

**Journal of Social Sciences Research & Policy (JSSRP)**

## The Mediating Role of Emotion Regulation in the Relationship between Stress, Social Support, and Craving Intensity in Individuals with Substance Use Disorder

Wagma Iqbal<sup>1</sup>, Anum Iqbal<sup>1</sup>, Kashmala Rehan<sup>1</sup>, Jabir Ansari<sup>1</sup>

1. MPhil Scholar, Department of Psychology, Abdul Wali Khan University Mardan, Pakistan.

**How to Cite This Article:** Iqbal, W., Iqbal, A., Rehan, K. & Ansari, J. (2026). The Mediating Role of Emotion Regulation in the Relationship between Stress, Social Support, and Craving Intensity in Individuals with Substance Use Disorder. *Journal of Social Sciences Research & Policy*. 4 (01), 243-258.

DOI: <https://doi.org/10.71327/jssrp.41.243.258>

ISSN: 3006-6557 (Online)

ISSN: 3006-6549 (Print)

Vol. 4, No. 1 (2026)

Pages: 243-258

### Key Words:

emotion regulation, substance use disorder, the degree of cravings, stress perception, social support, an issue related to emotion regulation, structural equation modeling

### Corresponding Author:

Wagma Iqbal

Email: [wagmajaved@gmail.com](mailto:wagmajaved@gmail.com)

### License:



**Abstract:** In this study, the author discusses the ability of emotion regulation to mediate a potential relationship between perceived stress, social support, and the severity of craving in people with substance use disorder (SUD). A correlational cross-sectional study was conducted, and the sample group comprised 1200 individuals with SUD diagnoses in Pakistani rehabilitation centers in Khyber Pakhtunkhwa. These questionnaires contained the PSS-10 (perceived stress), MSPSS (social support), DERS (emotion regulation difficulties), and OCDUS (craving intensity). Greater perceived stress was significantly related to emotion regulation difficulties ( $r = .52$ ,  $p < .001$ ) and craving intensity ( $r = .68$ ,  $p < .001$ ), and lower social support was inversely related to emotion regulation difficulties ( $r = -.46$ ,  $p < .001$ ) and craving intensity ( $r = -.26$ ,  $p < .001$ ). The importance of emotion regulation was supported by mediation analyses, and perceived stress was a major predictor of a poorer regulator of emotion, leading to a more significant level of craving, that is, it was revealed that there was some partial mediation. In the example of social support, the mediation was full, with support shedding light on the regulation of emotion, which, in turn, predicts the reduction of craving, implying that the protective qualities of social support are significantly mediated by alleviating the mechanisms of coping with emotions. These findings justify integrating the application of psychological skills training and social resource needs in the field of addiction management, making it clear that the intervention that implies an effort to decrease the level of stress, manage and regulate moods, and social support may lead to the overall reduction of cravings and a successful long-term post-treatment recovery in patients with SUD.

## Introduction

Substance Use Disorder is a complex disorder involving the inability to choose between abusing drugs and failing to gain positive results, as drug use adversely affects their health, mental, and social lives (Schreiber et al., 2012). This is a serious public health issue, and detoxification does not significantly reduce relapse rates (Xia et al., 2022). The main characteristics of SUDs also entail compromised

substance use control, which is indicated by taking substances in an increased amount or retention, or over an extended period than intended, inability to limit or regulate usage, and failure to quit (McNeely & Adam, 2020; Poisson et al., 2021). One of the main aspects of SUD that considerably leads to relapse and sustains addictive behavior is craving (Volkow et al., 2019). Craving is defined as the raw desire or urge to be affected by the effects of a substance that was once used (Rizk et al., 2024). It is a multidimensional mental process that is wider than substance abuse because it involves behaviors related to food, sex, and other reward-seeking behaviors, and it engages the limbic system and the prefrontal cortex (Shabbir et al., 2013; Sharma et al., 2014). Craving may vary depending on how mild or deep craving thoughts may feel up to the urge of the subject to the point of actually becoming overwhelming and are influenced by environmental situations, stress, and substance availability (Kakko et al., 2019). Additionally, SUD is more complex because of its common co-occurrence with other mental conditions, such as post-traumatic stress disorder (McCauley et al., 2012).

The etiology and maintenance of SUD is a complex interaction of many factors, including stress, social support, emotion regulation, and self-control. Stress, an inseparable component of contemporary life, has a substantial influence on substance use behaviors (Koob, 2014). It can also serve as an effective relapse step since people may resort to using substances as an inadequate coping method that will help them manage their sense of distress (Poisson et al., 2021). It may interfere with decision-making because the limbic system associated with emotions matures before the frontal cortex, which regulates decision-making (Ritchwood et al., 2015). On the other hand, social support, including resources such as emotional, instrumental, or informational support that other people offer, is stated to be a protective factor that prevents substance use and relapse. Specifically, people who are within positive social networks are stated to have a high threshold for stress-induced craving. This means that such people have less will to turn to substances to regulate their emotions.

Emotion regulation, defined as the ability to modulate and manage emotional experiences, is a critical psychological process in the context of SUDs (Feltenstein & See, 2008). It is a multifaceted construct encompassing the conscious and unconscious strategies individuals employ to modulate the intensity, duration, and expression of their emotional experiences. Deficits in emotion regulation skills have been consistently linked to increased substance use, cravings, and relapse rates. Individuals with impaired emotion regulation capabilities may be more susceptible to experiencing intense cravings, which in turn precipitates a heightened reliance on substances as a maladaptive strategy for emotional modulation (Shabbir et al., 2013; Sharma et al., 2014).

### **Theoretical Background and Hypotheses Formation**

#### **Self-Regulation Theory and Addiction**

Self-regulation- theory posits that individuals have a finite capacity to exert control over their impulses, emotions, and behaviors—a “strength” that can be depleted, much like a muscle (Muraven & Baumeister, 2000; Baumeister, 2002). In addition, substance use can be viewed as a self-regulation failure, where craving overwhelms this psychological resource (Baumeister, 2002). Empirical studies have shown that individuals with higher self-control are more successful in maintaining abstinence, and greater self-regulation capacity correlates with longer periods of sobriety in communal recovery settings (Ferrari et al., 2009). Furthermore, addicts exhibit higher impulsivity and steeper delay-discounting rates, preferring immediate substance use despite greater future costs, suggesting a compromised ability to weigh long-term outcomes (Ferrari et al., 2009). Thus, under stress, diminished self-control weakens resistance to cravings, increasing the risk of relapse. Therefore, strengthening self-regulatory capacity may enhance treatment efficacy.

