Clinical Neuropsychiatry (2015) ***12****, 4, 83-89*

DIFFICULTIES IN EMOTION REGULATION AMONG INPATIENTS WITH SUBSTANCE USE DISORDERS: THE MEDIATING EFFECT OF MATURE DEFENSES MECHANISMS

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Abstract

Objective: Although the relationship between Substance Use Disorders (SUDs) and emotion regulation is a topic of great scientific interest, little is still known about the nature of this association. The aim of the present study is to clarify which specific difficulties in emotion regulation describe SUD inpatients, studying whether this relationship is mediated by the use of defense mechanisms.

Method: Difficulties in emotion regulation and defense mechanisms were evaluated in 58 SUDs inpatients and 73 community participants.

Results: Results showed that SUDs are associated with limited access to emotion regulation strategies when negative emotions are experienced. This relationship between difficulty in accessing emotion regulation strategies and the presence of SUDs was mediated by mature defenses. The more difficulties in accessing such strategies were, the less mature defenses were used; the less mature defenses were used, the more likely the presence of SUDs was.

Conclusions: These findings suggest the importance of considering mature defense mechanisms in understanding difficulties in emotion regulation among SUD inpatients. Research and Clinical implications are discussed.

Key words: substance use disorder, emotion regulation, defense mechanisms

Declaration of interest: the authors do not have any disclosures, and the authors do not have any affiliation with or financial interest in any organisation that might pose a conflict of interest

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Introduction

Defined as "*a problematic pattern of drug use, leading to clinically significant impairment or distress*" (APA 2013; p. 481), substance use disorder (SUD) is one of the most prevalent and costly of psychiatric disorders (SAMHSA 2014). The lifetime prevalence rates of SUDs (illicit drugs) changes among different countries (Kessler et al. 2004): it is about 2-3% in U.S. adults (Merikangas, Vetisha and McClair 2012) and about 1% in the Italian general population (WHO 2010). The prevalence rates rise up when patients with personality disorders (PDs) are considered: studies have shown high rates of co-occurrence between SUDs (both alcoholism and drug abuse) and PDs, with reported rates typically ranging from 30% to 75% (Verheul, Van Den Brink and Hartgers 1995, Verheul et al. 2000). In particular, the highest co-occurrence is found between SUDs and Cluster B PDs, specifically with borderline personality disorder (McGlashan et al. 2000, Trull 2000, Chapman et al. 2007, James et al. 2007, Pennay et al. 2011).

Theorists and researchers have suggested that emotion regulation may be involved both in development and maintenance of SUDs. Although it has been studied for a long time, the association between emotion regulation and SUDs is complex and little is still known about its nature. As stated by Kober (2014), the scientific literature on SUDs suggests that emotion regulation is one of the main motivations for substance use, but also that emotion dysregulation might be at the same time the casual factor of the substance use and its consequence. With regard to the emotion regulation function, SUD patient's reports often suggest that drugs are not the problem but the solution because they are used to look for relief from negative emotional states (Jones, Corbin and Fromme 2001, Le Moal 2009). Moreover, the high co-occurrence of SUDs and PDs, and specifically borderline PD, suggests that individuals who showed difficulties in regulating negative emotions are more likely to develop SUDs (Trull et al. 2000). For example, one of the core features of borderline personality disorder is the affective instability and lability that often leads to anger and negative affective states, which are poorly modulated. The presence of such difficulties might increase the likelihood of using drugs to alleviate such affective states (Kessler et al. 2004). After all, a large amount of studies showed that negative affective states trigger drug craving, drug use and relapse (Shiffman et al. 1996, Sinha and Li 2007). These findings are in line with the "*self-medication hypothesis*" by Khantzian (1985) which postulates that negative affective states propel to drug use and that the choice of drug is consistent with its effect on negative affective states which individuals are experiencing. In this sense, the self-medication theory suggests that drug consumption and SUDs are ways to cope with negative affective states which individuals are not able to alleviate

