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Social cognition, personality dimensions and clinical symptoms as variable predictors in people with polydrug abuse in treatment

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Abstract. The consumption of substances has been related to difficulties in terms of social cognition and personality. Our objective was to estimate the relationship between social cognition, personality variables and clinical symptoms as variable predictors of addictive behavior. The study included a total of 54 participants from different drug associations in Spain. Statistically significant differences in reaction time in emotional recognition were observed in happiness, disgust, sadness and anger. Significant differences were obtained, with the clinical group scoring lower for the empathy variable. In addition, differences were obtained in clinical variables, such as depression, anxiety, phobic anxiety, intensity of symptoms and psychic discomfort. A logistic regression model with previously significant variables accounted for 67% of variance. The predictive variables of the addictive behavior correspond to the reaction time to static emotion stimuli and the ability to put oneself in the place of another.

Keywords: Consumption; empathy; social cognition; personality trait.

Cognición social, dimensiones de personalidad y síntomas clínicos como variables predictoras en un colectivo de policonsumo en tratamiento

Resumen: El consumo de sustancias se ha relacionado con dificultad en la cognición social y rasgos de personalidad. Nuestro objetivo fue estimar la relación entre la cognición social, las variables de personalidad y cómo los síntomas clínicos pueden predecir el comportamiento adictivo. El estudio incluyó un total de 54 participantes miembros de diferentes asociaciones en España. se observaron diferencias estadísticamente significativas en el tiempo de reacción en el reconocimiento emocional en alegría, asco, tristeza y enfado. Se obtuvieron diferencias significativas en el grupo clínico para la variable empatía. Además, se obtuvieron diferencias en variables clínicas, como depresión, ansiedad, ansiedad fóbica, intensidad de síntomas y malestar psíquico. En el modelo de regresión logística se observan diferencias significativas representando el 67% de la varianza. las variables predictivas de la conducta adictiva corresponden al tiempo de reacción y la capacidad de ponerse en el lugar del otro.

Palabras clave: Policonsumo; empatía; rasgos de personalidad; síntomas clínicos.

Introduction

It is estimated that 1 in 20 adults, approximately 250 million people between 15 and 64 years old, consumed at least one drug in 2014. This figure could be similar

to the sum of the entire existing population in Germany, France, Italy and the United Kingdom. However, it is estimated that more than 29 million people who use drugs suffer from disorders related to them or suffer from dual consumption or polysubstance use (Kerridge et al., 2015; Oficina de las Naciones Unidas contra la droga y el delito, 2016). The number of drug-related deaths in 2014 was estimated at around 43.5 deaths per million people aged 15 to 64 years in the world. Apart from the high social, economic and personal costs rooted

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in the use of drugs, the consumption itself is a major problem (UNODC, 2016).

Psychoactive substances are considered drugs with serious psychological and socio-health repercussions (Cándido et al., 2007). Indeed, addictions are a problem related to multiple variables, including certain personality traits (Zilberman, Yadid, Efrati, Neumark, & Rassovsky, 2017). Kornor & Nordvik (2007) note that there is significant interest in identifying the type of addictive personality. In this same vein, Aluja, Balada, Blanco, Fibla, & Blanch (2018) observe that neuroticism and the search for sensations are traits frequently associated with addictive behaviors. These authors have suggested that people with addictive behaviors show higher scores in the search for sensations and lower scores in self-direction. This would explain why people with one or several addictions make hasty and not very thoughtful decisions, even when those decisions imply a negative risk. Ersche, Turton, Pradhan, Bullmore, & Robbins (2010) state that the sensation seeking represents 11.9 % of the explanatory variance of externalizing disorders, which is related to addictive behaviors. In addition, we have identified the personality characteristics in addictive behaviors that tend to lead to poorly considered actions that are not aimed at a specific objective because of the predominant personality background in addictive behavior (Cándido et al., 2007; Thoma, Winter, Juckel, & Roser, 2013). For this reason, the same authors raise the question of whether an addictive behavior is influenced by personality traits that would contribute to the development of this problem. At the same time, they highlight the existence of variables such as impulsivity, which are strongly related to addictive behaviors.