### **Emotion Regulation as a Self-Regulatory Mechanism**

Emotion regulation is closely tied to self-control and refers to the capacity to modulate emotional arousal to adaptive ends (Gross, 1998). Addiction research has demonstrated that poor emotion regulation is a key vulnerability factor in SUD, as individuals resort to substance use to alleviate negative affect (Aldao, Nolen-Hoeksema, & Schweizer, 2010). Under the limited resource model, both emotion regulation and self-control draw from the same pool; thus, stress-induced depletion can lead to emotional dysregulation and impulsive substance use, manifested in intensified craving and increased relapse potential.

### **Stress-Buffering Model of Social Support**

Cohen and Wills (1985) introduced the stress-buffering model, asserting that perceived social support mitigates the negative impact of stress. Social bonds offer emotional and informational resources that reappraise stressors or reduce physiological arousal (e.g., cortisol), buffering individuals during high stress episodes (Cobb, 1976; Cohen & Wills, 1985). A meta-analysis of smoking cessation cohorts revealed that social support reduces relapse risk by alleviating withdrawal-related stress (Creswell et al., 2014). Neurobiologically, support elevates oxytocin levels, which dampens stress responses and facilitates executive functioning (Heinrichs et al., 2003).

### **Association between Perceived Stress and Craving Intensity**

The interplay between perceived stress levels and craving intensity constitutes a complex psychophysiological phenomenon with significant implications for understanding and treating addictive disorders. Because perceived stress is an indicator of an individual's appraisal of demands they cannot cope with their available resources, the onset of a cascade of neuroendocrine processes may have dire consequences on craving circuits (Park & Sung, 2020). Localized in large part in the limbic system and prefrontal cortex, these circuits are complex determinants of the motivational drive to search for and ingest rewarding stimuli, and resulting substances of abuse or highly palatable foods (Shabbir et al., 2013; Sharma et al., 2014). The neurobiological foundations of this connection are highlighted by the engagement of the hypothalamic-pituitary-adrenal axis, leading to the release of cortisol, one of the main stress hormones. However, in the short term, it can cause harmful effects on brain activity when chronically elevated (Maier et al., 2015).

Repeated stress may sensitize a major part of the brain's reward system, the mesolimbic dopamine circuit, which causes an exaggerated response to craving cues (Zorrilla & Koob, 2019). This sensitization may appear as an augmented release of dopamine when exposed to stress or various aspects of a drug substance, thereby exacerbating the addition of the subjective experience of craving and increasing the threat of relapse among people with substance use disorders (Kakko et al., 2019). In addition, the manifestation of other neurotransmitter systems is also possible, including serotonin and norepinephrine, which change due to stress and lead to craving intensification (Ulrich-Lai, 2016). The complex interplay between the desire for food, drugs, and sex concerns the limbic system and prefrontal cortex, which underlines the significance of craving in managing depression and enhancing quality of life (Shabbir et al., 2013; Sharma et al., 2014). For example, stress may interfere with the serotonergic system, which is pivotal in controlling mood and appetite, which, in turn, may result in being more impulsive and having the tendency to indulge in craving-related behaviors (Shabbir et al., 2013; Ventura et al., 2013). Addiction is involved in the orbitofrontal cortex and anterior cingulate gyrus, as these regions are activated when one is intoxicated, craving, and bingeing, and deactivated during withdrawal (Yang et al., 2022).

In addition, a significant center of the reward circuitry, the nucleus accumbens, also experiences

functional and morphological alterations as a result of chronic stress and substance exposure (Bayassi-Jakowicka et al., 2022). These modifications make it more difficult to engage in cognitive control of craving, hence adding to the independence of addiction (Feltenstein & See, 2008). An initial phase of dopamine release in association with reward is preceded by a dysfunction in dopamine processes and an anti-reward effect by the corticotropin-releasing factor system (George et al., 2011; Taber et al., 2012), a phenomenon that depicts an allostatic state resulting from the resultant chronic dysregulation of these systems. Remarkably, corticotropin-releasing factor, which is released after a stressful encounter by the hypothalamus and amygdala, is of utmost importance in sensitization, which is between systems mechanism of neuroadaptation (Roberts and Koob, 1997). Glutamatergic neurons are also used as a significant excitatory neurotransmission system in the central nervous system, which controls addiction behavior (Rao et al., 2015). This implies that stress-induced neuroplasticity in these brain cortices is also the reason why craving is more permanent and why it is difficult to be free even after quitting it (Volkow et al., 2011).

### **H1: Perceived stress and craving intensity are positively correlated.**

#### **Association between Perceived Social Support and Craving Intensity**

Subjectively perceived social support as the belief in the accessibility of assistance and post-traumatic comfort in others has proven to be a powerful protective factor against an abundance of maladaptation, such as substance abuse and the severity of urges (Perry et al., 2012; Spohr et al., 2018). The concept of perceived social support is a reflection of an emotion-based experience by the individual regarding how they feel respected, supported, and understood physically in their social environment (Li et al., 2022). Such an understanding is important because it focuses on the subjective experience of support and the perception of a lack of a social network rather than the objective existence of a social network (Miller et al., 2021). Subscribers who report having perceived a more significant amount of social support normally depict a more profound psychological health, improved coping style, and the ability to withstand stressful life events without using substance abuse as a component of maladaptive scholarly coping behavior (Langford et al., 1997). On the other hand, individuals with low perceived social support will have an enhanced susceptibility to negative emotional states and will be highly dependent on substances to reduce distress, thus escalating cravings (Miller et al., 2021; Nisbet et al., 2023).

The negative correlation between the measure of perceived social support and the levels of craving intensity occurs due to the multilayered processes of interaction of neurobiological, psychological, and social processes. The neurobiological mechanism of action of perceived social support is the possible regulation of the reward pathway in the brain, which decreases the salience of substance-related stimuli and lessens cravings (Sharma et al., 2014). Social support can alleviate the negative emotional states that constitute the so-called darkness of addiction, including high reliance on drugs as a means of managing withdrawal symptoms and positive emotions, which are encouraged and facilitated by social support (Kakko et al., 2019; Kenny et al., 2006). Moreover, executive functions can be strengthened with the help of perceived social support, which can help a person have more control over their impulses and possess craving resistance (Koob, 2014; Shabbir et al., 2013). The lower craving that has been associated with abstinence from opioids means that the social context is a key factor in the ability to control addiction and craving, and relapse is more pronounced when patients feel isolated (Dijkstra et al., 2007). Psychologically, the impression of social support gives one the contented sensation of a sense of belonging, self-worth, and hope that they might eradicate the triggers that translate to craving onset. Social support is the understanding of being understood and accepted (Surzykiewicz et al., 2022). The promotion of the display of emotions and the attitude of warmth, support, and reassurance among

people also constitute the components of functional social support (Machado et al., 2020). Social support has the following consequences: positive health outcomes, psychosocial adaptation, coping behaviors, and health (Behrendt et al., 2023). Socially, the attribution of social provision provides accessibility to resources, counsel, and support to participate in prosocial efforts, and it favors healthier lifestyle tendencies (Stout et al., 2012).