Submitted April 2015, accepted May 2015

otherwise. Additionally, emotion dysregulation seems to be involved in the etiology and maintenance of SUDs (Kober 2014). Longitudinal studies found that poor self-control abilities in childhood, including frustration tolerance and impulsivity, predict the onset of drug use and SUDs in adulthood (August et al. 2006, Ivanov et al. 2011, Moffitt et al. 2011). However, initiation of drug use often takes place during adolescence, when emotion regulation abilities generally decrease (Silvers et al. 2012). Finally, emotion regulation deficits have been found in SUD patients. In particular, low levels of emotion regulation abilities and inadequate emotion regulation strategies are associated both with the presence of SUDs and the frequency of drug consumption (Fox et al. 2008, Fucito et al. 2010, Berking et al. 2011). Although studies identified two main dimensions of emotion regulation that are associated with SUDs, awareness of emotions and distress tolerance (Kun and Demetrovics 2010), the majority of studies were conducted on alcoholics or cigarette smokers (Riley and Schutte 2003, Verdejo et al. 2008, de Sousa Uva et al. 2010, Marshall-Berenz et al. 2011). Indeed, as found by Sudraba et al. (2012), alcoholics and drug addicts may differ in relation to some emotional intelligence competencies such as emotion regulation skills: drug addicts reported both poorer impulse control and self-actualization abilities than alcoholics. Moreover, some studies showed that opiate addicts have a greater ability to identify their emotions than alcoholics (Kornreich et al. 2003, Foisy et al. 2005). In this sense, the studies on drug addicts suggest that they are generally able to identify and recognize their affective states but have poor confidence in their abilities to cope with them and to be able to control the impulse to alleviate them resorting to drugs. Finally, a recent research (Di Pierro et al., 2014), suggested that SUDs of illicit drugs is associated with maladaptive ways to cope with negative affective states. The study found that patients with SUDs (illicit drugs) and co-occurring personality disorders reported higher levels of aggressive behaviors (both self-directed and other-directed) than PD patients and healthy controls. Indeed, as suggested by Roberton et al. (2012), aggression may be conceptualized as the behavioral effect of maladaptive emotion regulation strategies. According to the authors, individuals who under-regulate negative affective states, such as anger, may be more likely to behave aggressively in an attempt to repair or avoid uncomfortable emotional states; similarly, individuals who over-regulate negative emotions may behave aggressively due to the increase of negative affective states and physiological arousal.

A large body of research suggests that emotion regulation and defense mechanisms are related. Defined as unconscious and involuntary mental processes that modify the conscious experience of thought, feeling, and emotion, defense mechanisms allow individuals to preserve themselves from negative emotions or disproportionate anxiety connected to these experiences (Cramer 1991). According to Vaillant's original theoretical model (1992) defense mechanisms are generally categorized as immature defenses, which tend to distort reality and that are more commonly associated with less adaptive functioning, and mature defenses that attenuate distressing reality and allow for more adaptive functioning. Research on the relationship between the emotion regulation and defense mechanisms stressed both similarities and differences between the two constructs. Despite both of them contributing to broader affect regulation abilities, emotion regulation allows the subject to adjust both positive and negative emotional experiences and includes both conscious and unconscious processes; whereas defense mechanisms contribute to help the subject to avoid overwhelming emotional experiences through unconscious mental processes (Calkins and Hill 2007). In this sense, the association between explicit emotion regulation and defense mechanisms found in many studies (Pellitteri 2002, Alilu et al. 2014) might be due to their specific adaptiveness or maladaptiveness: greater rigidity of emotional regulation strategies generally reflects rigidity of defense mechanisms which lead to maladaptive functioning features (Sala et al. 2015).

Despite the acknowledgment of emotion regulation and defense mechanisms as two components of affect regulation, few studies investigated defense styles among patients with SUDs. Moreover, research on the association between defense mechanisms and SUDs has shown mixed findings. On the one hand, many studies found that SUD patients were more likely to use immature defense styles than nonclinical controls (Redick et al. 2002, Evren et al. 2012), suggesting that addiction involves the use of maladaptive mechanisms such as denial, projection, suppression and rationalization (Miller 1985, Ward 1991, Benjamin et al. 1996). On the other hand, some studies reported a more complex relationship between SUDs and defense mechanisms. Studies showed that both immature and mature defense mechanisms are associated with the presence (Redick 2002, Halim and Sabri 2013) and the severity of addiction (Grebot and Dadard 2010, Taskent et al. 2011) among SUD patients. In particular, beyond the use of immature defenses, these studies highlighted the role of sublimation as a mature defense which enables drug addicts to continuously use drugs as this action is acceptable in the subculture of addicts in order to reduce their unacceptable thoughts or emotions (Halim and Sabri 2013). Nevertheless, the role of mature defenses among SUDs is not clear yet and further studies are needed. Indeed, Evren et al. (2012) did not found any difference neither in mature defense style nor in the use of sublimation between heroin addicts and healthy controls, whereas differences were found only in immature defense mechanisms. Heroin addicts were more likely to use splitting and devaluation than healthy controls.

