

Psychological recovery stages of alcohol dependent patients after an intensive outpatient treatment: A 4-year follow-up study

Fases de la recuperación psicológica en pacientes dependientes del alcohol tras un tratamiento intensivo: un seguimiento de 4 años

FRANCISCO ARIAS*, **, ***, ANA SION**, REGINA ESPINOSA****, ROSA JURADO-BARBA**, *****, MARTA MARÍN*, ANDRÉS MARTÍNEZ MALDONADO**, GABRIEL RUBIO*, **, *****, *****, *****.

* Psychiatry Department. 12 de Octubre Hospital, Madrid. Spain.

** Biomedical Research Institute. Hospital 12 de Octubre, Madrid. Spain.

*** Psychology Faculty. Complutense de Madrid University, Madrid. Spain.

**** Department of Psychology, Education and Health Science Faculty. Camilo José Cela University, Madrid. Spain.

***** Medicine Faculty. Complutense de Madrid University, Madrid. Spain.

***** Addictive Disorders Network. Carlos III Institute, Madrid. Spain.

Abstract

The aim of this work is to determine if relapses can hinder the sequence of psychological recovery and to rebuild this sequence in patients with severe alcohol dependence that seek treatment. The sample was comprised of 159 patients seeking an intensive outpatient treatment of two years duration and who were subject to follow-up during four years after discharge. Patients were grouped according to the presence of relapse during follow-up, resulting in abstainers (n = 80) and relapsers (n = 79). Assessments were carried out in the following periods: baseline, at discharge, and at the second- and fourth-year follow-ups. The measurement variables were avoidance behavior, anxiety, depression, impulsivity and meaning in life (MiL). A control group (n = 74) was evaluated at the same periods as the patients. Results indicate a slower recovery in relapsers in comparison to abstainers in all psychological dimensions and periods assessed. At the second-year follow-up, the abstainers achieved similar scores in depression as the control participants, in addition to higher scores in Meaning in Life at the end of treatment. In patients with severe alcohol dependence, our data supports a sequence of recovery that could continue beyond the four years of follow-up after treatment. This sequence would begin with the avoidance of risk situations and continue with the rest of dimensions (anxiety, depression, impulsivity).
Keywords: Alcohol dependence; Recovery; Meaning in life; Abstinence; Affective symptoms; Impulsivity.

Resumen

El objetivo de este trabajo es comprobar si las recaídas dificultan la secuencia de la recuperación psicológica y reconstruir la secuencia de la recuperación de pacientes graves que solicitan tratamiento. Los participantes fueron 159 pacientes tratados durante dos años en un programa ambulatorio intensivo y tras ser dados de alta fueron seguidos durante cuatro años. En función de la presencia o no de recaída durante el seguimiento se configuraron dos grupos, el de abstinentes (n = 80) y el de pacientes que recaen (n = 79). Las evaluaciones se realizaron: basal, al alta del tratamiento, al 2.º y 4.º año de seguimiento. Las variables fueron: conductas de evitación, ansiedad, depresión, impulsividad y sentido de la vida. Se incluyó un grupo de control (n = 74) que fue evaluado con la misma cadencia que los pacientes. Los resultados indican una recuperación más lenta en el grupo con recaídas frente a los abstinentes, en todas las dimensiones psicológicas y los períodos estudiados. A los dos años de seguimiento, los pacientes abstinentes obtuvieron puntuaciones en depresión similares a los controles, además de puntuaciones superiores en sentido de la vida (MiL) a partir del final del tratamiento. Al menos en pacientes con dependencia grave del alcohol, nuestros resultados apoyan una secuencia de recuperación que podría continuar más allá de los cuatro años de seguimiento. Se inicia con la evitación de situaciones de riesgo y continúa con el resto de las dimensiones (ansiedad, depresión, impulsividad).
Palabras clave: Dependencia de alcohol; Recuperación; Sentido de la vida; Abstinencia; Sintomatología afectiva; Impulsividad.

Received: July 2020; Accepted: November 2020.

Send correspondence to:

Ana Sion. Instituto de Investigación Biomédica. Hospital 12 de Octubre. Avda de Córdoba s/n, 28041-Madrid, España Tfn: +34 913908019.

E-mail: asion@ucm.es o anasion.imas12@h12o.es.

The Substance Abuse and Mental Health Services Administration (SAMHSA) (2011) defines recovery as “a process of change through which individuals improve their health and wellness, live a self-directed life, and strive to reach their full potential” and includes four major dimensions: health, home, purpose and community. Psychological health, comprising depressive and anxiety symptoms or life purpose, has been one of the most studied dimensions related to recovery, although as an abstinence or relapse predictor. In fact, they represent dimensions that have been found to be altered during the dependence process, being associated to a poorer quality of life (Ugochukwu et al., 2013), psychological wellbeing and treatment success in general (Amodeo, Kurtz & Cutter, 1992; Laudet, Becker & White, 2009). Specifically, alcohol dependent individuals show anxiety and/or depression-like symptoms along the dependence process (Ghorbani, Khosravani, Bastan & Ardakani, 2017), as well as a lack of motivation, decision-making problems, coping and impulsivity, among others (Ando et al., 2012; Brown, Vik, Patterson, Grant y Schuckit, 1995; Courtney et al., 2012). It has been assumed that with continued abstinence a normalization/stabilization of these variables starts to take place (White, 2012), however, little is known with respect to recovery sequence and whether the patients ever reach values similar to healthy population (Kelly, Greene & Bergman, 2018).