**H2: Perceived social support is negatively associated with craving intensity.**

**Emotion Regulation Mediator between the Perceived Stress and Craving Intensity**

Perceived stress, the omnipresent feature of contemporary living spaces, significantly affects the emotional states and behavioral patterns of people, leading to maladaptive coping strategies such as increased craving intensity (Flores-Kanter et al., 2021). The correlation between perceived stress and craving intensity is not a straightforward relationship; the ability to handle emotions decisively plays the role of a mediator in this complex interaction (Lazarus, 1974). Emotional regulation is considered a subset of cognition and behavior, which are used to control the experience and expression of emotion, and they regulate the kind of response to the emotion and its strength (Compare et al., 2014). Good emotion regulation allows one to pass through stressful situations without engaging in maladaptive behaviors, while poor emotion regulation may worsen the effects of stress, making one susceptible to cravings and other impulsive behaviors (Schreiber et al., 2012). Stressful events usually trigger emotional distress in individuals, and they adopt emotion-focused coping to deal with it (Ali et al., 2025). While problem-focused coping aims to address stressors directly, emotion-focused coping seeks to minimize their emotional impact. When such coping mechanisms are ineffective, negative emotions can intensify, potentially triggering cravings as a means of seeking immediate relief (Ali et al., 2025).

The transactional model of stress and self-regulation posits that coping strategies are employed to manage the emotional and practical challenges of stressful situations (Ali et al., 2025). This model emphasizes the dynamic interaction between the individual and the environment, highlighting how coping strategies can mitigate or exacerbate the impact of stress on well-being. In this context, emotion regulation serves as a critical moderating factor that influences the effectiveness of coping efforts and subsequent cravings. Difficulties in emotion regulation have been identified as a transdiagnostic risk factor for various forms of psychopathology, underscoring the importance of understanding how stress affects emotion regulation and, consequently, craving intensity (Langer et al., 2025). The capacity to adapt to undesirable situations and maintain composure under stress is linked to emotion-focused coping (Gonçalves e Jesus, 2015). Emotions may be more helpful to focus on, and do it depend on the situation.

**H3: Emotion regulation mediates the relationship between perceived stress and craving intensity.**

**Mediation of Emotion Regulation in the Relationship Between perceived social support and craving intensity**

The interactions between the perception of social support, emotion regulation, and the intensity of craving are very complex and constitute an important research direction, especially when it comes to addictive behaviors and mental health (Swerdlow & Johnson, 2020). As a protective factor, perceived social support may play a significant role in ensuring that an individual is in a good position to effectively control their emotions, which, in turn, affects the severity of the cravings that a person develops (Wang & Shen, 2025). Part of the mood manipulation strategy is a potent mechanism through which social support affects craving, namely emotion regulation (Sandel et al., 2022). These mediation results indicate that individuals reporting higher values of perceived social support feel prepared to use adaptive emotion regulation strategies, which prevents them from experiencing high levels of craving



(Surzykiewicz et al., 2022). The ability to control emotional states is a valuable indicator of various behaviors (Kim et al., 2024). Certain individuals employ various tactics to manage their feelings (Li et al., 2017).

The question of how emotions are socially regulated requires input from different disciplines to make this picture as complete as possible (Reeck et al., 2015). Skills-based training, being the basis of the control of emotional influences, would have led to the effectiveness of the interventions applied to the enhancement of emotional well-being (Clen et al., 2013). Emotion regulation deficits contribute to the development, maintenance, and alleviation of many different manifestations of psychopathology (Gross & Muñoz, 1995). Impairment in emotion management may manifest as excess responsiveness, hyperactivity, and delays in restoring the normal state (Kalisch et al., 2006; Robin et al., 2023). Emotional dysregulation has been attributed to many psychopathologies; therefore, it is essential to comprehend the effect of perceived social support on emotion regulation (Navas et al., 2017).

The support offered is also a significant contributing factor to a person having the tools and strength to move through precipitous events and emotional anxiety (Renna et al., 2020). When people have a sense of being helped and belonging to others, they tend to have better chances of emerging with proper emotion regulation strategies (Snyder et al., 2013). Social support entails a sense of understanding and acceptance, which provides desirable emotional support and promotes a healthy mind (Surzykiewicz et al., 2022). Support can be provided through different relationships. These are friends, family members, and other social connections that can help people use effective emotion regulation strategies. On the other hand, decreased social support may worsen emotional dysfunction and, hence, make one more susceptible to craving and other negative coping skills (Ali et al., 2025). Perceived social support has also been shown to optimize psychological processes (Morey et al., 2021).

**H4: Emotion regulation mediates the relationship between perceived social support and craving intensity.**

### Methodology

This research adopted the above cross-sectional correlational research study design to investigate how emotion regulation mediates the relationship between perceived stress and social support with the intensity of craving among people with substance use disorder (SUD). One-thousand two hundred people with SUD were sampled using rehabilitation centers in Peshawar, Mardan, and Charsadda districts in Khyber Pakhtunkhwa, Pakistan. The inclusion criteria consisted of treating patients with SUD, meeting the diagnostic criteria in accordance with the Drug Abuse Screening Test (DAST-10), and a minimum age of 18 years. Patients with extreme psychiatric comorbidities or cognitive impairment were also excluded. Sampling was purposive and was done in collaboration with the staff at the rehabilitation center. This study received ethics approval and administrative authorization, and informed consent was obtained from all participants. The DAST-10 was used to screen the respondents, and a score of 3 and above indicated eligibility. Potential candidates were either randomly selected or self-selected and asked to provide responses to questionnaires either individually or in small groups with some help from trained research personnel.

### Scales Used

- **Drug Abuse Screening Test (DAST-10):** A 10-item instrument scored dichotomously (0/1). A score of  $\geq 3$  indicates moderate-to-severe drug problems. (Skinner, 1982)
- **Perceived Stress Scale (PSS-10):** A 10-item self-report scale rated on a 5-point Likert scale (0–4) that measures perceived stress levels. (Cohen, Kamarck, & Mermelstein, 1983)

- **Multidimensional Scale of Perceived Social Support (MSPSS):** A 12-item scale on a 7-point Likert scale (1–7) assessing support from family, friends, and significant others. (Zimet et al., 1988)
- **Difficulties in Emotion Regulation Scale (DERS):** A 36-item scale rated on a 5-point Likert scale (1–5) that measures six domains of emotion dysregulation. (Gratz & Roemer, 2004)
- **Obsessive Compulsive Drug Use Scale (OCDUS):** A 13-item scale rated on a 5-point Likert scale (0–4) assessing obsessive thoughts, interference, and craving intensity. (OCDUS; Franken et al., 2002)

Data analysis included descriptive statistics and Pearson correlations using SPSS. Mediation was tested using Hayes' PROCESS macro (Model 4) with 5,000 bootstrap samples to assess the indirect effects.