As stated above, despite the relationship between SUDs and emotion regulation has attracted the scientific interest for a long time, little is still known about the nature of this association. Indeed, the majority of studies were conducted on nonclinical populations and studies on SUD patients were predominantly conducted on alcoholics, making poorly generalized findings. Moreover, the mechanism through which difficulties in emotion regulation may lead to SUDs is already uncertain. The aim of the present study is to clarify the nature of the association between difficulties in emotion regulation and SUDs. Specifically, we investigate which dimensions of emotion regulation deficits are specifically associated with SUDs of illicit drugs and whether this association might be explained by the use of defense mechanisms. Based on previous studies on drugs addicts, we hypothesized that the presence of SUDs was associated with deficits in the impulse control ability and less confidence in their ability to regulate negative affective states. Finally, we hypothesized that difficulties in emotion regulation might lead individuals to use less mature defense mechanisms to cope with negative affect states, increasing the likelihood to use illicit drugs to alleviate them.

Methods

Participants

The study involved two groups of participants: 58 SUD inpatients (SUD group) consecutively admitted in a residential treatment service for patients with SUDs, and 73 community participants (C group) recruited through fliers posted in meeting places in the community and through word of mouth. Inclusion criteria for all participants were as follows: (1) be over 18 years old; (2) exhibit no significant cognitive impairment; and (3) not meet the criteria for a current manic episode or psychotic disorder.

The SUD group included 42 males (72.4%) and 16 females (27.6%), with an overall mean age of 35.14 years (SD ± 9.31 years; range 18–54). The majority of participants (71.2%; N = 42) reported a high education level (high school or above). The C group included 20 males (27.4%) and 53 females (72.6%), with an overall age of 28.85 (SD ± 5.95 years; range 21–50). The majority of participants (98.6%; N = 72) reported a high education level (high school or above).

The two groups of participants significantly differed in relation to gender (χ^2=26.27, p<.05) and age (t (129)= - 4.69, p<.05).

Materials

The *Difficulties in Emotion Regulation Scale* (DERS; Gratz and Roemer 2004, Giromini et al. 2012) is a 36 item self-report measure to assess clinically relevant difficulties in emotion regulation. It evaluates six facets of emotion regulation such as non-acceptance of emotional responses, difficulties engaging in goal-directed behavior, impulse control difficulties, lack of emotional awareness, limited access to emotion regulation strategies and lack of emotional clarity. Participants respond on a five-point Likert scale ranging from 1 to 5 (1= "almost never"; 5= "almost always"). Higher score indicates greater difficulties in the emotion regulation. The Italian version of the DERS showed satisfactory internal consistency (range α= .77 - .92). The *Response Evaluation Measure-71* (REM-71; Steiner et al. 2001, Prunas et al. 2009) is a 71 item self-report questionnaire that assesses the defensive style. It evaluates 21 defenses each of which is resulting from responses to three or four questions. Participants estimate their level of agreement on each item on a scale ranging from 1 to 9 (1= "strongly disagree"; 9= "strongly agree"). Each defense is scored obtaining the average of the scores for the items related to that particular defense. The Italian version of the REM-71 showed adequate internal consistency (range α= .73 - .88). The *Structured Clinical Interview for DSM-IV Axis II Personality Disorders* (SCID-II; First et al. 1997) is a 140-item semi-structured interview designed to provide categorical assessment of DSM-IV Axis II disorders. The SCID-II interview was preceded by the administration of its self-report screening questionnaire. Given the diagnostic purposes of the SCID-II, it was not administered to the nonclinical participants.

Procedure

The present study was approved by the Research Ethics Board of the University of Milano-Bicocca. Assessment procedures were performed after participants provided written informed consent. The SCID-II was administered by a clinical psychologist.

Statistical analyses

All analyses were performed using SPSS 18.0 (SPSS, Chicago, IL). Descriptive statistics were used to describe the sociodemographic and psychopathological characteristics.

T-test analyses were conducted to test differences between the two groups of participants with regard to difficulties in emotion regulation. Finally, multiple logistic and linear regression models were conducted to evaluate which difficulties in emotion regulation were associated with the presence of SUDs, controlling for the effect of gender and age, and whether this association was mediated by defense mechanisms. Three SUD inpatients were excluded from T-test and regression analyses due to missing values on the DERS.

