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EMOTION AND ADDICTION (K MORIE, SECTION EDITOR)

The Role of Affect in Psychosocial Treatments for Substance Use Disorders

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Abstract

Purpose of Review This paper provides a narrative review of studies published over the past 5 years that have examined the role of affect, including both affective symptoms and affective disorders, in psychosocial treatments for substance use disorder.

Recent Findings A growing body of literature suggests that affective symptoms and affective disorders may moderate substance use disorder treatment efficacy, mediate the effects of treatment on substance use outcomes, and may be directly changed by substance use disorder treatment.

Summary Substance use disorders and affective disorders commonly co-occur, and both affect and affective disorders are associated with substance use disorder treatment outcomes. Future research should continue to examine affect as a moderator, mediator, and outcome of substance use disorder treatments. In particular, new studies that are designed to test precision medicine hypotheses would greatly expand our understanding of the role of affective symptoms and disorders in substance use disorder treatment.

Keywords Affect · Substance use · Substance use disorder · Psychosocial treatment · Affective disorders · Emotion

Introduction

Alcohol and other substance use disorders cause societal burden through human disability and death, as well as economic cost [1–3]. Numerous effective treatment options exist to address this burden, including psychosocial treatments (e.g., brief interventions, cognitive-behavioral treatment) and pharmacological treatments [4–6]. Yet, returning to alcohol and/or substance use (i.e., relapse) is the most common outcome following alcohol and/or substance use disorder treatment [7]. One of the primary precipitants of substance use relapse is negative affect [8], and thus, affect is commonly targeted in psychosocial treatments. Affect is often used as an all-encompassing term including both emotions (i.e., short, targeted feelings) and moods (i.e., long-term, expansive states) [9]. Affect can be either positive (e.g., excited or interested) or negative (e.g., irritable or distressed) and examined within the context of affective disorders, such as depression and anxiety [9]. Substance use disorders and affective disorders commonly co-occur and both affect [10, 11] and affective disorders [12, 13] are associated with substance use treatment outcomes. Likewise, substance use disorder treatment predicts improvements in affective outcomes [14].

Given the prominence of affect and affective disorders in predicting substance use outcomes, the current review focuses on the role of affect and affective disorders in the treatment process with a specific focus on affect as a predictor, mechanism, and outcome in substance use disorder treatment.

For this review article, we only examined manuscripts that were in English, had available full-text, and were published in the past 5 years, between 2015 and 2019. We included substance use disorders identified within the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5; [15], e.g., alcohol, cannabis, stimulants, sedatives, opioids). We examined manualized, evidence-based psychosocial treatments that have been developed or adapted to treat substance use disorders and excluded pharmacotherapies and brief interventions for substance use disorders. Given the range of pharmacotherapies across substance use disorders and their direct and indirect effects on affect, we kept our review focused on psychosocial treatments. We excluded brief interventions for

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the paucity of recent articles focusing on affect as a predictor, mechanism, or outcome within these treatments.

Cognitive-Behavioral Therapy

Cognitive-behavioral therapy (CBT) is perhaps the most common psychosocial treatment for substance use disorders and is delivered in both individual and group settings [16]. CBT targets the development of cognitive and behavioral skills to decrease substance use and prevent relapse [16, 17]. Related to affect, CBT therapists commonly delineate affective triggers, including negative and positive emotional states and thoughts, for substance use via functional analysis [18]. The therapist then teaches coping skills to modify the client's reactions to affective triggers, including problem-solving, cognitive restructuring, relaxation, and distress tolerance skills [16, 18]. Additional skills developed in CBT include enhancing one's social network, increasing non-substance use pleasurable activities, modifying alcohol outcome expectancies, and coping with craving. The development of such skills might also indirectly decrease negative affect and increase positive affect.