## Results

**Table 1**

**Demographic Characteristics of Participants (N = 1200)**

Variable	Category	N	%
Gender	Male	1040	86.7
	Female	160	13.3
Age	20–25	191	15.9
	26–30	203	16.9
	31–35	211	17.6
	36–40	181	15.1
	41–45	186	15.5
	46–50	228	19.0
Substance	Heroin	592	49.3
	Cannabis	350	29.2
	Ice/Meth	135	11.3
	Prescription drug	92	7.7
	Others	31	2.6

The study included 1,200 participants, the majority of whom were male (86.7%), with females accounting for 13.3% of the sample. Age distribution was relatively balanced across categories, although the largest proportion (19.0%) fell into the 46–50 years age group. Regarding substance use, heroin was the most commonly reported primary substance (49.3%), followed by cannabis (29.2%), while smaller proportions reported ice/meth (11.3%), prescription drugs (7.7%), and other substances (2.6%). This demographic profile indicates a predominantly middle-aged male population, with heroin and cannabis being the most prevalent substances.

**Table 2**  
**Correlation Matrix of Study Variables (N = 1200)**

Variable	1	2	3	4
1. Perceived Stress	—			
2. Social Support	.03	—		
3. Emotion Regulation	.52**	-.46**	—	
4. Craving Intensity	.68**	-.26**	.57**	—

Note:  $p < .01$  (2-tailed). All coefficients are Pearson's  $r$  values

Higher perceived stress was strongly associated with greater craving intensity ( $r = .68, p < .01$ ) and poorer emotion regulation ( $r = .52, p < .01$ ). Social support was negatively related to emotion regulation difficulties ( $r = -.46, p < .01$ ) and craving intensity ( $r = -.26, p < .01$ ), indicating its protective role in reducing these factors. Poorer emotion regulation was linked to higher craving intensity ( $r = .57, p < .01$ ), supporting the study's hypothesis.

**Table 3**  
**Mediation Analysis of Emotion Regulation on Craving Intensity**

Path	Coefficient (B)	$p$ -value
H3:		
Stress → Emotion Regulation	0.91	< .001 **
Emotion Regulation → Craving	0.26	< .001 **
Stress → Craving (direct)	0.82	< .001 **
H4:		
Social Support → Emotion Regulation	-0.60	< .001 **
Emotion Regulation → Craving	0.51	< .001 **
Social Support → Craving (direct)	0.01	0.754 (ns)

\*\* $p < .001$  All coefficients are unstandardized.

Higher perceived stress significantly predicted poorer emotion regulation ( $B = 0.91, p < .001$ ), which, in turn, significantly predicted greater craving intensity ( $B = 0.26, p < .001$ ). The direct effect of stress on craving remained significant ( $B = 0.82, p < .001$ ), indicating a partial mediation.

Greater social support significantly predicted better emotion regulation ( $B = -0.60, p < .001$ ), which, in turn, significantly predicted reduced craving intensity ( $B = 0.51, p < .001$ ). The direct effect of social support on craving was not significant ( $B = 0.01, p = .754$ ), indicating complete mediation.

These results support both H3 and H4, confirming that emotion regulation plays a key mediating role between stress, social support, and craving intensity.

## Discussion

This study examined the interrelationships among perceived stress, social support, emotion regulation, and craving intensity in a large sample of individuals with substance use disorders. The findings provide



strong empirical support for all hypothesized relationships. Consistent with prior research, perceived stress was strongly and positively associated with craving intensity ( $r = .68, p < .001$ ), indicating that individuals who experience greater stress tend to report stronger urges to use substances. This aligns with recent studies suggesting that stress activates neurobiological systems that heighten reward sensitivity and craving, particularly in individuals with dysregulated emotional responses (Weiss et al., 2021).

Similarly, social support was negatively related to craving intensity ( $r = -.26, p < .001$ ), suggesting that individuals embedded in stronger support networks reported lower craving levels. This supports the stress-buffering hypothesis, which posits that social resources protect individuals from adverse psychological effects of stress (Taylor, 2021). Recent evidence has further shown that higher perceived support is associated with a lower relapse risk and better treatment adherence in substance-use populations (Yang et al., 2021).

The mediation analyses provided deeper insights into these relationships by confirming the critical role of emotion regulation. For perceived stress, the mediation was partial: stress predicted poorer emotion regulation, which in turn predicted higher craving intensity, but stress also retained a direct influence. This suggests that while difficulty in regulating emotions explains a significant portion of the stress–craving link, stress also affects craving through additional pathways, potentially including heightened physiological reactivity or automatic drug-use schemas.

For social support, the mediation was full—support predicted better emotion regulation, which subsequently predicted reduced craving, but the direct effect of support on craving was non-significant. This implies that the protective influence of social support operates almost entirely through its ability to strengthen emotional coping. This aligns with resilience models that frame social resources as key enhancers of adaptive self-regulation in the face of stress (Park et al. 2022). The distinction between partial and full mediation also has important clinical implications, suggesting that while social support works primarily by improving emotional coping, stress affects craving through both emotional and non-emotional mechanisms.

These findings fit within a growing body of research highlighting the interplay between emotional processes and environmental support in addiction outcomes. Recent meta-analyses have confirmed that difficulties in emotion regulation are among the strongest predictors of craving and relapse (Darharaj et al., 2023). Moreover, interventions that specifically target both social resources and emotional coping skills have shown promising results in improving treatment outcomes (Sun et al., 2024). By integrating these approaches, treatment programs may more effectively address the internal and external drivers of craving in individuals with substance use disorders.

### **Theoretical and Practical Implications**

The results reinforce theoretical frameworks such as Lazarus and Folkman’s (1984) stress–coping model, in which social support buffers the negative impact of stress on health outcomes, and contemporary resilience models that highlight emotion regulation as a core mechanism of adaptive functioning. The evidence that emotion regulation mediates both stress and support effects underscore the value of targeting this skill in treatment.