An important aspect of recovery could be the avoidance behavior, as a coping strategy regarding substance exposure, meaning the avoidance of risky situation, that is, where alcohol is present or alcohol-related contexts (e.g. bars, parties, etc). Avoidance coping is a key element to relapse prevention goals, among other coping strategies (Marlatt, 1990; Marlatt & Witkiewitz, 2005), since it has an intense presence from early stages of psychotherapeutic treatment.

Studies regarding anxiety evolution in alcohol dependent patients seeking for treatment have determined that after several months of abstinence, a decrease of *anxiety* scores is produced; and that the higher the baseline scores are, the larger is the risk for relapse (Brown, Irwin & Schuckit, 1991; Rubio et al., 2017). With respect to depression symptoms, research has also shown a reduction in *short and long-term depression* scales (Wilcox, Pearson & Tonigan, 2015; Worley, Tate & Brown, 2012). These lower depression scores have been associated with a greater level of attendance to mutual-help groups, although its persistence or sudden presence in an intense form represents a challenge in the recovery of these patients (Kelly, Stout, Magill, Tonigan & Pagano, 2010a). Lower levels of *impulsivity* have also been observed, at least during the first year of abstinence (Blonigen, Timko, Moos & Moos, 2009). Studies carried out in subjects with alcohol dependence that attended mutual-help groups indicate a decrease in impulsivity up to fifteen months of follow-up (Blonigen, Timko, Finney, Moos & Moos, 2011; Kelly, Stout, Tonigan, Magill & Pagano,

2010b). Our previous research results also indicate an improvement of these symptoms, that could last over two years of treatment (Rubio et al., 2018).

At the same time, *values acquisition* like *spirituality* and *meaning in life* have been considered as essential variables in alcohol dependence recovery, especially in studies carried out in the field of programs based on the 12 steps, such as Anonymous Alcoholics (AA) (Tonigan, McCallion, Frohe y Pearson, 2017; Wilcox et al., 2015). Kelly, Hoepfner, Stout and Pagano's (2012) research with two samples from the MATCH project showed that spirituality correlated with groups attendance, particularly in patients included in the continuing care sample (n = 774), that is, the most severe cases. Another value involved in recovery is *meaning in life* that has been related to a better social functioning (Witkiewitz et al., 2019), life quality (Laudet & White, 2008) and long-term abstinence maintenance (Rubio et al., 2018). A recent study (Kelly et al., 2018) performed in a community sample of alcohol dependent patients found that within the first months of recovery the indexes of *life quality* and *psychological well-being* were low at the beginning but then got higher, although they did not reach general population levels up until 10 years after.

In summary, up to these days, research points to a bidirectional relation between abstinence length and an improvement in avoidance behavior, anxiety, depression, impulsivity, spirituality and life purpose. Nevertheless, we do not fully understand how the sequence of psychological recovery takes place and if we could identify different stages and duration. There is also a lack of results on whether this recovery, after several years of abstinence, would imply similar scores to general population, regarding the mentioned psychological dimensions.

In this way, the aim of this study was to determine the progress of behavioral variables (avoidance) and psychological ones (anxiety, depression, impulsivity and life purpose) during the period of intensive treatment of two years duration and four years of follow-up. In this study we used a sample from a previous study (Rubio et al., 2018) divided by the presence of relapse, forming two groups (relapsers and abstainers), and followed-up during four years. We also included a control group formed by participants from the general population.

Our hypothesis is that the presence of relapse would slow-down the psychological recovery process, and that even abstainers would not reach similar scores to control participants in the measured psychological dimensions (Kelly et al., 2018).

Method

Participants

The sample was selected over a period of 14 months from patients attending the alcohol dependence treatment pro-

gram from “12 de Octubre” Hospital (Rubio et al., 2018). A total number of 249 patients were included in the study, with 42 abandoning it at different moments of the study (third (N = 11), sixth (N = 12), ninth (N = 9), twelfth (N = 4) and eighteenth month (N = 5)). By the end of the follow-up, we had incomplete information regarding 41 subjects, either because it was difficult to contact them over time or they had passed away (n = 7). The final sample included in the analysis was comprised by 233 subjects. Patient’s group was divided according to the presence of relapses during the study, giving rise to a first group of abstainers and a second group of relapsers. Relapse is defined as the consumption of more than 4 units of standard drinks in males and 2.5 units in women, during at least three times a week or lower quantities more than three times a week.

With respect to the control group, participants were recruited through ads placed in two health centers, asking for participation in a study for emotional states progress evaluation. Once they were interviewed, those individuals who met criteria for abuse or substance use disorders, or any other psychiatric or neurological condition, were discarded. Participants were explained the tests instructions and the follow-up procedure of the study. The initial sample had 167 candidates, but 46 were discarded due to abuse or substance use disorders and 4 denied participation regarding the follow-up measures, whereas 32 did not attend to the second year of follow-up assessment. We disposed from complete data from 85 cases, although the final sample was composed by 74 patients, since they had to be similar in age and gender to the clinical sample.

Table 1 shows sociodemographic and clinical characteristics for all participants. 66% of the total sample were men and the average age was of 42.86 (8.35) years. 59.9% completed secondary education, 23.3% had a higher education level and 16.8% of them only went to primary school. Half of the sample had a job during the assessment. Regarding alcohol consumption data, patients reported high levels of daily consumption and their scores in EIDA (Rubio, Urosa & Santo Domingo, 1998) indicated a severe alcohol dependence, with over 10 years of evolution. While examining these sociodemographic differences between all three groups we did not find statistical significant differences for most variables, with the exception of study level, and abstinence levels in months between abstainers and relapsers ($p < 0.01$, see Table 1).