According to Aluja et al. (2018), personality traits can be closely related to the behavior of people addicted to certain substances, since it is believed that negative emotions such as anger are internalized more slowly in terms of reaction time and score higher in relation to the personality variable (neuroticism). Consequently, this relationship between the personality variable of emotional instability (neuroticism) and processing negative emotions (anger) would explain a greater tendency to symptoms of depression and anxiety. To sum up, good emotional management influences the management of impulsivity and affective alteration. For this reason, it is necessary to develop capacities related to social cognition.

Social cognition is the ability to process social information, this means, being able to code, store, recover and apply it in social situations (Cacioppo, Berntson, Sheridan, & McClintock, 2000). Among the skills included within this ability we find the following: emotion processing, theory of mind, attributional bias and

social perception (Pinkham, 2014). Emotion processing refers to the ability to perceive, understand and properly handle emotional information, both in relation to oneself and others. The theory of mind is defined as the ability to infer other people's mental states (thoughts, beliefs, and intentions). The attributional bias refers to the way in which people explain the positive and negative events that happen to them. Finally, social perception implies the assessment and understanding of the social rules and roles that occur in social situations, and the ability to adapt their own behavior based on those aspects (Green, Horan & Lee, 2015).

In recent years, numerous studies on social cognition within different groups have been published. These studies show that there are deficits in social cognition in psychiatric patients, as in the case of schizophrenia (SKZ) and obsessive-compulsive disorder (OCD). (Gallagher and Varga, 2015; Gil-Sanz et al., 2017; González-Panzano et al., 2019; Lahera et al., 2015). Regarding additions, Kuypers, Steenbergen, Theunissen, Toennes, & Ramaekers (2015) note that cocaine use can impair the recognition of emotions and, specifically, negative emotions. Their results suggest that the precision of answers lessens in the presence of anger when compared to control subjects. In addition, they identified difficulties in the emotion of sadness compared to a control group. Bayrakci et al. (2015) and Peterson, Malouff, & Thorsteinsson (2011) observe that a deficit in emotional processing has been reported in numerous patients who consume various drugs. This fact is confirmed by another study conducted by Hoshi, Bisla, & Curran (2013) where similar data were found. Gruber et al. (2009) show a reduction in the activity of the anterior cingulate and the amygdala in cannabis users during the presentation of negative emotionally charged stimuli. The objective of the present study is estimate the relationship between social cognition, personality variables and clinical symptoms as variable predictors of addictive behavior.

Method

Participants

The study included a total of 54 participants, of which the clinical group consisted of $n = 34$ participants with substance use disorder (alcohol and cocaine) diagnosed according to DSM-5 criteria and a second control group of $n = 20$ healthy subjects. The study participants had been in a period of abstinence for at least 3 months. All the participants were matched by age and educational level (Table 1). The participants are members of the Proyecto Hombre España Association. The control subjects were

recruited through open invitation to collaborate in the study in the community of Cantabria. Control participants were excluded if they met criteria for hazardous use of substances, or substance abuse or dependence, excluding nicotine. All of the control participants reported drinking only sporadically. The inclusion criteria for the clinical groups were: (1) substance dependence as classified in the DSM-5 (cocaine and alcohol); (2) an abstinence period of at least 3 months; (3) they had to know how to read and write; (4) they could not manifest any type of motor impairment that would prevent the execution of the various tests applied; (5) they could not have any type of visual impairment; and (6) they could have no other mental illness diagnosis. In the case of the control subjects, the same inclusion criteria were used, except that they did not have a psychiatric pathology or history of drug use. All the participants were interviewed using a structured interview to collect sociodemographic data. All the ethical and ontological aspects involved in the evaluation process approved by the ethics committee were safeguarded.

Table 1. Sample distribution by gender and age, marital status, education level, job situation

	Clinical Group N = 34	Control Group N = 20	<i>t</i> / χ^2
Gender M (%)	28 (82.4%)	17 (85%)	0.06
F (%)	6 (17.6%)	3 (15%)	
Civil status			
Married	3 (8.8%)	9 (45%)	
Divorced	6 (17.6%)	3 (15%)	10.05*
Single	24 (70.6%)	8 (40%)	
Widower	1 (2.9%)	0	
Age	39.91 ± 10.24	39.30 ± 11.79	0.20
Years of studies	10.24 ± 3.78	11.10 ± 2.10	-1.00
Occupation			
Unemployed	5 (14.7%)	1 (5%)	
Employed	23 (67.6%)	16 (80%)	4.82
Student	2 (5.9%)	3 (15%)	
Disabled due to illness	3 (8.8%)	0	
Temporary disability	1 (2.9%)	0	

