

Efficacy of a treatment program based on positive psychology for drug use in juvenile offenders

Eficacia de un programa de tratamiento en el consumo de drogas en menores infractores desde la psicología positiva

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Abstract

One of the factors that increase the likelihood of adolescents starting to exhibit and consolidate anti-social behavior is drug use, with a consistent pattern of consumption of different substance found in young offenders (Aebi, Bessler & Steinhausen, 2021). A cognitive-behavioral group treatment program inspired by the positive psychology approach was developed and applied to drug use in minors deprived of liberty (experimental group); the results were compared to those of a group of adolescents with the same type of drug use in the same center (active control group) at two points in time: during and after incarceration. The fall in the rate of problems associated with drug use after incarceration in the experimental group was statistically significant compared to the control group, and the effect size of the experimental condition was large ($\eta^2 = 0.55$), much higher than the control group ($\eta^2 = 0.16$). The treatment program has proven to be an effective tool for reducing problems associated with drug use and is especially effective in reducing alcohol and cannabis consumption.

Keywords: Young offender; drug use; treatment; cognitive-behavioral; positive psychology.

Resumen

Uno de los factores que aumentan en mayor medida la probabilidad de que los adolescentes inicien y consoliden comportamientos antisociales es el consumo de drogas, encontrándose un patrón consistente de consumo de diferentes sustancias en los menores infractores (Aebi, Bessler y Steinhausen, 2021). Para la redacción del presente trabajo se desarrolló y aplicó un programa de tratamiento, de corte cognitivo – conductual e inspirado en el enfoque de la psicología positiva, para el consumo de drogas en menores de edad privados de libertad (grupo experimental). Los resultados se compararon con los de un grupo de adolescentes con la misma tipología de consumo internos en el mismo Centro (grupo control activo) en dos momentos, durante y tras el internamiento. El grupo experimental redujo de manera estadísticamente significativa la tasa de problemas asociados al consumo de drogas en comparación con el grupo control tras el internamiento, siendo el tamaño del efecto de la condición experimental elevado ($\eta^2 = 0,55$), mucho mayor que el del grupo control ($\eta^2 = 0,16$). El programa de tratamiento ha mostrado eficacia para la reducción de problemas asociados al consumo de drogas, siendo especialmente eficaz en la reducción del consumo de alcohol y de cannabis.

Palabras clave: Menor infractor; consumo de drogas; tratamiento; cognitivo-conductual; psicología positiva.

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In recent decades, the scientific community has shown a particular interest in the study of juvenile criminal behaviour (Bonta & Andrews, 2017; Roncero, Andreu & Peña, 2018). One of the main objectives in this type of research has been to determine the factors that increase the probability of adolescents initiating and consolidating antisocial behaviours. It seems clear that there is no single explanation for this phenomenon, so that there are multiple factors linked to criminal behaviour, this being in most cases the result of dynamic interactions between several variables (Barnert et al., 2021; Pérez & Ruiz, 2017; Simoes, Matos & Batista-Foguet, 2008). One of the variables that has received the most attention is drug use, given its possible relationship and/or reciprocal influence on this type of behaviour. Drugs and antisocial behaviour in adolescence are frequently associated (Aebi et al., 2021; López & Rodríguez-Arias, 2012; Mulvey, Schubert & Chassin, 2010), with findings showing a consistent pattern of different substances being used by juvenile offenders (Pérez & Ruiz, 2017). The literature seems to indicate that there is a clear link between drug use and antisocial behaviour, and that such substance use is more likely if the antisocial behaviour begins during childhood and persists during adolescence (Brislin et al., 2021).

In Spain, the Organic Law 5/2000, of January 12, which governs the criminal responsibility of minors, requires that treatment programs be applied with the greatest possible guarantees of effectiveness. Similarly, it provides the juvenile courts with different tools to deal with offending behaviour: provisions for the benefit of the community, detention measures, therapeutic incarceration, day centre attendance, probation measures or outpatient treatment, among other (Bujosa, González, Martín & Reifarth, 2021; Lázaro-Pérez, 2001).

Over the last 30 years, alternative intervention models to deprivation of liberty have gained much ground in treating drug use in people who have concurrently developed antisocial behaviour (Delen, Zolbanin, Crosby & Wright, 2021), including the adolescent population. The United States has a long tradition in the early approach to problems linked to drug use in adolescents with offending behaviours through outpatient interventions, and specific intervention courts for drug use have been in operation since the 1990s (Ledgerwood & Cunningham, 2019).