Affect as a Predictor Recent studies have found that affective experiences (e.g., symptoms, beliefs about negative affect) and affective disorders predict outcomes in CBT for substance use disorders. Greater baseline stress has been associated with lapse during CBT for alcohol use disorder, which was mediated by greater baseline craving [19]. Furthermore, greater self-efficacy to refuse cannabis when experiencing negative affect [20] and higher positive affect have predicted better substance use outcomes in CBT [21••], while baseline negative affect has been unrelated to treatment outcomes [21••]. One study of CBT for cocaine use disorder evaluated the impact of weekly affective symptoms on cocaine use and found that negative affect was associated with greater concurrent cocaine use, while positive affect did not predict concurrent cocaine use [21••].

Affect as a Moderator Two recent studies indicate that individuals with more emotional distress and dysfunction might experience the greatest benefits from CBT. In a study comparing female-specific CBT for alcohol use disorder with gender-neutral CBT, women who had higher baseline depression and anxiety were more likely to experience a steep decrease in drinking following CBT sessions addressing negative affect regardless of CBT treatment condition. These sudden gains translated to lower drinking frequency following treatment [22•]. Higher baseline alexithymia scores have also been associated with better outcomes in CBT for cocaine use disorder with particularly good outcomes in CBT versus treatment as usual (TAU) [23].

Affect as an Outcome Consistent with hypothesized treatment targets, recent studies of CBT for substance use disorders have shown declines in tension reduction alcohol outcome expectancies (i.e., expectations that alcohol will reduce negative affective states) [24], depression and anxiety symptoms [25], and general negative affect [21••] from pre- to post-treatment. Modified CBT protocols have also demonstrated impacts on affective symptoms, such as reductions in anxiety and depression, including in female-specific CBT that increases focus on managing negative affect [25] and Internet-based CBT [26]. Other studies evaluating changes in affective traits and symptoms during CBT have found less promising results. A recent review of psychosocial treatments for methamphetamine use disorder concluded that CBT had only small or no impact on depressive symptoms [27]. In a randomized trial comparing network support treatment with CBT for alcohol use disorder, neither emotional distress nor social anxiety symptoms significantly decreased in either treatment condition [28]. Furthermore, alexithymia, a trait characterized by difficulty identifying and describing emotions, remained stable in a trial of computerized CBT [23]. To our knowledge, the only CBT study published in the previous 5 years evaluating positive affect did not identify increases in positive affect from pre- to post-treatment among those with cocaine use disorder [21••].

In conclusion, findings indicated that greater emotional distress during CBT was concurrently associated with substance use, consistent with hypotheses that reductions in negative affect might predict lower likelihood of substance use. However, findings on changes in negative affect and affective experience from pre- to post-CBT were somewhat inconsistent. Although reductions in negative affect are hypothesized to translate into better substance use outcomes, we did not identify any studies published in the previous 5 years that examined changes in affect as a mechanism of behavior change in CBT. It is difficult to draw strong conclusions about the role of positive affect in CBT, given that only one of the eight reviewed CBT studies examined positive affect.

Behavioral and Behavioral Economic Treatments

Behavioral and behavioral economic treatments were developed to identify and change maladaptive or unhealthy behaviors that may contribute to and maintain disorders. These treatments include behavioral activation (BA) treatments, community-reinforcement approach (CRA), and contingency management (CM). Brief interventions in this category not examined in this article include episodic future thinking [29]

and substance-free activity session (SFAS; [30]), which have not shown robust differences in affect as a predictor, mechanism, or outcome.

BA is one of the earliest behavioral treatments developed as a component of cognitive-behavioral therapy [31] and later established as its own stand-alone treatment for depression [32, 33]. This treatment aims to have clients change their environment, so that positive reinforcement is more likely to arise from various sources [33]. A BA treatment developed to treat substance use disorders and depression is the Life Enhancement Treatment for Substance Use (LETS ACT) [34], which increases contact with reinforcing substance-free activities to protect against relapse and consequences of substance use [34, 35]. Although previous studies have shown reductions in affective symptoms, typically depressive symptoms, following LETS ACT (e.g., [35, 36]), the most recent clinical trial of LETS ACT in a residential substance use disorder treatment program did not find significant reductions in depression scores from baseline (at treatment initiation) to a 12-month post-treatment follow-up [34].