In practical terms, interventions for substance use disorders should incorporate structured emotion regulation training. Dialectical Behavior Therapy, Mindfulness-Based Relapse Prevention, and Mindfulness-Oriented Recovery Enhancement have demonstrated effectiveness in enhancing emotion regulation and reducing craving intensity (Weiss et al., 2021). Similarly, fostering supportive social environments through family-based interventions, peer support groups, and community recovery

networks may indirectly reduce cravings by enhancing emotional stability. Integrated programs that combine these elements could offer the most comprehensive approach to craving reduction and relapse prevention in alcohol use disorder.

### Limitations and Future Directions

The cross-sectional design of this study limits causal inference, and longitudinal research is needed to confirm the directionality of these effects. Although emotion regulation emerged as a significant mediator, other unmeasured factors, such as impulsivity, coping style, resilience, and trauma history, may also contribute to the observed relationships. Self-report measures may be affected by recall bias or social desirability bias. Future studies could benefit from incorporating behavioral and physiological assessments of stress and craving.

Future research should explore whether these relationships differ across substance types, cultural contexts, and demographic groups. For example, gender-based differences in emotion regulation strategies or access to social support could influence the magnitude or nature of the mediation effects. Examining the potential moderating role of social support in the stress–craving relationship could also add valuable nuance to our understanding of these pathways.

### Conclusion

The present findings demonstrate that perceived stress significantly increases craving intensity, whereas social support reduces it, with emotion regulation serving as a crucial mediator in both relationships. In the case of stress, this mediation was partial, indicating both emotional and non-emotional pathways to craving, whereas for social support, the mediation was full, underscoring its role in strengthening emotional coping. These insights highlight the importance of integrating psychological skills training and social resource enhancement in addiction treatment. By simultaneously targeting stress reduction, emotion regulation, and social support, interventions may more effectively reduce cravings and support sustained recovery in individuals with substance use disorders.

### References

- Aldao, A., Nolen-Hoeksema, S., & Schweizer, S. (2010). Emotion-regulation strategies across psychopathology: A meta-analytic review. *Clinical Psychology Review*, 30(2), 217–237. <https://doi.org/10.1016/j.cpr.2009.11.004>
- Ali, F., Khan, W., Treasurer, D., Bilal, A. R., & Nasir, S. (2025). Do coping strategies really matter at the workplace? Workplace stress and employee's psychological well-being during the COVID-19 pandemic. *Current Psychology*. <https://doi.org/10.1007/s12144-025-07457-z>
- Ali, F., Khan, W., Treasurer, D., Bilal, A. R., & Nasir, S. (2025). Do coping strategies really matter at the workplace? Workplace stress and employee's psychological well-being during the COVID-19 pandemic. *Current Psychology*. <https://doi.org/10.1007/s12144-025-07457-z>
- Baler, R. D., & Volkow, N. D. (2011). Drug addiction: The neurobiology of disrupted self-control. *Trends in Molecular Medicine*, 17(5), 294–302. <https://doi.org/10.1016/j.molmed.2011.01.003>
- Baumeister, R. F. (2002). Ego depletion and self-regulation failure: Implications for prevention of and intervention in addiction. *Addiction*, 97(1), 15–25. <https://doi.org/10.1046/j.1360-0443.97.s01.3.x>
- Bayassi-Jakowicka, M., Lietzau, G., Czuba, E., Patrone, C., & Kowiański, P. (2022). More than Addiction—The Nucleus Accumbens Contribution to Development of Mental Disorders and Neurodegenerative Diseases [Review of More than Addiction—The Nucleus Accumbens Contribution to Development of Mental Disorders and Neurodegenerative Diseases]. *International Journal of Molecular Sciences*, 23(5), 2618. Multidisciplinary Digital Publishing Institute. <https://doi.org/10.3390/ijms23052618>

- Behrendt, D., Spieker, S., Sumngern, C., & Wendschuh, V. (2023). Integrating social support into interventions among the elderly in nursing homes: a scoping review [Review of Integrating social support into interventions among the elderly in nursing homes: a scoping review]. *BMJ Open*, 13(4). BMJ. <https://doi.org/10.1136/bmjopen-2023-071962>
- Clen, S. L., Mennin, D. S., & Fresco, D. M. (2013). Emotion Regulation Strategies (p. 1). <https://doi.org/10.1002/9781118528563.wbcbt05>
- Cobb, S. (1976). Social support as a moderator of life stress. *Psychosomatic Medicine*, 38(5), 300–314. <https://doi.org/10.1097/00006842-197609000-00003>
- Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin*, 98(2), 310–357. <https://doi.org/10.1037/0033-2909.98.2.310>
- Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, 24(4), 385–396. <https://doi.org/10.2307/2136404>
- Compare, A., Zarbo, C., Shonin, E., Gordon, W. V., & Marconi, C. (2014). Emotional Regulation and Depression: A Potential Mediator between Heart and Mind [Review of Emotional Regulation and Depression: A Potential Mediator between Heart and Mind]. *Cardiovascular Psychiatry and Neurology*, 2014, 1. Hindawi Publishing Corporation. <https://doi.org/10.1155/2014/324374>
- Creswell, K. G., Cheng, Y., & Levine, M. D. (2014). A test of the stress-buffering model of social support in smoking cessation: Is the association between social support and stress independent of depression? *Nicotine & Tobacco Research*, 17(5), 566–571. <https://doi.org/10.1093/ntr/ntu173>
- Darharaj, A., Gopalakrishnan, R., & Rao, V. (2023). Emotional dysregulation and craving in patients with substance use disorder: The mediating role of psychological distress. *Substance Abuse Treatment, Prevention, and Policy*, 18(1), 21. <https://doi.org/10.1186/s13011-023-00512-4>
- Dijkstra, B. A. G., Jong, C. A. J. de, Bluschke, S. M., Krabbe, P. F. M., & Staak, C. P. F. van der. (2007). CLINICAL STUDY: Does naltrexone affect craving in abstinent opioid-dependent patients? *Addiction Biology*, 12(2), 176. <https://doi.org/10.1111/j.1369-1600.2007.00067.x>
- Feltenstein, M. W., & See, R. E. (2008). The neurocircuitry of addiction: an overview [Review of the neurocircuitry of addiction: an overview]. *British Journal of Pharmacology*, 154(2), 261. Wiley. <https://doi.org/10.1038/bjp.2008.51>
- Ferrari, J. R., Stevens, E. B., & Jason, L. A. (2009). The relationship of self-control and abstinence maintenance: An exploratory analysis of self-regulation. *Journal of Groups in Addiction & Recovery*, 4(1–2), 32–41. <https://doi.org/10.1080/15560350802712325>
- Flores-Kanter, P. E., Moretti, L. S., & Medrano, L. A. (2021). A narrative review of emotion regulation process in stress and recovery phases [Review of A narrative review of emotion regulation process in stress and recovery phases]. *Heliyon*, 7(6). Elsevier BV. <https://doi.org/10.1016/j.heliyon.2021.e07218>
- Franken, I. H. A., Hendriks, V. M., & van den Brink, W. (2002). Initial validation of two opiate craving questionnaires: The obsessive compulsive drug use scale and the desires for drug questionnaire. *Addictive Behaviors*, 27(5), 675–685. [https://doi.org/10.1016/S0306-4603\(01\)00200-2](https://doi.org/10.1016/S0306-4603(01)00200-2)
- George, O., Moal, M. L., & Koob, G. F. (2011). Allostasis and addiction: Role of the dopamine and corticotropin-releasing factor systems [Review of Allostasis and addiction: Role of the dopamine and corticotropin-releasing factor systems]. *Physiology & Behavior*, 106(1), 58. Elsevier BV. <https://doi.org/10.1016/j.physbeh.2011.11.004>
- Gonçalves, E., & Jesus, S. N. de. (2015). Vulnerability and Resilience to Stress and Immune and Neuroendocrine Function in Portuguese Subjects with Psychic Anomaly (Anxiety and Depression).