Despite the extensive scientific output regarding this type of intervention program, there are still issues to be resolved, such as the analysis of the effectiveness of different types of programs based on different conceptual frameworks (Ali, Benjamin & Fondacaro, 2022). Tripodi, Bender and Litschge (2010) carried out a meta-analysis to assess the efficacy of interventions based on legal measures with adolescents who presented problematic alcohol use. The aim of the analysis was to compare the efficacy of family-based interventions versus the efficacy of individual-based interventions. Accord-

ing to the results of this analysis, all interventions aimed at reducing alcohol use seemed to be successful, and the interventions with the greatest effects were cognitive-behavioural therapy integrated with the 12-step method (Tomlinson, Brown & Abrantes, 2004), the brief motivational interview (D'Amico, Miles, Stern & Meredith, 2008), follow-up after the intervention combined with cognitive behavioural therapy (Kaminer, Burleson & Burke, 2008) and multidimensional family therapy (Liddle et al., 2001).

In a more recent similar meta-analysis, Tripodi and Bender (2011) compared ten studies assessing the efficacy of alcohol and marijuana treatments for juvenile offenders. This study also revealed that the effects of individual-based interventions were weaker among juvenile offenders, while family-based programs showed more effective results approaching the levels of efficacy obtained in the non-offender population. Along the same lines, Dopp, Borduin, White and Kuppens (2017) stated that family-based treatments could reduce the social and economic consequences of crimes committed by adolescents. Similarly, family intervention-based treatments for juvenile offenders produced moderate but lasting effects over time (Dopp et al., 2017).

Some recent and relevant studies in this field are, for example, that of Tanner-Smith, Steinka-Fry, Hensman Ketrey and Lipsey (2016), who found no statistically significant differences between family therapy, motivational therapy or cognitive behavioural therapy in the efficacy of drug use treatment in juvenile offenders, with substance use of the participants significantly decreasing after entering any treatment. Mean reductions were greater for multi-substance users ($g\bar{g} = 0.63$) and for marijuana use ($g\bar{g} = 0.36$). Mean reductions were not significant for alcohol consumption ($g\bar{g} = 0.22$).

In Spain, studies focusing on the assessment of the influence of drug use on the origin and maintenance of criminal behaviour have repeatedly found consistent patterns of use involving different substances in juvenile offenders (San Juan, Ocariz & Germán 2009; Uceda-Maza, Navarro-Pérez & Pérez-Cosín, 2016; Vega-Cauich & Zumárraga-García, 2019). Although there is no separate juvenile tribunal in Spain, local juvenile courts have been applying therapeutic measures as alternatives to incarceration for years. After an exhaustive search, no studies were found that measured the efficacy of such interventions in an open environment. There is a similar lack of studies in incarceration contexts, whether open, semi-open or closed, assessing not only the effectiveness of the interventions but also the sociodemographic characterization of adolescents with high drug use who commit serious crimes. The most relevant study in this field was carried out by Esteban et al. (2002), involving a final sample of 251 minors from 26 detention centres. Contreras, Molina and Cano (2012) carried out a study of the prevalence of drug use in juvenile

offenders in the Province of Jaen, while Uceda-Maza et al. (2016) did the same in the Community of Valencia. These studies concluded that the prevalence of drug use in offending minors was higher than in the normal population. In addition, it can be highlighted that not only the prevalence is greater but also the seriousness of the problems associated with drug use in the offending population. Finally, it can be concluded that there are significant differences between offending minors and the normal population in the propensity to abuse substances (Bonta & Andrews, 2017).

In the process of searching for scientific evidence of the efficacy of treatment programs for drug use in juvenile delinquents, no programs based on the positive psychology paradigm were found, despite the fact that these approaches have proven effective in reducing antisocial behaviours (Riffo-Allende, 2021). Positive psychology is a general paradigm aimed at refocusing research, prevention and clinical practice perspectives on the individual's general resources and strengths (Carrea & Mandil, 2011; Fernández-Ríos & Vilariño Vázquez, 2018). Intervention programs explicitly based on positive psychology are aimed at promoting positive emotions and reinforcing well-being resources and experiences (Santamaría-Cárdaba, 2018; Toribio, González-Arratia, Van Barneveld & Gil, 2018). Studies carried out in positive psychology have led to the conclusion that promoting the development of adolescence in a context of well-being reduces the likelihood that psychopathology is generated (Bohlmeijer, Bolier, Lamers & Westerhof, 2017). A fundamental strategy of interventions based on positive psychology is the formation of an adequate orientation towards the future, defined by the presence of realistic aspirations, suitable expectations and the promotion of planning skills. Future orientation has been shown to be a relevant factor in the positive design of youth development, even for young people with a long history of serious antisocial behaviour and high drug use (Brooks, Miller, Abebe & Mulvey, 2018). Therefore, there is an urgent need to use the positive psychology paradigm to propose systematized interventions that offer alternatives to adolescents in acquiring a higher level of resilience and more efficiently preventing the appearance of negative emotions, particularly in a population presenting antisocial behaviours (Giménez, Vázquez & Hervás, 2010).