Treatment programs and follow-up interviews

Details regarding the therapeutic program can be read in Rubio et al (2017). The clinical groups were treated as outpatients and intensively, along 24 months, and they were sequentially included in the following programs: detoxification and motivation for abstinence, relapse prevention, social abilities, consolidation of healthy habits and lifestyle and preparation for discharge. Annually, we dis-

posed from data regarding each patient’s evolution. After discharge, every two years participants were interviewed in order to fill out psychological scales, gave a blood sample to determine GGT and the information relative to months of abstinence and attendance to follow-up appointments was registered. Half of the sample (n = 91), in addition to attending the outpatient program, also went to mutual-help groups of the Federation of Alcoholics from the Community of Madrid (FACOMA), which is based on the “help yourself-help-us” program (FACOMA, 2016).

Clinical assessment instruments

Patients were interviewed and diagnosed according to DSM-IV-TR criteria (American Psychiatric Association, 2000). A Spanish version (Rubio et al., 1998) of Severity of Alcohol Dependence Questionnaire (SADQ) (Stockwell, Murphy & Hodgson, 1983) was used to assess alcohol dependence intensity (EIDA) and it is composed by 30 Likert items with four answer options. Total EIDA scores can indicate low (<20), moderate (21-37) or severe (>37) dependence. This scale has good reliability values, with Cronbach’s alpha values of 0.91 in the adapted scale and 0.87 in this study. The follow-up for alcohol consumption was: it was carried out through the Alcohol Timeline Followback (TLFB) interview designed by Sobell, Sobell, Leo and Cancilla (1988) in order to determine the daily consumption. Through this interview the presence of relapse was determined, in addition to period of consumption and accumulated abstinence.

Coping strategies regarding alcohol dependence were assessed through a Spanish version (García González & Alonso Suárez, 2002) of The Coping Behavior Inventory (CBI) (Litman, Stapleton, Oppenheim & Peleg, 1983). This self-informed measure consists of 36 items and it aims to identify the frequency of coping strategies use in order to maintain abstinence in risk situations. Reliability values are of 0.78 for the Spanish validation and 0.76 in this study. Taking into account that one of the least used strategies by Spanish patients is avoidance of risk situation, and its particular cultural relevance in this country, we decided to include in this study the 5 items of the avoidance subscale (items 5, 8, 18, 20 and 30).

Affective symptomatology was assessed through Hamilton anxiety (HARS) (Hamilton, 1959) and depression (HDRS) (Hamilton, 1967) scales, with Cronbach’s alpha values of 0.78 and 0.82, respectively, for this study. Self-informed impulsivity was evaluated by the Barrat Impulsiveness Scale (BIS-11) (Patton, Stanford, & Barratt, 1995), which has 30 items that evaluate cognitive, motor and non-planned impulsivity. The Spanish version (Oquendo et al., 2001) has a good alpha coefficient and maintains the three factors structure. In this study alpha’s value is of 0.79.

Another measure used in this study was the Meaning in Life Questionnaire (MLQ), an instrument thought to

Table 1. Sociodemographic and clinical characteristics.

	Participants n = 233	Relapsers n = 79	Abstainers n = 80	Controls n = 74	F. Welch/ chi ²
Sex. no. (%)					
Men	154 (66.1)	56 (79.9)	49 (61.3)	49 (66.2)	1.68
Age. Mean ± SD	42.8 ± 8.35	41.6 ± 8.3	43.4 ± 8.4	43.5 ± 8.3	1.24
Civil Status. N (%)					
Single	56 (35.2)	30 (38)	26 (32.5)	--	
Married	68 (42.8)	33 (41.8)	35 (43.8)	--	
Separated/Divorced	33 (20.8)	16 (20.3)	17 (21.2)	--	
Widow	2 (1.3)	0 (0)	2 (2.5)	--	2.37
Study level. N (%)					
Primary	39 (16.8)	14 (17.7)	15 (19)	10 (13.5)	
Secondary	139 (59.9)	41 (51.9)	37 (46.8)	61 (82.4)	
Superior	54 (23.13)	24 (30.4)	27 (34.2)	3 (4.1)	27.59**
Employment situation. N (%)					
Active	81 (50.9)	35 (44.3)	46 (57.5)	--	
Unemployed	32 (20.1)	21 (26.6)	11 (13.8)	--	
TIW	28 (17.6)	14 (17.7)	14 (17.5)	--	
Pensioners	11 (6.9)	5 (6.3)	6 (7.5)	--	4.84
Homemaker	7 (4.4)	4 (5.1)	3 (3.8)	--	
Group of received treatment. n (%)					
Regular	68 (29.2)	46 (58.2)	22 (27.5)	---	
Mixed type with FACOMA	91 (39.1)	33 (41.8)	58 (63.7)	---	15.33**
Type of consumption. N (%)					
Social	33 (21.2)	16 (20.8)	17 (21.5)	--	
Solitary	47 (30.1)	27 (35.1)	20 (25.3)	--	
Mixed	76 (48.7)	34 (44.2)	42 (53.2)	--	1.89
Frequency of use. N (%)					
Daily excessive	134 (84.8)	69 (88.5)	65 (81.2)	--	
Weekend excessive	8 (5.1)	3 (3.8)	5 (6.2)	--	
Sporadic excessive	16 (10.1)	6 (7.7)	10 (12.5)	--	1.59
Beverage preference. N (%)					
Beer	82 (51.9)	40 (51.3)	42 (52.5)	--	
Wine	10 (6.3)	4 (5.1)	6 (7.5)	--	
Liquors	66 (41.8)	34 (43.6)	32 (40)	--	0.48
Initial age of alcohol consumption. Mean ± SD	17.24 ± 5.35	17.4 ± 6.07	17.9 ± 6.4	16.3 ± 2.31	3.07
Age of alcohol dependence diagnosis. Mean ± SD	29.79 ± 9.33	29.8 ± 9.31	29.7 ± 9.4	--	0.007
Years of alcohol consumption. Mean ± SD	12.82 ± 10.07	11.8 ± 9.05	13.8 ± 10.9	--	1.54
Abstinence in the first year (in months). Mean ± SD	11.09 ± 1.82	10.6 ± 2.2	12 ± 0	--	53.5**
Abstinence in the second year (in months). Mean ± SD	10.24 ± 2.54	8.46 ± 2.59	12 ± 0	--	149.7**
Abstinence in the fourth year (in months). Mean ± SD	9.14 ± 3.4	6.24 ± 2.55	12 ± 0	--	407.1**
Tobacco dependence. N (%)					
Yes	129 (81.2)	61 (77.2)	66 (82.5)	21 (29.6)	
No	20 (12.6)	12 (15.2)	8 (10)	50 (70.4)	
Abandonment	10 (6.3)	6 (7.6)	6 (7.5)	0 (0)	131**
Cocaine Consumption. N (%)					
No	107 (67.3)	49 (62)	58 (72.5)	--	
Abuse	22 (13.8)	13 (16.5)	9 (11.2)	--	
Dependence	30 (18.9)	17 (21.5)	13 (16.2)	--	2.01