Note. M = male; F = Female. * $p < .05$

Instruments

Facially Expressed Emotion Labeling (FEEL; Kessler, Bayerl, Deighton, y Traue, 2002). This test measures the ability to recognize basic emotions (anger, disgust, fear, happiness, surprise and sadness) in facial expressions by measuring the reaction time (RT) and the

accuracy of the given response (ACC). This instrument is applied through visual stimuli on the screen of a 14-inch laptop, under standardized conditions of brightness and external brightness in the room. Each emotion is expressed by four people of Caucasian or Asian origin. The test consists of 42 images (six emotions with seven images each). The presentation of the stimulus lasts 300 ms (Figure 1) with a Cronbach's alpha of .77.

Cognitive and Affective Empathy scale (TECA; López-Pérez, & Fernández-Pinto, 2008). This scale consists of 33 items subdivided into 4 scales that measure cognitive and affective components: (1) Cognitive role taking ($\alpha = .70$); (2) fantasy ($\alpha = .75$); (3) empathic concern ($\alpha = .70$); (4) personal distress ($\alpha = .86$). The test makes it possible to identify the level of empathy in a complete emotional situation. Scores on the scales obtained a Cronbach's alpha internal consistency of $r = 0.86$. With respect to the convergent validity, the TECA presented correlations of .63 and of .73 in the Spanish adaptation of the Interpersonal Reactivity Inventory (Pérez-Albéniz, De Paúl, Etxeberria, Montes, & Torres, 2003).

Zuckerman Sensation Seeking Scale-V (SSS; Pérez & Torrubia, 1986; Zuckerman, Eysenck & Eysenck, 1978). This test evaluates the personality trait of sensation seeking. The questionnaire consists of 40 questions that the subject must answer affirmatively or negatively. It contains four subscales of 10 items each: (a) Thrill and Adventure Seeking; (b) Experience Seeking; (c) Disinhibition; and Boredom Susceptibility. It can be administered individually or collectively. Scores on the scales obtained a Cronbach's alpha internal consistency of $r = .77$ and construct validity of the instrument is .87 (Pérez & Torrubia, 1986).

Five Factors Inventory (NEO-FFI; Costa & McCrae, 1985). This version is an abbreviated 60-item test that measures 5 personality dimensions: (a) Neuroticism N; (b) Extraversion E; (c) Openness O; (d) Agreeableness A; and (e) Conscientiousness C. This instrument makes it possible to measure normal personalities and takes approximately 15 to 20 minutes to administer. Scores on the scales obtain a Cronbach's alpha internal consistency of $r = .85$ (Sanz & García-Vera, 2009).

Symptom Checklist-90 Questionnaire (SCL-90; Derogatis, 1977; Spanish version of González de Rivera, De las Cuevas, Rodríguez, & Rodríguez, 2002). This is a Likert-type questionnaire composed of 90 items, each one of which describes a psychopathological alteration. The answers range from 0 –absence of discomfort– to 4 –maximum discomfort. The scale can be administered individually or collectively and takes approximately 15 minutes. The questionnaire is composed of 10 scales: (1) somatization; (2) obsession-compulsion; (3)

interpersonal sensitivity; (4) depression; (5) anxiety; (6) hostility; (7) phobic anxiety; (8) paranoid ideation; (9) psychoticism; and (10) additional scale. The test has an internal Cronbach's alpha consistency with values between .81 and .90.

Procedure

The patients belonging to the clinical group were recruited in the centres of Proyecto hombre in Cantabria and Burgos. In both cases, they had been diagnosed, prior to their participation in the present study, by the healthcare professionals who worked in those centres. The non-clinical group was composed of healthy volunteers from Cantabria. Informed consent was obtained from all participants. Two health psychologists were responsible for conducting a semi-structured interview for the collection of sociodemographic data and consumption habits. The administration of the protocol was carried out individually in the users' own centres in a session of approximately one hour (scheduled appointment) in the following order: NEO-FFI, Sensation seeking, SCL-90, FEEL and TECA.