Due to the scarcity of studies on the prevalence of drug use in Spanish juvenile offenders and the absence of studies measuring the effectiveness of interventions carried out in the Spanish population, this study had four objectives. The first was the sociodemographic description of adolescents who are serving a custodial sentence for committing serious crimes and who have a heavy pattern of drug use. The second objective was the development of an intervention program adapting techniques which are based on positive psychology and which have proven effective. The third objective was to assess the effectiveness

of the intervention developed for treating drug use in the population of offending adolescents who have committed serious crimes. This intervention has been implemented and developed in the Centro de Ejecución de Medidas Judiciales Teresa de Calcuta (CEMJTC) (Teresa of Calcutta Correctional Facility) of the Community of Madrid. Finally, the relationship between the application of the program and criminal recidivism was measured since, as mentioned above, there is a link between drug use and the origin and maintenance of antisocial behaviours (Aebi et al., 2021), with the expectation that a lower rate of recidivism will be found after the application of the program in comparison to the control condition.

Method

Participants

Participants in this study were 92 CEMJTC inmates jailed for committing serious crimes between 2015 and 2017 and released between 2016 and 2019. Average participant age at the start of their sentence was 16.97 years. All were men since the four women initially present were eliminated from the study given the small sample size. More than half the sample were of foreign nationality (60.9%). Most participants came from a dysfunctional family (61.6%). Within dysfunctional families, the most frequent problem was economic factors (47.5%), followed by relational problems (30.2%), multi-problem families (29.2%), delinquency (22.7%) and substance use (16.2%). A very high rate of school dropout (61.04%), absenteeism (75.21%) and academic failure (85.2%) was found. Almost 90% of the participants had a dissocial relationship group, frequently belonging to violent youth groups.

Most of the crimes committed by the participants were of a violent nature, affecting property (81.5%). Prior to imprisonment, 33.7% of the participants had previously completed a jail sentence and 65.2% had committed more than one crime, facts that show how deep-rooted the antisocial behaviour of the study participants was.

Measures

Teen-Addiction Severity Index (T-ASI) (Kaminer, Bukstein & Tarter, 1991).

The T-ASI is a brief structured interview designed to provide important information about aspects of the patient's life that may contribute to the substance abuse and/or dependence syndrome.

In the interview, the therapist asks about the seven potential problem areas during the month up to the evaluation. These areas include: drugs, school, employment/support, family, peers/social life, law, and psychiatry. Based on the information provided, three scales are completed: the self-assessment scale, the severity scale for the interviewer, and the validity scale.

In its Spanish adaptation, the T-ASI presents excellent validity in its substance abuse scale. The score obtained in this dimension correlates directly with the use of any type of substance ($Rho = 0.90$) as well as with the problems generated ($Rho = 0.69$) (Díaz & Castro-Fornieles, 2008). The reliability of the application of the T-ASI test in the present study was adequate, with a Cronbach's alpha of 0.84 being obtained.

Youth Level of Service/Case Management Inventory (YLS/CMI) (Hoge, 2010).

The adaptation to the Spanish population (IGI-J) (Garrido, López & Galvis, 2017) was used in the present study. The IGI-J consists of 42 items grouped into 8 risk/protection factors called criminal history, school record, formal education/employment, peer group, drug use, leisure and entertainment, personality and behaviour, and attitudes, values, and beliefs. These risk/protection factors are assessed through the information obtained in interviews with the minor and information obtained from other sources. The Spanish adaptation has adequate reliability, with a Cronbach's alpha of 0.90. The predictive validity analysis yielded a value of 0.71, which confirms its good predictive capacity, correctly identifying 66.7% of repeat offenders and 68.8% of non-reoffenders in terms of criminal behaviour (Garrido et al, 2017). The reliability of the application of the IGI-J test in the present study was adequate, obtaining a Cronbach's alpha of 0.79.

Consultation of legal files

The legal files were analysed to collect information on criminal recidivism during the follow-up period and socio-demographic information of the study participants.

Procedure

This study assessed the effectiveness the Educational and Therapeutic Intervention Program for Drug Use in Juvenile Offenders (PTCD) through a longitudinal quasi-experimental design of repeated measures.

The sample was divided into two groups, one experimental and one active control. The selection of the quasi-experimental design was determined by the non-random assignment of each participant to each experimental condition. The criterion for assigning the groups was the possibility being able to continuously carry out all the activities proposed in the program (some inmates had difficulties doing so due to the activities being incompatible with other activities carried out during incarceration or due to the duration of the measure).

The experimental group was made up of 52 CEMJTC inmates who participated in the PTCD and were released, with a minimum of 12 months follow-up. The active control group was made up of 40 inmates of the CEMJTC who did not complete the PTCD and were referred to exter-

nal resources for psychoeducation activities and individual cognitive behavioural therapy for the treatment of drug use, and were released, with at least 12 months follow-up. As a requirement for inclusion in the study, all participants, both in the control and experimental groups, had to score 4 or more on the interviewer's drug use severity scale in the T-ASI test.