Note. Sociodemographic and clinical descriptive data and statistic comparison indexes (either Welch. F and Chi-Squared) values for the three groups of study (abstainers and relapsers and control group). TIW stands for Temporary Inability to Work. "--" indicates that this data was not available in case of the control group. *, ** indicates p values < 0.05 and 0.01, respectively.

measure life significance, that is, the meaning of the subject's own nature and existence (Steger, Frazier, Kaler & Oishi, 2006). This scale evaluates two aspects of life meaning, through two subscales of 5 items: Presence and Search. Presence refers to the extent to which people understand, give or see a meaning of their own life, together with the

grade of purpose, mission or aims perception. The Spanish version has a good alpha value 0.80 and in the present study reaches the value of 0.87. Concurrent validity shows a good association with psychological well-being, where meaning in life was related to a committed and significant life (Góngora & Castro Solano, 2011).

Procedure

This is a follow-up study of a group of patients attending treatment for severe alcohol dependence, evaluated in four different occasions over 6 years: a baseline evaluation (before treatment), at treatment discharge and at 2 and 4 years after treatment. A group of control subjects were also evaluated in four occasions every two years (with a baseline, and at 2, 4 and 6 years after) in order to obtain an equivalence to patients' group periods of assessment.

Statistical analysis

Continuous demographic variables were evaluated using one-way analysis of variance (ANOVA). When the variances of the dependent variables were not equal across groups, we used the Welch test as a more robust and conservative alternative to the usual *F*-test.

We used 2x4-way ANOVAs repeated measures for avoidant coping, incorporating group (abstainers and relapsers) X time (baseline, at discharge, 2, and 4, years of follow-up). We used 3x4-way ANOVAs repeated measures dependent variables (i.e. anxiety, depression, impulsivity and MiL), incorporating group (abstainers, relapsers and controls) X time (baseline, at discharge, 2 years and 4 years of follow-up). Significant main and interaction effects were further analyzed by post-hoc comparisons with Bonferroni adjusted alpha level. All statistical analyses were performed using the SPSS v.22 package (IBM, 2013). An additional

descriptive and ANOVA for repeated measures analysis was carried out for impulsivity subscales, which can be consulted in the supplementary material of this work.

Results

Table 2 and Figure 1 show self-informed measures data of clinical (abstainers and relapsers) and control groups, along the several periods of evaluation.

Avoidant coping during the study

The results of this scale only refer to patients' groups. Abstainers had significantly higher scores compared to relapsers ($F = 166.44$; $p = 0.0001$; $partial\ eta^2 = 0.51$). This study also revealed a significant effect regarding the moment of measuring: at the end of the study (at the 4th year of follow-up), scores were significantly higher for both abstainers and relapsers comparing to the three previous moments of measuring ($Wilk's\ \lambda = 0.80$; $F = 12.46$; $p = 0.001$; $partial\ eta^2 = 0.19$). Particularly, in the group of abstainers, avoidant coping scores were significantly increased at discharge and the fourth year of follow-up, comparing to baseline and the second year of follow-up. For relapsers, significant differences were found between baseline, the fourth year of follow-up and the measurements at discharge, as well as the second year of follow-up ($Wilk's\ \lambda = 0.97$; $F = 1.55$; $p = 0.20$; $partial\ eta^2 = 0.03$).

Table 2. Psychological evaluation scores.