Statistical analyses

Firstly, the Kolmogorov-Smirnov test was used to analyse normality. All variables were normally distributed, with the exception of the SCLE and the "empathic joy" variable of the TECA scale. The data analyses consisted of two main steps. In the first, univariate differences in the variables between the clinical group and control group were explored through t-tests for independent samples. Both significance and effect size (Cohen's *d*) were calculated. Effect sizes were interpreted following Cohen's standards; values under 0.20 were considered small effects, values under 0.50 medium and values above 0.80 large. In the second step, a logistic binary

regression model was built. In this case, the variables that were significantly different between the two groups were introduced as predictors, and the dichotomy grouping variable (clinical/control group) was the outcome variable. In the case of the FEEL variables (mean time of response to each kind of emotion), a global score was calculated by factorizing the six individual emotions through a principal component analysis. This was supported on the significant relationship between the six individual scores based on Bartlett's sphericity test and the Kaiser-Meyer-Olkin (KMO) sample adequacy test. The intention was to create a model with a minimum number of predictors, as the relatively small sample size could threaten the statistical power. Moreover, introducing highly correlated variables as predictors in a regression model can cause multicollinearity problems. Then, the significant predictors of the grouping variable were established, and the total amount of variance that the predictors explained regarding the outcome variable was determined through Nagelkerke's R^2 . Additionally, the sensitivity and specificity of the model were calculated by analyzing the percentage of both clinical and control cases that were correctly classified. The data were analyzed using the Statistical Package for Social Science, version 22 (SPSS, Inc.).

Results

Evaluation of recognition of static emotions and empathy

Regarding the ability to discriminate static faces with emotional content, no statistically significant differences were observed in the accuracy of the responses given by the participants. However, as it can be seen in Table 2, statistically significant differences were observed in the reaction times to the emotional expressions of happiness, disgust, sadness and anger, with the clinical group being

Table 2. Reaction time averages by static emotion

	Control Group (<i>n</i> = 20)		Clinic Group (<i>n</i> = 34)		<i>t</i>	<i>p</i>	<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
RT Happiness	1450.76	521.01	1984.31	845.856	-2.52	.015	-0.75
RT Disgust	1868.07	632.22	2679.93	1099.07	-2.99	.004	-0.90
RT Sadness	2129.18	677.22	2717.61	871.84	-2.55	.014	-0.75
RT Anger	1898.16	499.21	2457.86	700.35	-3.09	.003	-0.92
RT Surprise	1851.84	598.11	2267.21	949.90	-1.74	.088	-0.52
RT Fear	2293.50	691.15	2660.16	1065.11	-1.36	.179	-0.40

Note. RT= Reaction time (milliseconds).

Table 3. Difference of means and size effect in personality traits.

	Control Group (<i>n</i> = 20)		Clinic Group (<i>n</i> = 34)		<i>t</i>	<i>p</i>	<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Neuroticism	16.15	7.47	26.41	6.99	-5.07	.000	-1.41
Extraversion	31.30	5.94	28.53	8.92	1.23	.223	0.17
Conscientiousness	31.10	8.47	24.71	6.28	3.16	.003	0.85
Openness	26.75	6.68	26.18	7.23	0.28	.774	0.08
Agreeableness	30.20	7.11	22.15	7.05	1.53	.132	1.13

slower when performing the test in comparison to the control group, with medium to large effects. Regarding empathic capacity, significant differences were observed in the Perspective-Taking subscale compared to the control group, $t(52) = 2.69$, $p = .010$, $d = 0.64$, with the control group scoring higher ($M = 28.23$; $SD = 3.23$) than the clinical group ($M = 26.03$; $SD = 3.58$). No significant differences in emotional feeling, empathic stress or empathic joy were observed.

Personality evaluation

Regarding the Sensation Seeking test, no statistically significant differences were observed in Thrill and Adventure Seeking (TAS), Experience Seeking (ES), Disinhibition (DIS) or Boredom Susceptibility (BS) in comparison to the control group. However, significant differences were observed in the neuroticism subscale of the personality test, with the clinical group scoring higher in comparison to the control group. Regarding the sense of responsibility personality trait, statistically significant differences were observed when comparing both groups (Table 3).

Clinical symptoms

Significant differences were observed in the following variables related to clinical symptoms: interpersonal sensitivity, depression, anxiety, phobic anxiety, psychic suffering, present symptoms and intensity of clinical symptoms, as shown in Table 4.