In order to verify the homogeneity of experimental and control groups, and to control the effect of variables that could confound the results, a series of statistical analyses were carried out. First, the relationship between experimental or control group membership with sociodemographic variables was assessed. No significant differences were found according to the educational level attained at admission ($\chi^2_{(4)} = 8.09$, $p = .08$), nationality ($\chi^2_{(3)} = 2.06$, $p = .63$), type of sentence ($\chi^2_{(2)} = 2.32$, $p = .32$) and type of crime committed ($\chi^2_{(5)} = 5.04$, $p = .46$). Similarly, different quantitative variables measured at the start of the jail sentence that could have an effect on the results were evaluated, with no statistically significant differences being found in age ($t_{(91)} = -1.74$; $p = .085$), or the use of alcohol ($t_{(91)} = -1.31$; $p = .19$), cannabis ($t_{(91)} = 0.03$; $p = .97$), cocaine ($t_{(91)} = 0.41$; $p = .67$), ecstasy ($t_{(91)} = 0.64$; $p = .52$), inhalants ($t_{(57.39)} = -1.52$; $p = .13$), benzodiazepine ($t_{(91)} = 0.45$; $p = .64$), heroin ($t_{(51)} = 1.76$; $p = .08$), school record ($t_{(91)} = -1.51$; $p = .13$), leisure and entertainment ($t_{(91)} = -0.53$; $p = .59$), education and work ($t_{(91)} = 1.61$; $p = .11$), personality and behaviour ($t_{(91)} = 1.85$; $p = .06$), problems associated with drug use ($t_{(91)} = 0.32$; $p = .75$), school problems ($t_{(91)} = -1.50$; $p = .13$), social problems ($t_{(91)} = -0.82$; $p = .41$) and legal problems ($t_{(91)} = 0.90$; $p = .36$).

A longitudinal design of repeated measures was chosen, given the two different time points (at the start of the jail sentence in the CEMJTC and after release) at which the data obtained from the application of the YLS/CMI and the T-ASI were analyzed. Recidivism was assessed using legal records one year after each inmate's release.

The first step of the treatment process was an assessment of each inmate using the T-ASI and YLS/CMI tests. Once the technical team had questioned the inmates, they were assigned to treatment in either the control or experimental condition.

Experimental condition

Once the minor was included in the program, the treatment groups were set up, with the number of participants and the rhythm of treatments adapted to the characteristics of the minors involved. Individuals with the greatest need of support were placed in groups of between five and seven members, and those with an adequate level of literacy and command of Spanish were in groups of eight to ten adolescents. The average number of participants per group was 8.5 subjects. The group program consisted of 27 sessions of an hour and a half, with a periodicity of two ses-

sions per week. The program was applied by a psychologist with extensive training in the treatment of addictions in adolescents with social conflict.

The theoretical foundation of the program is of a cognitive behavioural character, but at the time of application, the therapist based the intervention on the positive psychology paradigm, providing the participants with options for change rooted in positive and non-punitive messages. One of the main objectives of the intervention was to generate positive emotions in connection with the plan for personal change, thus breaking the learned helplessness frequently shown by participants, caused by previous treatment failures. This intervention model requires the therapist to see each participant as a unique and valuable human being, prioritizing the development of change options from protective factors and the resources of each individual. Risk factors, criminal behaviour and drug use are approached as dynamic variables that do not determine their future behaviour nor burden them with an indissoluble antisocial identity.

The treatment program was structured in eight modules. The first module, Information, aims to generate a therapeutic bond with the participants. At the same time, during the three sessions that make up this module, the restructuring of irrational beliefs is promoted through psychoeducation activities, addressing myths, long-term consequences of drug use and the relationship between use and escalation of antisocial behaviour. Once the therapeutic link is generated, the second module, Becoming aware, begins; in the three sessions of this module, participants write up a coherent and sincere description of their drug use pattern, identifying its functionality. Similarly, the impact of having a low-risk perception of drug use is addressed. This is followed by the third module, also comprising three sessions. In Restructuring my beliefs, the consequences of my drug use, the participants carry out activities to identify both motivations and consequences of their previous drug use patterns. The key aim of these first three modules is to enable adolescents, through activities aimed at reflection that avoid judgment and reproach, to connect the variables involved in the origin and maintenance of their drug use behaviour.

In the three sessions of Module 4, Phases and processes of change, psychoeducation activities are carried out so that the participants learn about the stages of change proposed in the Transtheoretical Model (DiClemente & Prochaska, 1982). Introspection activities are then implemented to help participants integrate this knowledge through a study of their life experiences, thereby generating a sense of control over the treatment process.

Module 5, My options for change, has three sessions to encourage the identification of the emotions experienced, especially those of social support, happiness, illusion, failure, loneliness or guilt. Participants are then asked to

project them into a hypothetical future in two different scenarios, treatment success and drug use maintenance. For this purpose, narrative techniques supported by the use of drawing are implemented. After this, participants are invited to decide which change option they will follow on release from jail.