- Open Journal of Psychiatry*, 5(4), 362. <https://doi.org/10.4236/ojpsych.2015.54041>
- Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in emotion regulation scale. *Journal of Psychopathology and Behavioral Assessment*, 26(1), 41–54. <https://doi.org/10.1023/B:JOBA.0000007455.08539.94>
- Gross, J. J. (1998). The emerging field of emotion regulation: An integrative review. *Review of General Psychology*, 2(3), 271–299. <https://doi.org/10.1037/1089-2680.2.3.271>
- Gross, J. J., & Muñoz, R. F. (1995). Emotion regulation and mental health. *Clinical Psychology Science and Practice*, 2(2), 151. <https://doi.org/10.1111/j.1468-2850.1995.tb00036.x>
- Heinrichs, M., Baumgartner, T., Kirschbaum, C., & Ehler, U. (2003). Social support and oxytocin interact to suppress cortisol and subjective responses to psychosocial stress. *Biological Psychiatry*, 54(12), 1389–1398. [https://doi.org/10.1016/S0006-3223\(03\)00465-7](https://doi.org/10.1016/S0006-3223(03)00465-7)
- Kakko, J., Alho, H., Baldacchino, A., Molina, R., Nava, F., & Shaya, G. (2019). Craving in Opioid Use Disorder: From Neurobiology to Clinical Practice [Review of Craving in Opioid Use Disorder: From Neurobiology to Clinical Practice]. *Frontiers in Psychiatry*, 10. *Frontiers Media*. <https://doi.org/10.3389/fpsy.2019.00592>
- Kalisch, R., Wiech, K., Herrmann, K., & Dolan, R. J. (2006). Neural Correlates of Self-distraction from Anxiety and a Process Model of Cognitive Emotion Regulation. *Journal of Cognitive Neuroscience*, 18(8), 1266. <https://doi.org/10.1162/jocn.2006.18.8.1266>
- Kenny, P. J., Chen, S. A., Kitamura, O., Markou, A., & Koob, G. F. (2006). Conditioned Withdrawal Drives Heroin Consumption and Decreases Reward Sensitivity. *Journal of Neuroscience*, 26(22), 5894. <https://doi.org/10.1523/jneurosci.0740-06.2006>
- Kim, J. H., Chun, J., Kim, J.-Y., Ju, H.-J., Kim, B. J., Jeong, J., & Lee, D. H. (2024). Emotion regulation from a virtue perspective. *BMC Psychology*, 12(1). <https://doi.org/10.1186/s40359-023-01490-y>
- Koob, G. F. (2014). Neurocircuitry of alcohol addiction [Review of Neurocircuitry of alcohol addiction]. *Handbook of Clinical Neurology*, 33. Elsevier BV. <https://doi.org/10.1016/b978-0-444-62619-6.00003-3>
- Langer, K., Wolf, O. T., Merz, C. J., & Jentsch, V. L. (2025). The effects of stress hormones on cognitive emotion regulation: A systematic review and integrative model [Review of the effects of stress hormones on cognitive emotion regulation: A systematic review and integrative model]. *Neuroscience & Biobehavioral Reviews*, 106040. Elsevier BV. <https://doi.org/10.1016/j.neubiorev.2025.106040>
- Langford, C. P. H., Bowsher, J. E., Maloney, J. P., & Lillis, P. P. (1997). Social support: a conceptual analysis [Review of Social support: a conceptual analysis]. *Journal of Advanced Nursing*, 25(1), 95. Wiley. <https://doi.org/10.1046/j.1365-2648.1997.1997025095.x>
- Lazarus, R. S. (1974). Psychological Stress and Coping in Adaptation and Illness [Review of Psychological Stress and Coping in Adaptation and Illness]. *The International Journal of Psychiatry in Medicine*, 5(4), 321. SAGE Publishing. <https://doi.org/10.2190/t43t-84p3-qdur-7rtp>
- Li, N., Yang, Y., Zhao, X., & Li, Y. (2022). The relationship between achievement motivation and college students' general self-efficacy: A moderated mediation model. *Frontiers in Psychology*, 13. <https://doi.org/10.3389/fpsyg.2022.1031912>
- Li, P., Wang, W., Fan, C., Zhu, C., Li, S., Zhang, Z., Qi, Z., & Luo, W. (2017). Distraction and Expressive Suppression Strategies in Regulation of High- and Low-Intensity Negative Emotions. *Scientific Reports*, 7(1). <https://doi.org/10.1038/s41598-017-12983-3>