Based on the previous results, a logistic binary regression model was constructed, introducing as predictors all the variables for which statistically significant differences were obtained in the analysis. First, we factorized the response time score for emotions. The results showed that the *KMO* index of sample adequacy was satisfactory ($KMO = .88$) and Bartlett's sphericity test was significant, $\chi^2(15) = 195.92$, $p < .001$, which shows that the relationship between the variables introduced in the model is high. It was observed that the six variables were grouped into a single factor (termed 'reaction time between emotional expressions'), which explained 65.52% of the variance and showed a high internal consistency ($\alpha = .89$). The factorial weights of the individual variables ranged from .67 (happiness) to .87 (surprise).

Table 4. Mean differences in clinical symptoms.

	Control Group <i>n</i> = 20		Clinical Group <i>n</i> = 35		<i>t</i>	<i>p</i>	<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Interpersonal sensitivity	0.57	0.47	1.14	0.82	-2.80	.007	-0.85
Depression	0.59	0.48	1.21	0.98	-2.62	.011	-0.80
Anxiety	0.45	0.43	0.93	0.79	-2.05	.015	-0.80
Phobic anxiety	0.16	0.25	0.47	0.64	-2.03	.047	-0.63
Psychic suffering	0.29	0.27	0.75	0.71	-2.81	.007	-0.85
Present symptoms	0.54	0.45	0.95	0.64	-2.47	.017	-0.74
Intensity of symptoms	33.80	20.89	45.91	20.64	-2.07	.043	-0.58
Somatization	0.69	0.57	0.85	0.66	-0.88	.383	-0.25
Hostility	0.56	0.59	0.83	0.78	-1.34	.186	-0.39
Paranoid Ideation	0.88	0.70	1.33	0.93	-1.88	.065	-0.26

The regression model was then produced, the results of which are in Table 5. As it can be seen, the variables that remained significant were the reaction time between emotional expressions and cognitive role taking. In total, the model explains 67.0% of the variance in the grouping variable. In addition, it shows high sensitivity (85% correctly classified clinical cases) and specificity (90.3% correctly classified control cases).

Table 5. Logistic binary regression model predicting the grouping variable.

	<i>B</i>	<i>S.E.B</i>	<i>Exp (B)</i>	<i>p</i>
RT emotions	1.44	0.65	4.23	.026
Cognitive role taking	-0.38	0.15	0.68	.011
Neuroticism	0.10	0.08	1.10	.213
Consciousness	-0.08	0.07	0.92	.248
Anxiety	0.08	1.76	1.08	.964
Phobia	2.36	2.09	10.60	.257
Interp. Sens.	-0.22	1.36	0.80	.870

Note. Nagelkerke's R^2 : 67.0%. RT = Reaction time. * $p < .05$.

Discussion

The main objective of this study is to identify the levels of social cognition and personality variables and how they might modulate addictive behavior (alcohol and cocaine). According to the data obtained, it was observed that people who consumed alcohol and cocaine showed lower reaction times in relation to the control group, specifically in negative emotions such as disgust, sadness and anger, with a large effect. Spronk, Ramaekers, & Verkes (2013) note that after sustained use of cocaine in combination with other drugs such as alcohol, reaction times and other cognitive domains can be altered. Following this idea, Kuypers et al. (2015) and Hulka et al. (2014) observe that social skills and the ability to recognize emotions are deficient in relation to healthy subjects. This differs with the data that we obtained, as we did not observe difficulties in the recognition of static facial emotions with regard to the accuracy of the response, although we did observe differences in reaction times. Fernández-Serrano, Lozano, Pérez-García & Verdejo (2010) note that alterations in reaction times in the case of polydrug use may be due to anomalies in the activation and integration of emotional states at the neural level, affecting decision making. On the other hand, our study observed that the participants with addictions showed less ability to establish flexible thoughts and less ability to understand the mental states of others, which can be an obstacle to communication

and relationships with other people. This situation is confirmed through the data obtained about the medium size of the effect in cognitive role taking. Therefore, difficulties in the imaginative ability to put oneself in the place of another person would be seen. In this regard, Rameson & Lieberman (2009) suggest that people with addictions show greater empathic difficulties compared to control subjects. Similarly, Preller et al. (2014) note that people with addictions show problems of empathy, resulting in difficulties with social contact, a situation that could produce antisocial behaviors.