Once the tasks aimed at strengthening the motivation to change are completed, participants are provided with sufficient strategies to reduce the problems associated with drug use, thus reinforcing an appropriate orientation towards the future, a fundamental strategy within the positive psychology paradigm (Brooks et al., 2018). To this end, Module 6 trains participants to modify the lifestyle associated with drug use habits. The module is made up of four sessions in which, after first discussing the concept of lifestyle in general, each participant is asked to identify risk and protective factors, prosocial and antisocial motivations and commitments in their earlier lifestyle. Each participant is then helped to draft a personal change plan built and supported by their potentialities, protection factors and prosocial motivations and commitments.

To reinforce the plan for personal change, Module 7, Psychological detoxification and desire management, provides training in strategies for managing the desire to consume drugs. This module is made up of five sessions, in the first of which psychoeducation techniques are carried out to identify the desire to consume. The second session, behavioural techniques, focuses on breathing exercises and progressive relaxation. In the third session, cognitive techniques, strategies for thought suppression, alternative thinking, decision-making balance and problem solving are trained, while the fourth session, assertiveness techniques, trains strategies for managing social situations in which the participant needs to maintain their stance of abstinence in the company of a group of peers who are continuing their consumption behaviours. In the last session, Integration of the intervention, role-play techniques are used to practise the automatization of the strategies acquired.

Finally, during the three sessions that make up Module 8, Relapse prevention, the risk of drug use relapse is defined in practical terms, strategies are trained for the identification of risk factors and signs of relapse, and a personal risk plan is drawn up.

Active control condition

This group includes those inmates who were not able to take part in the activities designed in the experimental condition (due to incompatibility with the other activities carried out during their prison term or due to the duration of the measure) and who were referred for drug use treatment to community resources such as the Integrated Drug Dependency Care Centres (CAID) or the Drug Dependency Care Centres (CAD), where they participated in individual cognitive-behavioural psychotherapy activities.

Data analysis

All statistical analyses were performed using the statistical package SPSS 21.0.

To describe the sample, analyses of frequencies and percentages were carried out. Regarding treatment efficacy, the variation between pre-treatment and post-treatment in those dependent variables measured by the T-ASI test was measured. For this purpose, a two-factor ANOVA with repeated measures in one factor was performed with each of the variables, with the intergroup factor being group membership (experimental vs. control) and the intragroup factor being time of assessment (pre-treatment vs. post-treatment). For each group, the effect size (partial eta squared) of these differences was also obtained.

Finally, to analyze the data on recidivism, Pearson's chi-square tests were carried out.

Results

Data analysis revealed a strong presence of multiple risk factors for drug use in both the control group and the experimental group. An extreme problem with drug use was reported by 88.2% (n = 81) of the participants, while 60.9% (n = 56) had an extreme problem at school, 37% (n = 34) had an extreme problem at work or in making a living, 66.3% (n = 61) had an extreme family environment problem, and 75% (n = 69) had an extreme problem with their closest circle of friends.

Regarding the type of substance use, the two substances that stood out as being most frequently consumed in the sample were cannabis and alcohol. Compulsive cannabis use was presented by 85.9% of the participants, and 64.1% presented alcohol abuse (see Table 1). Cocaine was also frequently consumed, with 22.8% of participants using abusively, 13% occasionally and 21.7% reporting experimental use.

The main objective of this research was to assess the possible reduction of problems associated with drug use in PTCO participants. To measure the effect of the intervention, the results of the longitudinal study of participants in treatment, the experimental group, were compared to those of a group of participants with the same characteristics who did not receive the treatment, the control group.

The results of the statistical analyses allow the conclusion to be drawn that on the scale measuring problems with drug use in the T-ASI test, the effects of the group factor ($F_{(1,90)} = 11.87$; $p < .01$; $\eta^2 = 0.11$), time factor ($F_{(1,90)} = 105.16$; $p < .001$; $\eta^2 = 0.53$) and the interaction between both ($F_{(1,90)} = 14.54$; $p < .001$, $\eta^2 = 0.13$) were significant, as can be seen in Table 2.

Subsequently, the rate of change found in the two experimental conditions was assessed. In the problems associated with the drug use variable, there was a statistically significant reduction between pre- and post-treatment use for

both the control group ($F_{(1,90)} = 18.35$; $p < .001$; $\eta^2 = 0.16$) and the experimental group ($F_{(1,90)} = 113.8$; $p < .001$; $\eta^2 = 0.55$). However, the effect size of the intervention program in the experimental group was much larger than that of the control group ($\eta^2 = 0.55$ vs $\eta^2 = 0.16$), as can be seen in Table 3.