CRA was similarly developed to create greater positive reinforcement for non-substance use activities with an emphasis on sobriety and reduced positive reinforcement from alcohol and other substance use [37, 38]. Although originally developed for alcohol use disorder, it is now used in the treatment of other substance use disorders as well [39]. CRA focuses on increasing motivation to change, monitoring drinking and experimenting with sobriety, increasing positive reinforcement from non-substance activities, developing new coping skills, and enhancing support from significant others [39]. In a recent study of CRA and two other active treatments, homeless adolescents and young adults with substance use disorders showed significant reductions in depressive symptoms after CRA treatment [40]. However, these reductions were not significantly different than reductions after motivational enhancement therapy or case management [40]. In another study of CRA for adolescents enrolled in substance use treatment organizations, adolescents with a substance use disorder showed no significant reductions in emotional problems between treatment and 6-month follow-up [41].

CM is a behavioral economic approach that focuses on positively reinforcing desired behaviors (i.e., treatment targets) as soon as possible to increase the frequency of the desired behavior [42]. For substance use disorders, this treatment often reinforces abstinence through drug-negative urine samples with extrinsic monetary-based rewards, vouchers, or prizes [43, 44], and typically, the quality or quantity of reinforcement increases as the time of abstinence increases [44]. A recent study found that greater depression and anxiety symptoms at baseline predicted early drop-out from CM treatment for those with opioid use disorder [45]. Other recent studies have examined affective symptoms as an outcome of CM, although findings have been mixed. Among participants with cocaine use disorder in an outpatient research clinic, negative affect throughout treatment was not significantly different in those who responded to CM (i.e., those who had continued abstinence) and those who did not [46]. Conversely, among participants with cocaine use disorder who received CM and the standard treatment, they had lower depression and anxiety scores after treatment than those who received standard treatment without CM [47•].

Overall, findings showed mixed results for affect as a predictor and outcome of behavioral and behavioral economic treatments of substance use disorders. However, most studies focused on only negative affect as a predictor or outcome. Of the six studies examined, only two reported including measures of positive affect within their studies [41, 46], but neither reported analyzing those measures for these articles. As a predictor, negative affect was shown to predict treatment drop-out, and as an outcome, negative affect was reduced in only some trials and treatments.

Mindfulness- and Acceptance-Based Therapies

A growing evidence base over recent decades has supported "third wave" behavioral therapies as a promising approach for treating substance use disorders [48, 49]. These mindfulness- and acceptance-based treatments include Mindfulness-Based Relapse Prevention (MBRP) [50], Mindfulness-Oriented Recovery Enhancement (MORE) [51], and Acceptance and Commitment Therapy (ACT) [52], as well as others [53]. These treatments teach clients a new way of relating to distressing emotions, thoughts, and experiences such as craving [54]. Unlike traditional CBT, which equips clients with techniques to modify cognitions and behaviors, mindfulness- and acceptance-based treatments teach skills that increase present moment awareness combined with acceptance (i.e., nonjudgmental and nonreactive observation of moment-to-moment experience as it unfolds). In the context of addictive behaviors, these therapies guide clients through increasing their awareness and tolerance of craving as a momentary experience, as well as encouraging flexible responding by decoupling affective states from craving or other automatic behavior [55, 56].

Affect as a Moderator There is evidence to suggest that affective variables are important to consider in terms of treatment moderators in mindfulness- and acceptance-based treatments. Those with higher severity in co-occurring depression or anxiety may benefit the most from mindfulness-based interventions in terms of substance use disorder outcomes [57••]. Several recent studies of mindfulness- and acceptance-based therapies for substance use disorders have provided evidence that these therapies may directly or indirectly influence positive and negative affect.