Groups	Baseline	At discharge	2 years- follow-up	4 years- follow-up
Avoidant Coping				
Abstainers (n=80)	6.60 ± 1.51	7.06 ± 0.87	6.85 ± 0.91	7.37 ± 0.98
Relapsers (n=79)	5.37 ± 1.64	5.24 ± 1.35	5.18 ± 1.14	5.87 ± 1.12
Hamilton Anxiety Rating Scale				
Abstainers (n=80)	11.31 ± 5.51	10.24 ± 3.30	9.19 ± 1.61	9.90 ± 2.32
Relapsers (n=79)	11.4 ± 5.63	12.68 ± 4.81	10.03 ± 6.85	15.72 ± 5.79
Controls (n=74)	8.51 ± 1.87	8.38 ± 1.88	8.32 ± 1.77	8.05 ± 2.08
Hamilton Depression Rating Scale				
Abstainers (n=80)	10.92 ± 7.33	8.03 ± 3.64	6.11 ± 3.23	5.55 ± 2.82
Relapsers (n=79)	10.57 ± 7.92	9.76 ± 4.60	10.2 ± 3.87	11.3 ± 3.11
Controls (n=74)	5.97 ± 2.04	5.82 ± 2.07	5.89 ± 2.07	5.80 ± 2.06
Barrat Impulsiveness Scale				
Abstainers (n=80)	49.5 ± 14.45	46.3 ± 12.06	42.7 ± 9.96	41.2 ± 8.32
Relapsers (n=79)	57.7 ± 10.27	51.6 ± 9.14	48.4 ± 6.14	49.7 ± 7.48
Controls (n=74)	38.12 ± 11.7	37.2 ± 11.73	37.2 ± 11.4	36.7 ± 11.17
Meaning in Life Questionnaire				
Abstainers (n=80)	38.5 ± 7.73	47 ± 6.52	51.04 ± 5.4	58.4 ± 5.95
Relapsers (n=79)	39.1 ± 7.22	41.7 ± 6.85	41.6 ± 5.23	46.3 ± 6.05
Controls (n=74)	44.3 ± 7.13	42.4 ± 8.00	44.1 ± 8.04	45.3 ± 7.06

Note. Descriptive data (mean ±SD) for self-informed measures at the different moments of evaluations (columns), in each group of study (rows).

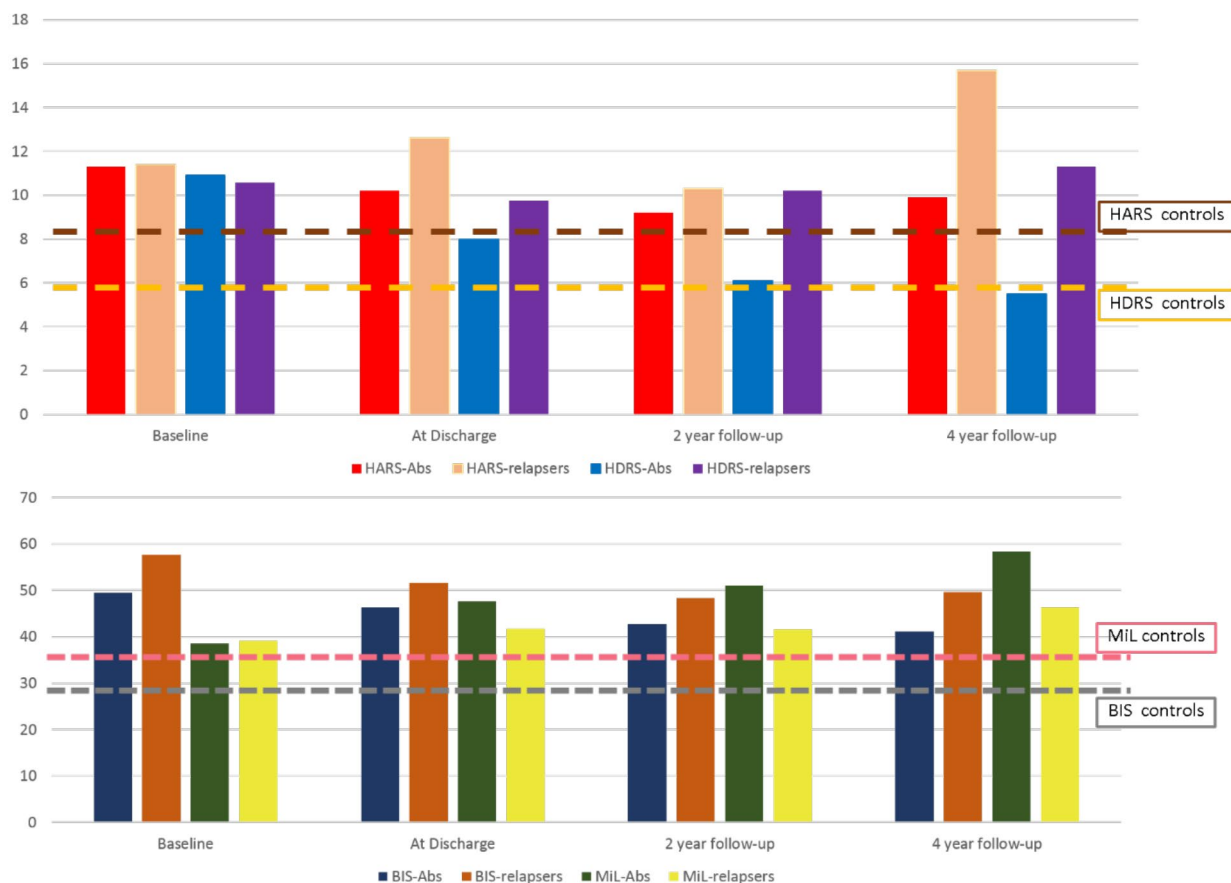


Figure 1. Changes in psychological symptoms.