The next step in the research was to determine the substances for which the intervention was most effective. Statistical analyses were performed on the substance-by-substance reduction in use. In the alcohol use variable, the effect of the group factor was significant ($F_{(1,90)} = 18.63$; $p < .001$; $\eta^2 = 0.17$), the effect of the time of assessment factor was also significant ($F_{(1,90)} = 43.57$; $p < .001$; $\eta^2 = 0.32$), as was the effect of the interaction ($F_{(1,90)} = 10.74$; $p < .01$; $\eta^2 = 0.10$) (see

Table 1. Prevalence of drug use in participants (%).

Substance	Abstinent	Experimental	Occasional	Abusive	Compulsive
Alcohol	0	5.4	25	64.1	5.4
Cannabis	1.1	3.3	2.2	7.6	85.9
Cocaine	41	21.7	13	22.8	1.1
Ectasy	78	5.4	7.6	8.7	0
Inhalants	90	2.2	4.3	1.1	2.2
Benzodiazepines	96.7	2.2	1.1	0	0
Heroin	96.7	3.3	0	0	0

Table 2. Severity index group means in the different areas measured by the T-ASI test in pre- and post-treatment, effect size of the program for each group and results of the ANOVA on these means.

Groups	T-ASI Drugs Pre	T-ASI Dr Post
Control (n = 40)	4.85 ± 0.36	3.93 ± 1.10
Experimental (n = 52)	4.88 ± 0.38	2.88 ± 1.48

Group: $F_{(1,90)} = 11.87$; $p = \mathbf{0.001^{**}}$; $\eta^2 = 0.116$

Time of assessment: $F_{(1,90)} = 105.16$; $p = \mathbf{0.000^{***}}$; $\eta^2 = 0.539$

Group × Time of assessment: $F_{(1,90)} = 14.54$; $p = \mathbf{0.000^{***}}$; $\eta^2 = 0.139$

Note. The data correspond to the mean ± standard deviation (SD).

* $p < .05$ ** $p < .01$ *** $p < .001$.

Table 3. Pre- and post-treatment changes in patient groups.

	Control (n = 40)	Experimental (n = 52)
	Change (pre-post)	Change (pre-post)
T-ASI Drugs	0.92*** $F_{(1,90)} = 18.35^{***}$ $\eta^2 = 0.16$	2*** $F_{(1,90)} = 113.80^{***}$ $\eta^2 = 0.55$

Note. The values of the columns indicate the difference between means of pre- and post-treatment in each one of the subscales. η^2 = partial eta square. * $p < .05$ ** $p < .01$ *** $p < .001$.

Table 4. Drug use group means in pre- and post-treatment, effect size of the program for each group and results of the ANOVA on these means.

Groups	Alcohol use Pre	Alcohol use Post
Control (n = 40)	2.85 ± 0.59	2.45 ± 0.65
Experimental (n = 52)	2.59 ± 0.69	1.48 ± 1.15
Group: $F_{(1,90)} = 18.63$; $p = 0.000***$; $\eta^2 = 0.172$ Time of assessment: $F_{(1,90)} = 43.57$; $p = 0.000***$; $\eta^2 = 0.326$ Group × Time of assessment: $F_{(1,90)} = 10.74$; $p = 0.001**$; $\eta^2 = 0.107$		
Groups	Cannabis use Pre	Cannabis use Post
Control (n = 40)	3.72 ± 0.67	2.72 ± 1.41
Experimental (n = 52)	3.75 ± 0.81	1.91 ± 1.62
Group: $F_{(1,90)} = 4.49$; $p = 0.037*$; $\eta^2 = 0.048$ Time of assessment: $F_{(1,90)} = 65.89$; $p = 0.000***$; $\eta^2 = 0.423$ Group × Time of assessment: $F_{(1,90)} = 7.977$; $p = 0.018*$; $\eta^2 = 0.060$		
Groups	Cocaine use Pre	Cocaine use Post
Control (n = 40)	1.12 ± 1.13	0.33 ± 0.66
Experimental (n = 52)	1.26 ± 1.31	0.24 ± 0.63
Group: $F_{(1,90)} = 0.28$; $p = 0.86$; $\eta^2 = 0.00$ Time of assessment: $F_{(1,90)} = 53.17$; $p = 0.000***$; $\eta^2 = 0.371$ Group × Time of assessment: $F_{(1,90)} = 0.87$; $p = 0.35$; $\eta^2 = 0.010$		
Groups	Ecstasy use Pre	Ecstasy use Post
Control (n = 40)	0.32 ± 0.76	0.0 ± 0.0
Experimental (n = 52)	0.57 ± 1.09	0.15 ± 0.48
Group: $F_{(1,90)} = 2.90$; $p = 0.092$; $\eta^2 = 0.031$ Time of assessment: $F_{(1,90)} = 15.20$; $p = 0.000***$; $\eta^2 = 0.145$ Group × Time of assessment: $F_{(1,90)} = 0.25$; $p = 0.61$; $\eta^2 = 0.003$		

Table 4). Similarly, in the cannabis use variable, the effect of the group factor was significant ($F_{(1,90)} = 4.49$; $p < .05$; $\eta^2 = 0.04$), as was the effect of the time of assessment ($F_{(1,90)} = 65.89$; $p < .001$; $\eta^2 = 0.42$) and the interaction effect ($F_{(1,90)} = 7.97$; $p < .05$, $\eta^2 = 0.06$) (see Table 4). In the cocaine use variable, only the effect of the time of assessment factor was significant ($F_{(1,90)} = 53.17$; $p < .001$; $\eta^2 = 0.37$), which also occurred in the use of ecstasy variable ($F_{(1,90)} = 15.20$; $p < .001$; $\eta^2 = 0.14$) (Table 4).