Regarding personality traits, it has been found that subjects with addictive behaviors score higher in the personality trait of neuroticism compared to the control group and score lower in a sense of responsibility, a phenomenon confirmed by the large size of the effect. Kotov, Gamez, Schmidt, & Watson (2010) have found evidence that people who consume substances have a predominance of certain personality traits, with high scores in neuroticism and a low awareness of the repercussions of their actions. This fact may be related to the data obtained regarding a low sense of responsibility in our study. Papachristou, Nederkoorn, & Jansen (2016) estimate that people who score high in neuroticism have a greater propensity for substance use, as well as greater difficulty in coping with problems. More specifically, it is estimated that high scores in neuroticism and a low sense of responsibility could be associated with greater difficulty in terms of coping styles, with the problematic use of substances being a 'strategy' to deal with negative emotional states (Herman, Critchley, & Duka, 2018; Moussa, McKinney, & Asberg, 2018).

On the other hand, large effects were obtained in interpersonal sensitivity, a dimension that reflects feelings of shyness and shame, as well as a predominance of feelings of inferiority and hypersensitivity to the opinions of others. Likewise, high scores were observed in psychic suffering, depression and anxiety. In contrast, the size of the medium effect on the intensity of the symptoms and the persistent fear of objects or situations generates avoidant behaviors. This could be related to aspects connected to the personality trait of neuroticism and a sense of responsibility (Moussa et al., 2018). In addition, all these aspects are reflected in the data obtained in our study, in which subjects with addictive behaviors show lower reaction times in the basic emotion of happiness. Chóliz (2005) notes that this may be due to the fact that people with lower reaction times could find it difficult to establish adequate social interactions, to adequately communicate affective states or to engage in prosocial behavior. Positive emotions can foster social and interpersonal bonds, in addition to emotional

stability and a lack of anxious or depressive symptoms. Therefore, all these altered dimensions can reduce the motivation directed towards an objective (Chóliz, 2005).

Finally, the variables that serve as predictors of the consumption of substances are the reaction time and the ability to put oneself in the place of another person. This suggests that these may be two relevant variables when intervening in addictive behaviors. For that reason, they should be taken into consideration when working with this group. According to Tirapu (2012), the ability to recognize mental states in oneself and in others allows us to anticipate behavior. This is related to social success because it facilitates a satisfactory relationship with one's environment. Deficits would produce erroneous perceptions, inadequate responses and social withdrawal (Ochsner, 2008; Tirapu, 2012). When the variables involved in social cognition are found to be deficient, either in terms of recognizing or slowly processing emotions, they can affect proper expression, which can lead to problems in recognizing feelings, difficulties in modulation and emotional regulation and difficulties in realistically and flexibly handling problems and generating self-motivating elements to achieve life goals (Bar-On, Tranel, Denburg, & Bechara, 2003; Dvorak et al., 2014; Mazza et al., 2007). However, addictive behavior can be seen as a problem when making deficit decisions, since it is difficult to end the self-destructive behavior of seeking pleasure and postponing discomfort, paying little attention to the social repercussions of one's conduct. This fact would support the idea that the social cognition of addiction would prolong substance abuse and that it would predispose the user to relapse (Tirapu, 2012; Weiss, Forkus, Contractor, & Schick, 2018). Another additional clinical implication is related to the fact that individuals with consumption are unable to identify certain emotional facial expressions. Therefore, this may influence the implementation of the psychotherapy.

Important limitations in this study must be mentioned. The cross-sectional design of the study precludes any conclusions regarding the observed associations. In addition, our study sample included individuals with polyconsumption belonging to the same association, who voluntarily participated. Thus, it would be relevant to include participants from other places and organizations. Furthermore, the control group was comprised of university students and participants across groups were not equally allocated according to their demographic characteristics (e.g., education). The study participants were mostly male, a significant factor to bear in mind for future studies. Since it is mainly men who go to centers and/or addiction treatment associations, it would be important to discover the data regarding

gender differences among people who consume dual substances. For the future, it would also be important to measure variables related to early life stressors that might act as modulating factors in addictive behavior and assess how these may affect social cognition.

Conflicts of interest

The authors have no conflicts of interest to declare.

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