Note. Mean scores for anxiety (HARS) and depression (HDRS), impulsivity (BIS) and meaning in life (MiL) at several moments of evaluation. Red, blue, dark blue and green columns represent mean scores for abstainers' group (Abs) in HARS, HDRS, BIS and MiL, respectively. Whereas salmon, purple, brown and yellow colors represent relapsers' scores for the same measures. For the sake of brevity, we represented an average value of these measures obtained by control subjects by using discontinuous lines (dark brown, orange, pink and grey for HARS, HDRS, BIS and MiL, respectively).

Recovery of anxiety symptoms

A main significant effect of the group factor was observed ($F = 62,17$; $p = 0,0001$; $partial\ eta^2 = 0,35$); control subjects had lower scores than abstinent and relapsers. This study also found a significant main effect for moment of evaluation, revealing significantly lower scores for the 2nd and 4th year of follow-up comparing to baseline and discharge moments (Wilk's $\lambda = 0,72$; $F = 28,89$; $p = 0,001$; $partial\ eta^2 = 0,27$). A significant decline in anxiety was observed for the group of abstainers at the 2nd year of follow-up, although no differences were observed at the 4th year. Regarding the relapsers' group, anxiety levels increased at discharge, decreased at the 2nd year of follow-up and then increased again significantly at the 4th year of follow-up. Control subjects showed no significant differences in anxiety scores across the 4 moments of evaluation.

Last, an interaction effect was observed between group and the moment of evaluation regarding anxiety (Wilk's $\lambda = 0,65$; $F = 17,97$; $p = 0,0001$; $partial\ eta^2 = 0,19$). Specifically, at

baseline, both relapsers and abstainers showed significant higher anxiety levels comparing to control participants. Whereas, at discharge, the group of abstainers showed significantly lower anxiety scores comparing to relapsers, although higher comparing to control subjects. These same results were observed at the 2nd and 4th years of follow-up.

Recovery of depressive symptoms

In a similar way as anxiety symptoms, control group showed significantly lower depression scores, followed by abstainers and relapsers ($F = 43,1$; $p = 0,0001$; $partial\ eta^2 = 0,27$). Diminished depression scores are observed from the baseline assessments to the discharge moment, and they are maintained along the follow-ups (Wilk's $\lambda = 0,90$; $F = 8,01$; $p = 0,001$; $partial\ eta^2 = 0,09$). In the abstainers group, scores reached until the 2nd year of follow-up maintained without significant changes to the 4th year of follow-up, although they were significantly lower compared to baseline and discharge moments. Relapsers had significantly lower

levels of depression at discharge, although they increased after this moment. Control participants maintained similar levels of depression along the study. A significant interaction between group and moment of evaluation was found ($Wilk's \lambda = 0.78$; $F = 9.86$; $p = 0.0001$; $partial \eta^2 = 0.11$), in such a way that, at the moment of discharge, abstainers showed significantly lower levels of depression comparing to relapsers, although higher than control subjects. At the 2nd and 4th years of follow-up, abstainers reached similar depression scores to control participants and maintained the lower scores comparing to relapsers.

Recovery of impulsivity symptoms

Regarding impulsivity, control subjects had the lowest scores, followed by abstainers and relapsers ($F = 41.1$; $p = 0.0001$; $partial \eta^2 = 0.26$). The moment of evaluation also influenced the scores ($Wilk's \lambda = 0.59$; $F = 52.87$; $p = 0.001$; $partial \eta^2 = 0.41$), in such a way that impulsivity levels at discharge and 2 years after treatment were significantly smaller comparing to the baseline evaluation, and remained stable at the 4th year after the treatment. Specifically, abstainers descended significantly in impulsivity levels across all moments of measuring. In a similar manner, relapsers went reducing their impulsivity scores across all moments, with the exception of the 4th year, where impulsivity was higher comparing to the 2nd year of follow-up. With respect to control subjects, they had no changes in impulsivity levels across all 4 moments. Finally, a significant interaction effect was observed between group and moment of evaluation regarding impulsivity ($Wilk's \lambda = 0.67$; $F = 16.42$; $p = 0.0001$; $partial \eta^2 = 0.17$). In this way, relapsers presented significantly higher impulsivity levels compared to abstainers and control subjects, at all moments of evaluation. In the same way, the abstainers showed a higher impulsivity compared to control individuals at all moments of evaluation.

Meaning in Life and recovery

Meaning in Life (MiL) scores for the abstainers were significantly more elevated comparing to the other two groups ($F = 39.32$; $p = 0.0001$; $partial \eta^2 = 0.25$). A significant main effect of moment of evaluation was found, where MiL scores were significantly higher at the follow-up moments during the 2nd and 4th years ($Wilk's \lambda = 0.50$; $F = 74.14$; $p = 0.001$; $partial \eta^2 = 0.49$). On one hand, abstainers had significantly increasing levels of MiL during the 2nd and 4th year of follow-up comparing to previous moments of evaluation. Relapsers, on the other hand, showed significant increases in MiL across all moments, with the exception of discharge and the 2nd year after treatment moments, where they remained stable. Last, MiL levels for control subjects showed no differences across the moments of evaluation, with the exception of the difference found between the 2nd and 4th evaluation, showing an increase in the latter.

Additionally, an interaction effect was observed between group and moment of evaluation regarding MiL scores ($Wilk's \lambda = 0.55$; $F = 25.99$; $p = 0.0001$; $partial \eta^2 = 0.25$). Post hoc comparisons show that, at baseline, both abstainers and relapsers had significantly lower MiL levels comparing to control subjects. Whereas, at discharge, abstainers had significantly higher MiL scores comparing to relapsers and to control participants. Similar results were maintained at the 2nd year of follow-up and the 4th year.