- Machado, T. D. S., Chur-Hansen, A., & Due, C. (2020). First-time mothers' perceptions of social support: Recommendations for best practice. *Health Psychology Open*, 7(1). <https://doi.org/10.1177/2055102919898611>
- Maier, S. U., Makwana, A., & Hare, T. A. (2015). Acute Stress Impairs Self-Control in Goal-Directed Choice by Altering Multiple Functional Connections within the Brain's Decision Circuits. *Neuron*, 87(3), 621. <https://doi.org/10.1016/j.neuron.2015.07.005>
- McCauley, J. L., Killeen, T. K., Grös, D. F., Brady, K. T., & Back, S. E. (2012). Posttraumatic stress disorder and co-occurring substance use disorders: Advances in assessment and treatment. *Clinical Psychology Science and Practice*, 19(3), 283. <https://doi.org/10.1111/cpsp.12006>
- McNeely, J., & Adam, A. (2020). Table 3, DSM-5 Diagnostic Criteria for Diagnosing and Classifying Substance Use Disorders [abc]. <https://www.ncbi.nlm.nih.gov/books/NBK565474/table/nycgsubuse.tab9/>
- Miller, N., Pundak, C., Cohen, G., Issakov, G., Gluska, H., Gandelman, E., Frishman, E. K., David, L., Bookstein, S. P., Goldenberg, J., & Wiser, A. (2021). Can Social Support on Facebook Influence Fertility Outcomes? *Reproductive Sciences*, 29(1), 212. <https://doi.org/10.1007/s43032-021-00611-5>
- Morey, B. N., Valencia, C., Park, H. W., & Lee, S. (2021). The central role of social support in the health of Chinese and Korean American immigrants. *Social Science & Medicine*, 284, 114229. <https://doi.org/10.1016/j.socscimed.2021.114229>
- Muraven, M., & Baumeister, R. F. (2000). Self-regulation and depletion of limited resources: Does self-control resemble a muscle? *Psychological Bulletin*, 126(2), 247–259. <https://doi.org/10.1037/0033-2909.126.2.247>
- Navas, J. M. M., Núñez-Lozano, J. M., Gómez-Molinero, R., García, A. Z., & Bozal, R. G. (2017). Emotion Regulation Ability and Resilience in a Sample of Adolescents from a Suburban Area. *Frontiers in Psychology*, 8. <https://doi.org/10.3389/fpsyg.2017.01980>
- Nisbet, J., Jamshidi, L., Andrews, K. L., Stewart, S. H., Shields, R. E., Teckchandani, T. A., Maguire, K. Q., & Carleton, R. N. (2023). Mental health and social support among Royal Canadian Mounted Police cadets. *Frontiers in Psychology*, 14. <https://doi.org/10.3389/fpsyg.2023.1092334>
- Park, J., Lee, J., & Kim, H. (2022). Mediating and moderating effects of perceived social support on well-being under stress: A resilience perspective. *Frontiers in Psychology*, 13, 922201. <https://doi.org/10.3389/fpsyg.2022.922201>
- Park, S., & Sung, E. (2020). 'You gotta have something to chew on': perceptions of stress-induced eating and weight gain among office workers in South Korea. *Public Health Nutrition*, 24(3), 499. <https://doi.org/10.1017/s1368980020000890>
- Perry, B. L., Pullen, E., & Oser, C. B. (2012). Too Much of a Good Thing? Psychosocial Resources, Gendered Racism, and Suicidal Ideation among Low Socioeconomic Status African American Women. *Social Psychology Quarterly*, 75(4), 334. <https://doi.org/10.1177/0190272512455932>
- Poisson, C. L., Engel, L., & Saunders, B. T. (2021). Dopamine Circuit Mechanisms of Addiction-Like Behaviors [Review of Dopamine Circuit Mechanisms of Addiction-Like Behaviors]. *Frontiers in Neural Circuits*, 15. *Frontiers Media*. <https://doi.org/10.3389/fncir.2021.752420>
- Rao, P., Yallapu, M. M., Sari, Y., Fisher, P. B., & Kumar, S. (2015). Designing Novel Nanoformulations Targeting Glutamate Transporter Excitatory Amino Acid Transporter 2: Implications in Treating Drug Addiction. *PubMed*, 1(1), 3. <https://pubmed.ncbi.nlm.nih.gov/26635971>
- Reeck, C., Ames, D. R., & Ochsner, K. N. (2015). The Social Regulation of Emotion: An Integrative, Cross-



- Disciplinary Model [Review of The Social Regulation of Emotion: An Integrative, Cross-Disciplinary Model]. *Trends in Cognitive Sciences*, 20(1), 47. Elsevier BV. <https://doi.org/10.1016/j.tics.2015.09.003>
- Renna, M. E., Fresco, D. M., & Mennin, D. S. (2020). Emotion Regulation Therapy and Its Potential Role in the Treatment of Chronic Stress-Related Pathology Across Disorders [Review of Emotion Regulation Therapy and Its Potential Role in the Treatment of Chronic Stress-Related Pathology Across Disorders]. *Chronic Stress*, 4. SAGE Publishing. <https://doi.org/10.1177/2470547020905787>
- Ritchwood, T. D., Ford, H. L., DeCoster, J., Sutton, M., & Lochman, J. E. (2015). Risky sexual behavior and substance use among adolescents: A meta-analysis. *Children and Youth Services Review*, 52, 74. <https://doi.org/10.1016/j.childyouth.2015.03.005>
- Rizk, J. G., Saini, J., Kim, K., Pathan, U., & Qato, D. M. (2024). County-level factors associated with a mismatch between opioid overdose mortality and availability of opioid treatment facilities. *PLoS ONE*, 19(4). <https://doi.org/10.1371/journal.pone.0301863>
- Roberts, A. J., & Koob, G. F. (1997). The neurobiology of addiction: an overview. [Review of The neurobiology of addiction: an overview.]. *PubMed*, 21(2), 101. National Institutes of Health. <https://pubmed.ncbi.nlm.nih.gov/15704343>
- Robin, M., Surjous, L., Belbèze, J., Bonnardel, L., Lamas, C., Silva, J., Peres, V., & Corcos, M. (2023). Four attachment-based categories of emotion regulation in adolescent psychic troubles. *Frontiers in Psychology*, 14. <https://doi.org/10.3389/fpsyg.2023.1133980>
- Sandel, D. B., Pearlstein, J. G., Swerdlow, B. A., & Johnson, S. L. (2022). Who disengages from emotion and when? An EMA study of how urgency and distress intolerance relate to daily emotion regulation. *Emotion*, 23(4), 1102. <https://doi.org/10.1037/emo0001152>
- Schreiber, L. R. N., Grant, J. E., & Odlaug, B. L. (2012). Emotion regulation and impulsivity in young adults. *Journal of Psychiatric Research*, 46(5), 651. <https://doi.org/10.1016/j.jpsychires.2012.02.005>
- Schreiber, L. R. N., Grant, J. E., & Odlaug, B. L. (2012). Emotion regulation and impulsivity in young adults. *Journal of Psychiatric Research*, 46(5), 651. <https://doi.org/10.1016/j.jpsychires.2012.02.005>
- Shabbir, F., Patel, A., Mattison, C., Bose, S. K., Krishnamohan, R., Sweeney, E. A., Sandhu, S., Nel, W., Rais, A., Sandhu, R. S., Ngu, N., & Sharma, S. (2013). Effect of diet on serotonergic neurotransmission in depression [Review of Effect of diet on serotonergic neurotransmission in depression]. *Neurochemistry International*, 62(3), 324. Elsevier BV. <https://doi.org/10.1016/j.neuint.2012.12.014>
- Sharma, S., Nepal, B., Moon, C. S., Chabenne, A., Khogali, A., Ojo, C., Hong, E., Gaudet, R., Sayed-Ahmad, A., Jacob, A., Murtuza, M., & Firlit, M. L. (2014). Psychology of Craving. *Open Journal of Medical Psychology*, 3(2), 120. <https://doi.org/10.4236/ojmp.2014.32015>
- Skinner, H. A. (1982). The drug abuse screening test. *Addictive Behaviors*, 7(4), 363–371. [https://doi.org/10.1016/0306-4603\(82\)90005-3](https://doi.org/10.1016/0306-4603(82)90005-3)
- Snyder, S. A., Heller, S. M., Lumian, D. S., & McRae, K. (2013). Regulation of positive and negative emotion: effects of sociocultural context. *Frontiers in Psychology*, 4. <https://doi.org/10.3389/fpsyg.2013.00259>
- Spoehr, S. A., Livingston, M. D., Taxman, F. S., & Walters, S. T. (2018). What's the influence of social interactions on substance use and treatment initiation? A prospective analysis among substance-using probationers. *Addictive Behaviors*, 89, 143. <https://doi.org/10.1016/j.addbeh.2018.09.036>