After analyzing the results yielded by the F tests for the main effects of the group and time of assessment factors, as well as for the effect of their interaction, we analyzed the interaction between group and time of assessment through post-hoc comparisons subsequent to applying the Bonferroni test.

A statistically significant reduction in alcohol use was observed both in the control group ($F_{(1,90)} = 4.88$; $p < .05$; $\eta^2 = 0.05$) and in the experimental group ($F_{(1,90)} = 56.11$;

$p < .001$; $\eta^2 = 0.38$); the same applied to cannabis use, where the reduction was statistically significant in both experimental conditions, in the control group ($F_{(1,90)} = 14.45$, $p < .001$, $\eta^2 = 0.13$) and in the experimental group ($F_{(1,90)} = 63.61$, $p < .001$, $\eta^2 = 0.41$). Similarly, there were significant reductions in cocaine use in both the control ($F_{(1,90)} = 17.88$; $p < .001$; $\eta^2 = 0.16$) and experimental groups ($F_{(1,90)} = 38.90$; $p < .001$; $\eta^2 = 0.30$). Finally, it is noteworthy that the reduction in ecstasy use both in the control group ($F_{(1,90)} = 5.10$; $p < .05$; $\eta^2 = 0.05$) and in the experimental group ($F_{(1,90)} = 11.13$, $p < .01$, $\eta^2 = 0.11$) was also statistically significant (Table 5).

The effect size of the experimental condition was much larger than that of the control condition for all measured variables. For alcohol use, the comparison was $\eta^2 = 0.38$ vs. $\eta^2 = 0.05$, for cannabis $\eta^2 = 0.41$ vs. $\eta^2 = 0.13$, for cocaine $\eta^2 = 0.30$ vs. $\eta^2 = 0.16$ and for ecstasy $\eta^2 = 0.11$ vs. $\eta^2 = 0.05$ (Table 5).

Table 5. *Changes in use between pre- and post-treatment in each group of patients.*

	Control (n = 40)	Experimental (n = 52)
	Change (pre-post)	Change (pre-post)
Alcohol use	0.34* $F_{(1,90)} = 4.88^*$ $\eta^2 = 0.05$	1.11*** $F_{(1,90)} = 56.11^{***}$ $\eta^2 = 0.38$
Cannabis use	1*** $F_{(1,90)} = 14.45^{***}$ $\eta^2 = 0.13$	1.84*** $F_{(1,90)} = 63.61^{***}$ $\eta^2 = 0.41$
Cocaine use	0.79*** $F_{(1,90)} = 17.88^{***}$ $\eta^2 = 0.16$	1.27*** $F_{(1,90)} = 38.90^{***}$ $\eta^2 = 0.30$
Ecstasy use	0.32* $F_{(1,90)} = 5.10^*$ $\eta^2 = 0.05$	0.42** $F_{(1,90)} = 11.13^{**}$ $\eta^2 = 0.11$

Note. The values of the columns indicate the difference between means of pre- and post-treatment in each one of the subscales. η^2 = partial eta square. * $p < .05$ ** $p < .01$ *** $p < .001$.

Table 6. *Criminal recidivism and group.*

	Control group	Experimental group	$\chi^2_{(1)}$
Recidivists (n = 30)	15 37.5% (C.R. = 0.9)	15 28.8% (C.R. = -0.9)	0.77 $p = .38$
Non-recidivists (n = 62)	25 62.5% (C.R. = -0.9)	37 71.2% (C.R. = 0.9)	

Note. C.R. = corrected residuals.

Finally, an analysis was carried out with the aim of finding differences between the control and experimental groups based on the criminal recidivism variable. For the statistical analyses, a contingency table was made and the chi-square test was used.

As shown in Table 6, 28.8% of the participants in the experimental group reoffended compared to 37.5% in the control group. Despite the fact that the experimental group had a lower recidivism rate, there were no statistically significant differences in criminal recidivism based on membership of the control group or the experimental group ($\chi^2_{(1)} = 0.77, p = .38$).