Table 1. *Rates of Personality Disorders among the SUD group (N=58)*

Personality Disorder	N	%
Avoidant	4	6.9
Dipendent	1	1.7
Obsessive- compulsive	3	5.2
Passive- aggressive	5	8.6
Depressive	4	6.9
Paranoid	5	8.6
Histrionic	1	1.7
Narcissistic	5	8.6
Borderline	13	22.4
Antisocial	14	24.1
Not otherwise specified	17	29.3

Significant group differences between the two groups of participants were found with regard to difficulties in emotion regulation (**table 2**). As in **table 2**, significant differences between groups were found only in the dimension of lack of awareness and limited access to emotion regulation strategies. The SUD group reported greater lack of awareness than the C group. Similarly, the SUD group reported greater limited access to emotion regulation strategies than the C group.

Table 2. *Means, standard deviations and independent sample t-tests assessing differences in emotion dysregulation between SUD inpatients and nonclinical participants*

DERS	SUD group[a]		C group[b]		
dimensions	M	SD	M	SD	t[c]
NonAccept	15.29	3.48	14.92	3.54	-.59 (126)
Goals	12.65	3.08	12.64	2.75	-.02 (126)
Impulse	12.34	2.79	12.33	2.78	-.03 (126)
Aware	7.65	3.16	5.74	2.41	-3.75* (97.68)[d]
Strategies	23.42	2.61	21.40	3.23	-3.80* (126)
Clarity	11.60	4.23	10.38	3.50	-1.78 (126)

*[a]N= 55; [b]N=73; [c]degrees of freedom are reported in brackets; [d]degrees of freedom change according to Levene's Test significance (F= 7.21; p<.05); NonAccept= Non-acceptance of Emotional Responses; Goals= Difficulties Engaging in Goal-Directed; Impulse= Impulse Control Difficulties; Aware= Lack of Emotional Awareness; Strategies= Limited Access to Emotion Regulation Strategies; Clarity= Lack of Emotional Clarity. *p< .001.*

Multiple logistic regression analyses were conducted to investigate which difficulties in emotion regulation were specifically linked with the presence of SUDs, controlling for the effect of gender and age. As in **table 3**, results showed that, when the effects of the DERS dimensions are considered together in a multiple regression model, only the dimension of limited access to emotion regulation strategies had a significant effect on the presence of SUDs. The greater the difficulty to access to emotion regulation strategies was, the higher the probability of have SUD diagnosis was (Exp(B) = 1.28, $\chi^2(1) = 6.30$; $p < .05$). At the same time, also gender and age had significant effect on the presence of SUDs: being male increased the probability of being affected by substance use disorder (Exp(B) = .10, $\chi2(1) = 18.68$; $p < .001$); the higher the age was, the higher the probability of having SUD diagnosis was (Exp(B) = 1.14, $\chi2(1) = 15.39$; $p<.001$).

Finally, a mediation model was tested to study whether the relationship between limited access to emotion regulation strategies and the presence of SUDs was mediated by the use of defense mechanisms. First of all, a multiple logistic regression analysis was conducted to investigate which defense mechanisms were specifically linked to the presence of SUDs. Results showed that the use

of defense mechanisms was associated with the presence of SUDs ($\chi^2(2) = 13.49$; $p<.001$). In particular, the presence of SUDs was specifically associated with lower use of mature defenses (Exp(B) = .43, $\chi^2(1) = 11.54$; $p < .05$); whereas the effect of immature defenses on the presence of SUD was not significant (Exp(B) = 1.26, $\chi^2(1) = 1.26$; $p > .05$).

Results of the mediation model were reported in **figure 1**. As shown, the effect of limited access to emotion regulation strategies on the presence of SUDs was partially mediated by the use of mature defenses. We tested the significance of this indirect effect using bootstrapping procedures. Unstandardized indirect effects have been computed for each of the 5.000 bootstrapped samples, and the 95% confidence interval was computed by determining the indirect effects at the 2.5th and 97.5th percentiles.

The bootstrapped unstandardized indirect effect was .05, and the 95% confidence interval ranged from .01 to .12. Thus, the indirect effect of Strategies on SUDs was statistically significant.

In general, the greater the difficulty in access to emotion regulation strategies was, the higher the probability of having SUDs was. Part of this effect was mediated by mature defenses: the greater the difficulty in access to emotion regulation strategies was, the less the use of mature defenses was, and the less the use of mature defenses was, the higher the probability of having SUDs was.

