commerce, law and journalism.

Measures

Snaith-Hamilton Pleasure Scale (SHAPS)

The SHAPS is a 14-item scale that measures anhedonia, the inability to experience pleasure. The items cover the domains ofsocial interaction, food and drink, sensory experience, and interest/pastimes. A score of 2 or less constitutes a "normal" score, while an "abnormal" score is defined as 3 or more. Each item has four possible responses: strongly disagree, disagree, agree, or strongly agree. Either of the "disagree" responses scores one point, and either of the "agree" responses score 0 points. Thus, the final score ranges from 0 to 14. The SHAPS has adequate construct validity and satisfactory test-retest reliability (ICC=0.70) and high internal consistency with Cronbach's alpha of 0.94 has also been reported (Franken et al, 2007)".

Behavioral Inhibition System and Behavioral Approach System (BIS/BAS)

Carver and White's (1994) developed this scale to assess sensitivity to avoidance motivation (BIS) and approach motivation (BAS). The BIS/BAS scale "consists of 24 items, evaluated on a 4-point Likert scale (1 = strongly agree, 4 = strongly disagree). The BAS subscale (17 items) is divided into three dimensions: BAS-Drive (pursuit of goals), BAS-Fun Seeking (seeking new rewards), and BAS-Reward Responsiveness (anticipation or response to rewards). Higher BAS activity is associated with risk-taking behavior and positive emotions, while higher BIS activity reflects risk-averse behavior and negative emotions. The BIS/BAS scale has demonstrated good psychometric properties, with satisfactory internal consistency (Cronbach's alpha = 0.83 for BIS, 0.85 for BAS) and adequate test-retest reliability of 0.66 (Torrubia et al., 2001)".

Data Analysis

For this study, data was collected from 267 college students from Delhi-NCR region. The data were then analyzed using Statistical Package for the Social Sciences (IBM SPSS 25.0).

Descriptive statistical analysis was found out of the data. Furthermore, Pearson's correlation and multiple regressionwere carried out with the purpose of hypotheses verification.

Results

Table 1

Table showing Descriptive measures of the study variables

Variables	Maximum	Minimum	Mean	Std. Deviation
RR	20	5	9.27	4.77
DR	16	4	9.08	2.84
FS	16	4	8.24	3.07
AN	14	0	9.40	2.46

Note. N=267, RR=Reward Responsiveness, DR=Drive, FS=Fun Seeking, AN=Anhedonia

Table 2

Correlational matrix of the study variables

Variables	RR	DR	FS	AN
RR	-			
DR	.544**	-		
FS	.708**	.660**	-	
AN	-.239**	-.163*	-.213**	-

Note. N=267, **=p>.01, *=p>.05, RR=Reward Responsiveness, DR=Drive, FS=Fun Seeking, AN=Anhedonia

Table 3

Multiple regression analysis for anhedonia

Predictors		R	R^2				
	B			Std. Error	Beta	F	Sig.
Constant	5.828			7.387			
AN	-.177			.097	-.132		
DR	-.749			.091	-.602		
FS	-.121	.721	.520	.075	-.089	58.824	.000

Note: Predictors: (Constant), AN, DR, FS

Discussion

The present study aimed to investigate the relationship between reward sensitivity and anhedonia and also contribution of the three dimensions of reward sensitivity towards anhedonia among non-clinical youth. Data were collected from 267 college going participants (M=65, F=102) using the Behavioral Activating System/Behavioral Inhibition System (BAS/BIS) Scale and Snaith Hamilton Pleasure Scale (SHAPS). The main hypothesis of the study assumed that there would be a significant relationship between reward sensitivity and anhedonia and both would be negatively correlated with each other. Findings suggest that reward responsiveness (RR) had a significant negative correlation ($r=-.239^{**}$, $p<0.01$) with anhedonia (AN). Additionally, fun-seeking (FS) was also found to be correlated negatively with anhedonia (AN) ($r=-0.213$, $p<0.05$) and drive (DR) was also found to be negatively significant correlation with anhedonia (AN) ($r=-0.163^{*}$, $p<0.05$). More importantly, the three dimensions explain 52% of variance ($R^2 = .52$, $p = .000$) of anhedonia score of college students.

These findings are consistent with prior research findings suggesting that people with higher reward sensitivity tend to experience greater pleasure and lower levels of anhedonia (Liu et al., 2016; Eshel & Roiser, 2010). Veldhoven et al. (2019) studied how anhedonia and delay discounting influence the relationship between reward sensitivity and activity engagement in patients with an alcohol use disorder. The findings revealed that reward sensitivity was negatively correlated with anhedonia however, the sample differed from our study. Despite the difference we found a significant negative correlation between reward sensitivity and anhedonia among non-clinical youth in Delhi NCR. Disruptions in reward processing, such as deficits in reward anticipation, consumption, and decision-making, are core features of depression (Eshel & Roiser, 2010; Treadway et al., 2012). Importantly Liu et al., (2016) found that self-reported

anhedonia was associated with reduced reward sensitivity, regardless of depressive symptoms. This suggests that reward-related deficits linked to anhedonia may serve as potential risk markers for depression, particularly in high-risk individuals with subclinical symptoms.

The results provide preliminary rather than strong evidence that higher reward sensitivity may have a modest protective effect against anhedonia. Furthermore, it is important to note that there is currently no prior evidence showing that the fun-seeking and drive components of BAS are negatively correlated with anhedonia. While our study found this relationship to be significant, these results should be interpreted carefully. It is possible that this negative association reflects factors unique to our sample, such as the academic and social context of Indian college students. Alternatively, it might suggest that these BAS components operate differently across cultures or non-clinical populations. Future research should examine these components further using larger and more diverse samples to confirm these preliminary findings.