In summary, abstainers showed superior levels of MiL after treatment comparing to the other two groups of study and they went increasing progressively across the follow-up moments.

Discussion

Data coming from this study can partially confirm the initial hypothesis. On one side, the group with relapses had a slower recovery comparing to abstinent patients, in all the psychological dimensions assessed. Nonetheless, and contrary to our hypothesis, the abstinent patients reached similar scores to control participants in the depression scale, at 2 years of follow-up. They also showed higher meaning in life scores comparing to controls, from the point of treatment discharge onwards. On the other side, with respect to the stages of psychological recovery sequence, while analyzing the situation for abstainers, we observed that the avoidance behavior was maintained along the treatment and follow-ups; that dimensions depending less on personality such as depressive symptoms remained stable and were even similar to control subjects 2 years after the treatment; whereas variables more related to personality such as anxiety and impulsivity continued to diminish during the follow-up period, although with higher scores than control individuals. In this group meaning in life was increased after finishing the treatment, with superior scores even to control participants.

Why relapses suppose a slowing-down of the recovery process?

From a neurobiological point of view, relapses or the interruption of abstinence suppose a re-activation of neurotoxic damage processes (Crews, 2008), stress activation (Beracochea, Mons & David, 2019), neuroinflammatory processes (Crews et al., 2005; Venner et al., 2006) and neurogenesis interruption (Crews & Nixon, 2009), giving rise to a worsening of anxiety symptoms (Brown et al., 1991; Rubio et al., 2017) and depression (Kelly et al., 2010a).

Relapses usually suppose an impact on the psychological state of the patient (Marlatt & Gordon, 1985), that could prolong in a significant manner through time. They regularly lead to a fast appearance of negative emotions, such as guilt and shame, which increase the sense of inefficacy and facilitate the relapse process, with the consequent exacer-

bation of anxiety and depression symptoms (de Hooge, Zeelenberg & Breugelmans, 2010).

Patients did not reach similar scores to controls in the assessed psychological dimensions

As it was hypothesized, patients from both groups had higher anxiety and impulsivity levels compared to control participants, along all the assessments. Our findings are in line with those published by Kelly et al. (2018), although the evaluated dimensions were not entirely the same. In their study, patients in recovery took an average of 10 years to achieve similar life quality levels to a control sample. Since life quality is not the same as anxiety or impulsivity, we could think that these higher scores have several origins: it has been shown that high scores in anxiety or impulsivity are a risk factor for substance dependence development in adolescence (Chow et al., 2018; Dyer, Heron, Hickman & Munafó, 2019; Stautz & Cooper, 2013), although they may also result from neurotoxic effects of alcohol (Beracochea et al., 2019; Mons & Beracochea, 2016). Hence, the differences in anxiety and impulsivity with the control group might be due to a mix of personality factors, previous to alcohol dependence development and they could also rise from alcohol damaging effects.

Something different happened with depression and meaning in life scores for the abstainers. The recovery of these variables seems more related to abstinence duration and attendance to mutual-help groups (Kelly et al., 2010a). So, the score normalization in depression or MiL for abstainers might be explained by their greater attendance to mutual help groups (Kelly et al., 2012; Kelly et al., 2010a).

The fact that several years of abstinence were needed in order to achieve depression normalization levels or meaning in life boost, agrees with the opinions that patients attending mutual-help groups have (FACOMA, 2016). Other models exploring the recovery of bio-psycho-social dimensions also agree with the need for several years to pass in order to achieve personality changes that would enable the adaptation to a new lifestyle (Chapman, 1991; Freyer-Rose, 1991; Gorski, 1990)

Can a sequence of psychological recovery be established in severe alcohol dependence?

If we think of the abstainers group as a recovery model for severe dependence, where the impact of relapse has been eliminated, our results would allow to hypothesize upon a sequence of some psychological variables represented in Figure 2. Behavioral changes (avoidant coping) initiated in a significant manner at the first moments of the treatment, are those that would allow for a secure environment, indispensable in order to avoid relapses and to keep introducing new healthy habits.

Conceivably, self-efficacy perception in relapse avoidance might facilitate the managing of emotions such as anxiety, depression and control of impulsive behavior. Since many of these dimensions are closely related to personality factors and with a long list of learned habits, it would be plausible to presume that it would take months or even years for patients to improve their scores in these dimensions. Over time, individuals would become capable of changing their motivation for abstinence maintenance, so that external motivations (worrying for alcohol con-