Discussion

The PTCO implemented at the CEMJTC within the positive psychology paradigm is an effective tool for the treatment of drug use, abuse and dependence in young people

serving a custodial sentence, especially involving problems derived from the use of alcohol and cannabis. The size of the intervention effect in reducing problems associated with drug use measured by the T-ASI test is large ($\eta^2 = 0.55$), with large effect sizes found in the reduction of cannabis ($\eta^2 = 0.41$) and alcohol use ($\eta^2 = 0.38$) after incarceration.

The notable contribution of this program is to offer an intervention model based on the positive psychology approach, crystallizing into a model that provides each participant with options for change based on positive and non-punitive messages. In this intervention model, the therapist sees each participant as a unique and valuable being, and focuses on generating options for change based on protective factors and the resources of the individual, addressing risk factors, criminal behaviours and drug use as variables that do not determine their future behaviour nor burden them with an indissoluble antisocial identity. The techniques applied, mainly cognitive-behavioural, have been adapted from well-established and approved intervention models with the intention of consolidating an adequate future orientation.

Interventions shown to be effective in the population of adolescents without problems with the law have not obtained similarly good results in the population of those that have committed crimes and have entered the juvenile justice system; this indicates that changing drug use behaviours in juvenile offenders is more complex when a risk factor as powerful as antisocial behaviour is also involved (Tripodi & Bender, 2011). Given this premise, the results of the study acquire greater relevance since they not only show some evidence of the usefulness of the PTCO but also that the techniques are suited to a problem and a population that is so complex to address. The results of the present study suggest that PTCO is a useful tool for reducing alcohol, cannabis, cocaine and ecstasy use after imprisonment. Similarly, incarceration in the CEMJTC seems to operate within a therapeutic community so that, together with individual cognitive-behavioural psychological treatment, the rates of alcohol, cannabis, cocaine and ecstasy use after imprisonment are reduced in a statistically significant manner.

In order to determine whether the PTCO is a tool at the level of those already used in other settings, it was compared with the data obtained by Waldron and Turner (2008) in their meta-analysis. They examined effect sizes in pre- and post-treatment in three types of intervention: individual cognitive-behavioural therapy, group cognitive-behavioural therapy and family therapy in non-criminal population. The results of the meta-analysis indicated that the mean effect size of the programs evaluated using Cohen's d statistic was 0.45, which is an average effect size. The size of the effect of the intervention in this study, measured through the problems associated with drug use variable using the T-ASI test was $\eta^2 = 0.55$, which suggests that the intervention's effect size was high.

Another important contribution of the PTCd is its special effectiveness in reducing alcohol and cannabis use after imprisonment; in these substances, the effect of interventions on juvenile offenders has been limited, as in the case of cannabis, or even insignificant, as in the case of alcohol (Tanner-Smith et al., 2016).

Finally, it should be noted that criminal recidivism was lower in the experimental group (28.8%) than in the control group (37.7%), although this difference was not statistically significant. It is highly probable that these results were mediated by the effect of not having carried out a randomized study with a control group without treatment, which would have made it possible to measure the impact of non-intervention versus the new intervention proposal.

Beyond the limitations of the quasi-experimental model used, we found certain variables in which it was not possible to intervene, or which were not assessed, and which would have been of interest. These include the cognitive variables involved in the change processes of the study participants. The availability of this information would have made it possible to discuss not only the effectiveness of the program but also which cognitive processes were most enhanced in adolescents during the intervention.

Another limitation was the impossibility of carrying out a systematized family intervention with the study sample that would accompany the group dynamics. Family intervention is one of the fundamental actions implemented in the CEMJTC, yet the great diversity of the families of origin and the impossibility of working with a significant number of them (they are in the countries of origin and do not speak Spanish) prevented the PTCd modules being applied as part of family intervention. As previously mentioned, family therapy has shown particular efficacy in the treatment of problems linked to drug use in juvenile offenders (Dopp et al., 2017; Hartnett, Carr, Hamilton & O'Reilly, 2017; Tanner-Smith et al., 2016; Tripodi & Bender, 2011). For this reason, it would be of considerable interest for future studies to be able to see how family intervention might contribute to strengthening the results obtained by the PTCd.

Similarly, the quasi-experimental methodology and the lack of an experimental group without treatment meant that it was not possible to compare the effect size of the intervention. In future research, the use of experimental methodology would increase the scope of the conclusions. These limitations are difficult to overcome in a context in which the well-being of the individual being treated must be prioritized.

Looking ahead, it seems of interest that future research evaluates the variables contributing to the results obtained in this study. It would thus be essential to expand our knowledge of the cognitive processes that have made the impact of the program possible, especially in reducing alcohol and cannabis use after imprisonment. Similarly, it would be very interesting to apply the PTCd in open-environment sentences, such as compliance with probation or

community service, in order to measure the impact of the PTCd in community contexts where criminal behaviour has not yet become chronic.

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Conflict of interests

There are no conflicts of interest related to the present study entitled Efficacy of a treatment program based on positive psychology for drug use in juvenile offenders.

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