A key strength of this study lies in its focus on non-clinical youth in India, a group that has been largely overlooked in existing research on reward sensitivity and anhedonia. Most studies in this area either focus on the Western or clinical populations. By studying non-clinical Indian youth, this research provides valuable insight into how reward-related processes function in a different cultural and social context. Indian college students often face high academic pressure, limited mental health awareness, and changing social environments. These stressors can influence emotional well-being and affect the way rewards are perceived and experienced. Exploring these dynamics in a non-clinical group helps in identifying early psychological risk markers before the onset of clinical symptoms. This not only fills a major gap in the global literature but also contributes to cross-cultural understanding of anhedonia and reward processing. The presence of anhedonia among non-clinical youth is suggestive of increased risk

of the population for mental health issues like depression. An important thing to note here is that while anhedonia is strongly linked with depression, other psychiatric issues like anxiety, schizophrenia, chronic and persistent pain have also been found to be associated with anhedonia as found in the meta-analysis by Trostheim et al. (2020). This highlights the importance of developing reference values of anhedonia for non-clinical populations in order to better understand the nature of anhedonia.

The findings reveal that higher levels of anhedonia were observed in the non-clinical youth sample. This heightened anhedonia may be attributed to several socio-cultural and psychological factors. One significant contributor is the increasing materialism and consumer-oriented values among young adults. Research has shown that materialistic value orientations are negatively associated with life satisfaction, intrinsic motivation, and the ability to experience pleasure, suggesting a link between materialism and anhedonic symptoms (Dittmar et al., 2014; Kasser, 2016). In addition, the pervasive influence of social media reinforces these materialistic values and constant social comparisons. In today's age, social media platforms actively promote overconsumption, creating an environment where individuals are constantly comparing themselves to others, leading to a sense of inadequacy and dissatisfaction. Studies have found that excessive social media use is associated with depressive symptoms, emotional numbness, and reduced reward responsiveness (Sherman et al., 2016). As a result, the joy derived from simple, everyday pleasures is overshadowed by the pressure to acquire and achieve more. This shift may explain why even non-clinical populations such as the college students in our sample, report higher levels of anhedonia.

Furthermore, anhedonia is no longer just a symptom exclusive to depression as its presence in our non-clinical youth sample demonstrates. College-going students in Delhi are

often under significant stress. Notably, chronic stress especially in competitive academic environments has been shown to alter neural pathways associated with reward sensitivity and pleasure processing. Prolonged stress reduces dopaminergic activity and dampens hedonic capacity (Pizzagalli, 2014). These cumulative stressors stemming from being away from home, handling academic pressures, and competing in a highly competitive environment for future careers can contribute to an overall emotional numbness and loss of pleasure in everyday activities, exacerbating anhedonic symptoms. Therefore, the high levels of anhedonia observed in this study may reflect the broader psychological impact of modern societal pressures on today's youth.

One of the major limitations of the study is that data was collected using self-report measures of anhedonia and reward sensitivity which might have influenced the findings. Second the sample size, though adequate enough for the statistical analysis conducted, was relatively small and may not have captured the subtle differences within subgroups or across varying cultural and socio-economic backgrounds. And finally, there is no existing literature to support our findings that fun-seeking and drive are negatively correlated to anhedonia.

Conclusion

The present study aimed to explore the relationship between reward sensitivity and anhedonia among non-clinical youth. Findings revealed a negative correlation between anhedonia and the BAS components, particularly reward responsiveness, indicating that individuals with greater reward sensitivity may experience fewer anhedonic symptoms. Although the correlations observed were weak in strength, they were statistically significant, suggesting a consistent pattern of association that warrants further examination. These results, therefore, offer

preliminary evidence rather than conclusive proof of a protective relationship between reward sensitivity and anhedonia.

The results tentatively suggest that higher reward responsiveness and fun-seeking tendencies could buffer against anhedonic symptoms in non-clinical populations, but further research is necessary to validate this interpretation. Because the study relied solely on self-report measures, it is possible that response biases and individual differences in introspection influenced the results. Moreover, the cross-sectional design limits the ability to infer causality between reward sensitivity and anhedonia.

Despite these limitations, this study contributes valuable insights into how reward-related processes operate within non-clinical Indian youth, a group that has been largely underrepresented in the literature. It highlights the importance of investigating early emotional and motivational markers before the onset of clinical symptoms. While the correlations are modest, their statistical significance showcases that meaningful relationships exist and can inform future research aimed at understanding mechanisms of emotional resilience and vulnerability.

Future research should build on these preliminary findings by adopting longitudinal or mixed-method designs to examine how reward sensitivity and anhedonia evolve over time. Such approaches would help determine causal relationships and clarify whether reduced reward responsiveness predicts later emotional difficulties or vice versa. Studies should also include more diverse samples of Indian youth, considering variations across gender, socioeconomic status, and cultural background to enhance the generalizability of results. Incorporating behavioural tasks that objectively assess reward processing, alongside neurobiological measures such as neuroimaging or psychophysiological indicators, would provide a more comprehensive

understanding of the mechanisms linking reward sensitivity and hedonic experience. These advancements could ultimately inform early intervention strategies and contribute to culturally informed models of youth mental health.

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