Discussion

This study investigated the relationship between SUDs and difficulties in regulating emotions, aiming to examine whether defense mechanisms might be considered as significant mediators.

In line with the literature findings the present study suggests that having difficulties in managing negative affects increases risk for SUDs (Kober 2014). Overall, according to previous studies, substance addicts report poorer awareness of their emotional states (Fox et al. 2008, Kun and Demetrovics 2010) and less ability to cope with negative affect states (Riley and Schutte 2003, Verdejo et al. 2008, Kun and Demetrovics 2010, De Sousa Uva et al. 2010, Marshall-Berenz et al. 2011). However, although the association between emotion regulation and SUDs has been investigated for a long time, the majority of studies were conducted exclusively on alcoholics or cigarette smokers (Riley and Schutte 2003, Verdejo et al. 2008, Kun and Demetrovics 2010, De Sousa Uva et al. 2010, Marshall-Berenz et al. 2011). Indeed, as found by recent studies drug addicts do not always show difficulties in recognize their emotions (Kornreich et al. 2003, Foisy et al. 2005) but they generally report poorer self-actualization abilities (Sudraba et al. 2012), compared to alcoholics. According to recent studies (Fox et al. 2008, Fucito et al. 2010, Berking et al. 2011), our findings showed that, even though poor awareness of emotions can be observed, a specific role in the presence of SUDs is assigned to the individual's inability to find emotion regulation strategies when they are upset. After all, the poor confidence reported by SUD patients in their abilities to cope with negative affect states seems to

Table 3. *Multiple logistic regression analysis: the effects of difficulties in emotion regulation on the presence of SUDs*

	B	Exp(B)	df	χ^2
Multiple regression model			8	64.12**
NonAccept	.08	1.09	1	.84
Goals	-.08	.92	1	.49
Impulse	-.20	1.22	1	2.57
Aware	.11	.82	1	1.36
Strategies	.25	1.28	1	6.30*
Clarity	.03	1.03	1	.22
Gender	-2.33	.10	1	18.68**
Age	.13	1.14	1	15.39**
Pseudo R^2				.53
HL Test				5.26

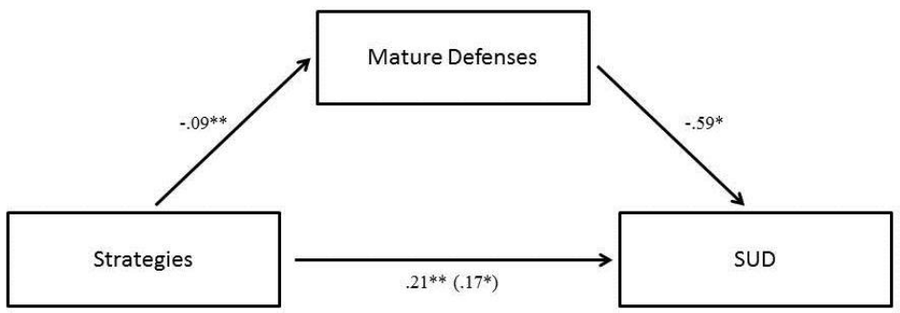
N= 128; NonAccept= Non-acceptance of Emotional Responses; Goals= Difficulties Engaging in Goal-Directed; Impulse= Impulse Control Difficulties; Aware= Lack of Emotional Awareness; Strategies= Limited Access to Emotion Regulation Strategies; Clarity= Lack of Emotional Clarity; Pseudo-R= Nagelkerke's Pseudo R square measure; HL Test= Hosmer-Lemeshow Test for Logistic Regression
**p<.05; **p<.001.*

support the "self-medication" hypothesis (Khantzian 1985). According to studies showing that drugs are often used to look for relief from negative emotional states (Jones et al. 2001, Le Moal 2009), our results highlight that SUD inpatients report to feel very depressed every time they experience overwhelming negative affect states showing a lack of confidence with regard to the possibility to modify this condition in a short time. In this sense, the poor confidence in being able to use internal emotional regulation strategies might promote the use of drugs as an external effective replacement.