Among individuals with chronic pain and opioid misuse or opioid use disorder, those who received MORE demonstrated increases in post-treatment self-reported positive affect, improvements in psychophysiological measures of positive reward attribution, decreases in stress, and increases in the number of craving events but lower intensity of those cravings. These improvements in positive affect were associated with reduced risk of post-treatment opioid misuse and also mediated the effect of MORE on opioid misuse outcomes at follow-up [58, 59, 60••]. Notably, these findings were consistent with the reward restructuring hypothesis of MORE, that enhancing savoring skills to increase awareness of the positive affective experiences of natural rewards is an important pathway in treating addictive behaviors. In a sample with co-occurring substance use disorder, traumatic stress, and psychiatric disorders, MORE may be additionally associated with greater reductions in negative affect than CBT or TAU [61]. Other studies have also found improvements in self-reported and psychophysiological measures of emotion dysregulation among women in substance use disorder treatment receiving adjunctive mindfulness treatment [62, 63].

Other studies testing mindfulness- or acceptance-based therapies as either primary or adjunctive treatments for substance use have shown more inconsistent findings. One study found no effect of adjunctive MBRP on perceived stress compared with usual care with an adjunctive control group [64], and another found no effect of ACT specifically on depression or anxiety outcomes in an inpatient substance use disorder treatment setting [65].

Somewhat variable findings and differences in measured variables (e.g., assessing negative affectivity alone versus both positive and negative affectivity) among studies make it difficult to draw firm conclusions. However, there are several takeaways from this literature. Baseline affective symptom severity may be an important mediator to consider and may be a potential third-wave treatment matching variable. In addition, the majority of studies testing mindfulness- or acceptance-based therapies find benefit in terms reduction in negative affect and emotion dysregulation. Only one therapy in this category, MORE, measured positive affect and found improvements following treatment. Unlike other mindfulness- or acceptance-based therapies, MORE explicitly hypothesizes that savoring, or focusing on positive affective responses to natural non-substance rewards, is a primary mechanism of action for this type of treatment.

Integrated and Transdiagnostic Treatments for Co-occurring Substance Use and Affective Disorders

In recent years, there has been an increased focus on concurrently treating substance use and affective disorders, which commonly co-occur and have several shared mechanisms, such as greater negative emotionality, reactivity to negative affect, and avoidance of negative emotional states [66, 67]. Specifically, integrated and transdiagnostic treatment modalities attempt to simultaneously address substance use and co-occurring disorders by either including a combination of disorder-specific protocols or targeting transdiagnostic processes thought to underlie co-occurring disorders [68]. Previously evaluated integrated and transdiagnostic treatments have spanned treatment modalities, including CBT, BA, mindfulness- and acceptance-based treatments, and novel transdiagnostic treatments that integrate protocols from several traditional modalities. In the present review, we focus on treatments targeting co-occurring substance use disorders and posttraumatic stress, anxiety, and depressive disorders.

Co-occurring Substance Use Disorder and Posttraumatic Stress Disorder Treatments targeting co-occurring substance use and posttraumatic stress disorder (PTSD) are both trauma-focused, explicitly addressing and exposing clients to traumatic memories, and non-trauma-focused. Trauma-focused treatments for this co-occurrence typically combine CBT for substance use disorders with prolonged exposure for PTSD (e.g., Concurrent Treatment of PTSD and Substance Use Disorders Using Prolonged Exposure [COPE]). Conversely, non-trauma-focused treatments, such as Seeking Safety and integrated CBT, include psychoeducation on the co-occurrence between substance use disorder and PTSD and seek to develop coping skills to manage both substance use and PTSD symptoms [69, 70].

Only one study examined affect as a predictor in trauma-focused compared with non-trauma-focused treatments. In this study, moderation analyses suggested that those who meet full threshold for PTSD, as compared with subthreshold PTSD, and those with higher emotion dysregulation (i.e., the ability to identify and control emotional reactions), demonstrated greater reductions in PTSD severity in COPE versus non-trauma-focused relapse prevention treatment [71, 72••].