- Stout, R. L., Kelly, J., Magill, M., & Pagano, M. E. (2012). Association Between Social Influences and Drinking Outcomes Across Three Years. *Journal of Studies on Alcohol and Drugs*, 73(3), 489. <https://doi.org/10.15288/jsad.2012.73.489>
- Sun, C., Wang, Y., & Li, X. (2024). Self-control as mediating and social support as moderating factors in relapse among individuals with substance use disorders. *Scientific Reports*, 14, 16254. <https://doi.org/10.1038/s41598-024-70884-8>
- Surżykiewicz, J., Skalski-Bednarz, S. B., Sołbut, A., Rutkowski, S., & Konaszewski, K. (2022). Resilience and Regulation of Emotions in Adolescents: Serial Mediation Analysis through Self-Esteem and the Perceived Social Support. *International Journal of Environmental Research and Public Health*, 19(13), 8007. <https://doi.org/10.3390/ijerph19138007>
- Swerdlow, B. A., & Johnson, S. L. (2020). The Interpersonal Regulation Interaction Scale (IRIS): A multistudy investigation of receivers' retrospective evaluations of interpersonal emotion regulation interactions. *Emotion*, 22(6), 1119. <https://doi.org/10.1037/emo0000927>
- Taber, K. H., Black, D. N., Porrino, L. J., & Hurley, R. A. (2012). Neuroanatomy of Dopamine: Reward and Addiction [Review of Neuroanatomy of Dopamine: Reward and Addiction]. *Journal of Neuropsychiatry*, 24(1), 1. American Psychiatric Association Publishing. <https://doi.org/10.1176/appi.neuropsych.24.1.1>
- Taylor, S. E. (2021). Social support: A review of its role in health and well-being. *Annual Review of Psychology*, 72(1), 737–767. <https://doi.org/10.1146/annurev-psych-062520-122518>
- Ulrich-Lai, Y. M. (2016). Self-medication with sucrose. *Current Opinion in Behavioral Sciences*, 9, 78. <https://doi.org/10.1016/j.cobeha.2016.02.015>
- Ventura, T., Santander, J., Torres, R. C., & Contreras, A. M. C. (2013). Neurobiologic basis of craving for carbohydrates [Review of Neurobiologic basis of craving for carbohydrates]. *Nutrition*, 30(3), 252. Elsevier BV. <https://doi.org/10.1016/j.nut.2013.06.010>
- Volkow, N. D., Michaelides, M., & Baler, R. (2019). The Neuroscience of Drug Reward and Addiction [Review of The Neuroscience of Drug Reward and Addiction]. *Physiological Reviews*, 99(4), 2115. American Physiological Society. <https://doi.org/10.1152/physrev.00014.2018>
- Volkow, N. D., Wang, G., Fowler, J. S., & Tomasi, D. (2011). Addiction Circuitry in the Human Brain [Review of Addiction Circuitry in the Human Brain]. *The Annual Review of Pharmacology and Toxicology*, 52(1), 321. Annual Reviews. <https://doi.org/10.1146/annurev-pharmtox-010611-134625>
- Wang, J., & Shen, W. (2025). The Emotional Reinforcement Mechanism of and Phased Intervention Strategies for Social Media Addiction [Review of The Emotional Reinforcement Mechanism of and Phased Intervention Strategies for Social Media Addiction]. *Behavioral Sciences*, 15(5), 665. Multidisciplinary Digital Publishing Institute. <https://doi.org/10.3390/bs15050665>
- Weiss, N. H., Forkus, S. R., Contractor, A. A., & Dixon-Gordon, K. L. (2021). Emotion regulation and substance use: A meta-analysis. *Journal of Substance Abuse Treatment*, 131, 108442. <https://doi.org/10.1016/j.jsat.2021.108442>
- Xia, Y., Gong, Y., Hanbin, W., Li, S., & Mao, F. (2022). Family Function Impacts Relapse Tendency in Substance Use Disorder: Mediated Through Self-Esteem and Resilience. *Frontiers in Psychiatry*, 13. <https://doi.org/10.3389/fpsy.2022.815118>
- Yang, C., Xia, M., Han, M., & Liang, Y. (2021). Social support and resilience as mediators between stress and life satisfaction among people with substance use disorder. *Frontiers in Psychiatry*, 12, 618576. <https://doi.org/10.3389/fpsy.2021.618576>

- Yang, W., Singla, R., Maheshwari, O., Fontaine, C. J., & Gil-Mohapel, J. (2022). Alcohol Use Disorder: Neurobiology and Therapeutics [Review of Alcohol Use Disorder: Neurobiology and Therapeutics]. *Biomedicines*, 10(5), 1192. Multidisciplinary Digital Publishing Institute. <https://doi.org/10.3390/biomedicines10051192>
- Zimet, G. D., Dahlem, N. W., Zimet, S. G., & Farley, G. K. (1988). The multidimensional scale of perceived social support. *Journal of Personality Assessment*, 52(1), 30–41. [https://doi.org/10.1207/s15327752jpa5201\\_2](https://doi.org/10.1207/s15327752jpa5201_2)
- Zorrilla, E. P., & Koob, G. F. (2019). The dark side of compulsive eating and food addiction. In Elsevier eBooks (p. 115). Elsevier BV. <https://doi.org/10.1016/b978-0-12-816207-1.00006-8>