Moreover, this hypothesis is strengthened by the mediating role played by defense mechanisms. Although literature on the association between SUDs and defense mechanisms has been mainly focused on a greater use of primitive defense mechanisms among drug addicts (Miller 1985, Ward 1991, Benjamin et al. 1996, Khan et al. 2008, Evren et al. 2012, Halim and Sabri 2013), few studies recently suggested that mature defenses are also implicated in the maintenance of SUDs and the intensity of addiction (Redick et al. 2002, Grebot and Dadard 2010). Furthermore, a new understanding of defense mechanisms as strategies on a continuum from maladaptive to adaptive ones suggests that individuals (both nonclinical and clinical ones) may use a complex mixture of both (Sala et al. 2015). On this basis, considering both mature and immature defenses, the present study showed that mature rather than immature ones are primarily involved in SUDs. Specifically, the poor confidence in their own abilities to cope with negative affect states lead individuals to a less use of mature defense mechanisms, which increases the probability to have a SUD diagnosis. As stated above, SUD patients generally report poor confidence in modulating negative emotions through their internal regulation strategies when they feel upset. This might discourage the use of mature defenses such as sublimation or humor, which could weaken the intensity of these affect states and channel unbearable thoughts or emotions into more socially acceptable behaviors (Halim and Sabri 2013). The result is that drug is needed to balance out the emotional arousal which individuals were not able to cope with through adaptive defenses.

The results of the current study can be better understood in the context of the study's limitations. The cross-sectional research design allowed correlational rather than causal relationships to be established. Despite this, our interpretation of results is based on clinical literature and findings from longitudinal studies identifying emotion regulation difficulties as causal factors for the development and maintenance of SUD (Kober & Bolling 2014). Again, one limitation concerns the presence of PDs among the majority of SUD patients. Indeed, difficulties in emotion regulation might be linked to the presence of PDs, such as borderline personality disorder, which is characterized by poor modulation of negative emotional experiences. According to this, it is possible that some of the results we found might be partly explained by the presence of co-occurring PDs among SUD inpatients. In this sense, it will be interesting to further investigate the association between difficulties in emotion regulation and SUDs considering groups of PD inpatients without SUDs in addition to SUD patients and healthy controls. This would help to understand whether difficulties in emotion regulation are linked to the presence of SUDs or to the presence of co-occurring PDs. Despite this, it is important to note that the high prevalence of co-occurring PDs among SUD patients, and especially borderline personality disorder (McGlashan et al. 2000, Trull 2000, Chapman et al. 2007, James et al. 2007, Pennay et al. 2011), is in line with empirical studies (Rounsaville et al. 1998) and it reflects the ecological reality of substance treatment services in Italy. Finally, some limitations of the study concern differences on sociodemographic characteristics between the two groups we considered. First, the two groups differed on the overall mean age. As suggested by previous studies, younger age is generally related to greater difficulties in regulating emotions (Pfeifer et al. 2007, Silvers et al. 2012, Riediger and Klipker 2014) which may increase risk for SUDs (Ianov et al., 2011; Sinha & Li, 2007). Despite this, our results suggested that specific emotion regulation difficulties were related to the presence of SUDs after controlling for the effect of age. Nevertheless, it would be useful to replicate our study considering groups of participants which are balanced by age. This could further clarify the relationship between emotion regulation difficulties and the presence of SUDs. Similarly, the two groups differed with regard to gender: males were predominant in the SUD group whereas females were predominant in the NC group. Despite this, the imbalance seemed not to affect our results. Considering the possible influence of gender on both the presence of SUDs and difficulties in emotion regulation, regression analyses were conducted controlling for its effect: however, after controlling for the effect of gender, results showed that SUDs were associated with limited access to emotion

Figure 1. *Mature defense mechanisms mediate the relationship between limited access to emotion regulation strategies and the presence of SUDs*



Note. Standardized regression coefficients are reported. Results of the analysis show that the effect of Strategies on SUD classification is partially mediated by Mature Defenses (Total effect: .21; Direct effect: .17; Indirect effect: .05).
**p<.05; **p<.001.*

regulation strategies when individuals feel upset.

In conclusion, the present study helps to clarify the association between SUDs and difficulties in emotion regulation. Indeed, findings from the study showed that drug addicts are characterized by limited access to emotion regulation strategies when they feel upset, and that this association is partially explained by the inability to cope with these feelings through the use of mature defenses. In this sense, the study may have important implications both on research and clinical practice. First, it suggests the need to study the role of mature defense mechanisms on the onset and maintenance of SUDs. Until recent years, empirical studies have considered exclusively the effect of primitive defenses, neglecting mature ones. Finally, results suggest the importance of focusing psychotherapy interventions on SUD patients through strengthening the use of mature defense mechanisms in order to increase their sense of agency and confidence related to their abilities to cope with negative emotions.

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