However, many studies have focused on affect as an outcome in these treatments. A recent meta-analysis found that trauma-focused treatments for co-occurring substance use disorder and PTSD had a small effect on PTSD severity and substance use outcomes, while non-trauma-focused treatments did not have a significant impact on PTSD severity or substance use outcomes [73]. More recent trials have found significant decreases in negative affective symptoms, including PTSD, depression, and general mental health, in both trauma- and non-trauma-focused treatments for co-occurring substance use disorder and PTSD [71, 72••, 74], although some studies indicate that these reductions are greater in treatments that address traumatic memories [75]. Identified mechanisms of improvements in PTSD symptoms include decreases in between-exposure subjective units of distress in COPE [76] and decreases in maladaptive trauma–

related cognitions in cognitive-processing therapy (CPT), which attempts to challenge and modify unhelpful beliefs about clients' traumatic events [77].

Two recent studies have evaluated third-wave treatments for co-occurring substance use disorder and PTSD. Targets in these treatments include transdiagnostic processes hypothesized to underlie co-occurring substance use disorder and PTSD, including increasing tolerance of distress and engagement with values-based activities and decreasing avoidance of negative emotional states. One such trial compared MORE with group CBT and TAU for men with a substance use disorder who had extensive trauma histories, not necessarily meeting PTSD criteria, and psychiatric disorders [61]. Findings of this study indicate that MORE was associated with significantly greater reductions in PTSD symptoms and general negative affect than CBT and greater improvements in PTSD symptoms and positive affect than TAU; depression and anxiety symptoms decreased across modality with no significant differences by condition. Furthermore, increases in mindfulness were found to mediate the effects of MORE on improvements in PTSD symptoms. In an open pilot trial of ACT for co-occurring alcohol use disorder and PTSD, participants demonstrated statistically significant reductions in PTSD symptoms, depressive symptoms, suicidal ideation, and experiential avoidance [78].

Overall, trauma-focused, non-trauma-focused, and third-wave treatments appear to reduce negative affective symptoms among those with co-occurring substance use disorders and PTSD. Although reductions in negative affective symptoms appear to mediate the effects of COPE and CPT on PTSD outcomes, the role of changes in negative affect in substance use outcomes is less clear [76, 77]. Although anhedonia (i.e., the inability to experience pleasure) is a common PTSD symptom [79], only one study (of the nine reviewed) examined positive affect and found increases from pre- to post-treatment in MORE.

Co-occurring Substance Use Disorder and Anxiety Disorders Integrated treatments for co-occurring substance use disorder and anxiety disorders commonly combine disorder-specific CBT protocols and therefore include psychoeducation on this co-occurrence, relapse prevention skills, cognitive restructuring, and exposure to anxiety-related imagery and situations. Such integrated treatments have produced statistically significant reductions in anxiety symptoms from pre- to post-treatment [80–82] and generally demonstrate greater improvements in anxiety symptoms than treatments targeting substance use only [81, 82]. Decreases in anxiety sensitivity, but not coping motives, have been found to mediate the effect of integrated CBT on substance use outcomes [83•]. Transdiagnostic CBT might also improve mental health symptoms, such as depression, anxiety, and substance use, via changes in emotion regulation strategies; however, these relationships did not differ by study treatment condition (i.e., venlafaxine-transdiagnostic CBT, placebo-CBT, venlafaxine-progressive muscle relaxation, placebo-progressive muscle relaxation) [84].

Recent studies have also attempted to identify patient characteristics that might predict response to integrated CBT versus anxiety- or substance use disorder-only treatments. While affect-related predictors were not identified, coping motives for substance use have been associated with better drinking outcomes in integrated CBT versus progressive muscle relaxation for those with co-occurring alcohol use disorder and anxiety disorders [85]. Conversely, another study found that coping motives and anxiety sensitivity did not moderate treatment outcome, but older age, female gender, alcohol use disorder, the presence of opioid-related symptoms, and more substance use disorders predicted better substance use outcomes in integrated CBT versus substance use disorder-only treatment [86].

Taken together, integrated treatments for substance use and anxiety disorders have resulted in greater reductions in negative affect than treatments targeting substance use only. Furthermore, reductions in negative affective experiences appear to mediate the effects of these integrated treatments on substance use outcomes. Future research should examine the role of positive affect in integrated treatment for substance use and anxiety disorders, given that none of the reviewed studies in this area (of the six reviewed) examined positive affect as an outcome or a mechanism or moderator of substance use outcomes.

Co-occurring Substance Use Disorder and Depressive Disorders Studies of integrated treatments for co-occurring substance use disorder and depressive disorders have investigated integrated CBT (targeting substance use and depressive cognitions and behaviors and increasing coping skills), BA (targeting substance use and depressive symptoms by increasing engagement with values-based activities), and ACT (targeting transdiagnostic processes, including acceptance, cognitive diffusion, mindfulness, self as context, values, and committed action) [68]. With affect as a predictor in these treatments, individuals with higher baseline depression symptoms might benefit more from integrated CBT [87]. Recent reviews of treatments for co-occurring substance use disorder and depressive disorders indicate that receiving integrated CBT (versus a variety of control conditions) is generally associated with greater reductions in depression [68], including in adolescents [88]. One study evaluated integrated BA versus CBT-based self-help for those with co-occurring substance use disorder and depression [89]. This trial identified reductions in depressive symptoms in both groups, with no greater benefit in integrated BA, but engagement in treatment was very low across groups. Lastly, ACT has demonstrated promising results in treating co-occurring

substance use disorder and depressive disorders [68] with one pilot trial demonstrating greater improvements in depression, anxiety, and substance use symptoms in ACT versus TAU [90].

Overall, various integrated treatments for substance use and depressive disorders, including integrated CBT, BA, and ACT, have resulted in improved negative affective symptoms. However, we did not identify any studies published in the previous 5 years that examined affective symptoms as a mediator of the effect of these treatments on substance use and depression outcomes. In addition, no identified studies (of the five reviewed) examined positive affect, although anhedonia is a hallmark symptom of depression [91].

Conclusions

Affect in the treatment of substance use disorders is important as a predictor of treatment success, a mechanism of the treatment itself, as well as an outcome. Support for improvements in affect and affective disorders after CBT, mindfulness- and acceptance-based treatments, and transdiagnostic treatments was somewhat mixed but generally showed that treatments positively influenced affect and affective symptoms. Less support was found for the role of affect and affective disorders in behavioral and behavioral economic treatments. As reviewed above, we found that even if affect is not a target of a specified intervention, it is often an influential component in the recovery of those with substance use disorders, taking into account affective characteristics such as baseline affective symptoms (e.g., depression or anxiety scores) or pre-existing affective disorders (e.g., PTSD) could allow for precision medicine approaches to be used in addiction treatment, which could reduce harm and improve recovery outcomes for those with substance use disorders [90, 92, 93•]. The current review also has limitations. We did not conduct an exhaustive, systematic review of the literature; rather, we focused on studies published within the last 5 years. Additionally, only full-length, manualized treatments were examined.

Future studies should consider how theoretical models of treatments intend to modulate affect and affective symptoms. While these treatments may not directly aim to change affective states, they may impact psychological process variables related to affective states such as emotional awareness, emotional reactivity, emotion dysregulation, psychological flexibility, or distress tolerance. Future studies should consider these variables in addition to directly experienced affective symptoms. Additionally, researchers should further examine positive affect as it may play an underexplored but potential role in the treatment of substance use disorders [60••, 94], particularly with respect to precision medicine. Our review shows that affect and affective disorders may influence treatment efficacy and recovery among clients in substance use disorder treatments and should be taken into account when initiating treatment, but future research is warranted to determine how affect and affective disorders can inform precision medicine approaches.

Compliance with Ethical Standards

Conflict of Interest ERS and VRV were supported by a training grant (T32AA018108) and JES and KW by a research project grant (R01AA022328) from the National Institute on Alcohol Abuse and Alcoholism (NIAAA).

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