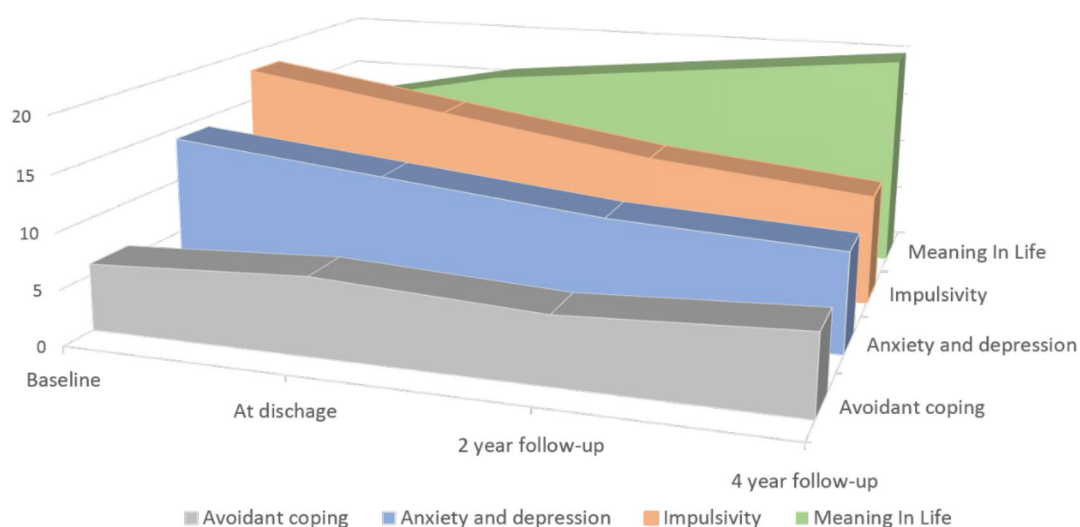


Figure 2. Psychological recovery stages along the study: behavioral-emotional-meaning in life.

Note. A visual representation of psychological recovery sequence across each moment of evaluation (X axis): baseline, at discharge of treatment, followed by 2 and 4 years after. Y axis would represent theoretical changes across these periods in several psychological dimensions (Z axis) (Meaning in Life, impulsivity, anxiety and depression and avoidant coping).

sumption-related consequences in physical and psychological health, as well as work and family areas) are replaced by internal ones (coherence, meaning in life, sense of belonging in the mutual-help groups). This hypothesis is in line with motivational approaches based on behavioral change maintenance (Kwasnicka, Dombrowski, White & Sniehotka, 2016).

Empirically, there has now been rigorous scientific studies conducted on how exactly mutual-help groups, like AA or FACOMA, confer recovery benefits. These studies suggest that the main ways that AA aids remission and recovery is through facilitating changes in the social networks of attendees and by boosting abstinence self-efficacy, coping, and by maintaining abstinence motivation (Kelly et al., 2010a; Kelly, et al., 2010b). Evidence suggests too that these broad benefits may depend on severity of dependence (Kelly et al., 2012) and also gender (Kelly & Hoepfner, 2013) whereby for more severely addicted individuals, in addition to facilitating important social network changes, AA may also aid recovery by reducing negative affect and increasing spiritual practices. It is also possible that MiL could be a determinant variable, even from the first moments of treatment, by favoring the abstinence through an increase of avoidance strategies and lowering of the depression levels

Regarding the limitations of this study, it is possible that our results would not be applicable to a mild form of dependence, nor to individuals that do not seek for treatment, since this study is carried out in patients with severe alcohol dependence seeking for treatment. Another limitation could be represented by the fact that an important percentage of patients attended mutual help therapy groups. This might give rise to differences between subjects in several psychological dimensions and aspects of recovery. In fact, we already addressed this matter (Rubio et al., 2017) and found that patients that attended FACOMA self-help groups, besides the psychotherapeutic treatment, improved in affective symptoms and meaning in life, accumulating more months of abstinence.

All the patients had family support, being one of the requirements to enter the study, therefore we ignore if the course of the studied variables would have been the same with other conditions of support. Abstinence was recorded based on self-informed reports, therefore we could not assure a total lack of consumption that could have been hidden by patients; although it is also true that self-reports usually have a good correlation with real amounts of consumption. Given the considerable number of patients that were not able to complete these measures, we could hypothesize that the observed changes in this work would correspond to the group with better outcomes. Although this is a possibility, at least we dispose from a sequence for recovery in a group of patients, though less vulnerable to relapse.

Last, an additional limitation could be constituted by the fact that we did not dispose from civil status and employment situation in control subjects. While this kind of sociodemographic information could be of use regarding its possible influence on several psychological variables, they were not the main concern of the aims of this study and further research on this topic should account for these variables.

Implications of this study: Given that the psychological dimensions of impulsivity and anxiety studied in this work were not stabilized until 2+2 years of abstinence, we think is important to emphasize the need for follow-ups by primary care teams, in order to impulse the revision of patients in recovery.

We think that it would be important to recommend or insist in the advisability to attend mutual-help groups as a strategy of usefulness to improve emotional states related to anxiety, depression and impulsivity, and what is more important, to breed or boost values such as meaning in life (Kelly & Yeterian, 2013; Rubio et al., 2018). From our standpoint, recovery in severe patients would begin with a behavioral component (changes in lifestyle), followed by an emotional one (anxiety and depression) and a final step based on purpose in life and spirituality.

Acknowledgements

The contribution of GR to the study was supported by the Carlos III Health Institute (Grant Number: FIS15-00463). On the other hand, the contribution of RJB, and RE was supported by Camilo José Cela University (Grant number: 2018-02).

To the Federation of Alcoholics and Relatives Associations of the Community of Madrid, FACOMA- C.A.PA. network.

Conflicts of interests

None of the authors had conflicts of interest with public or private entities.

References

- American Psychiatric Association (2000). *DSM-IV-TR :diagnostic and statistical manual of mental disorders* (4th ed). Washington, DC: American Psychiatric Association. doi:10.1007/978-3-642-28753-4_1094.
- Amodeo, M., Kurtz N. & Cutter H. S. (1992). Abstinence, reasons for not drinking, and life satisfaction. *The International Journal of the Addictions*, 27, 707-716. doi:10.3109/10826089209068762.
- Ando, B., Must A., Kurgys E., Szkaliczki A., Drotos G., Rozsa S., ... Almos P. Z. (2012). Personality traits and coping compensate for disadvantageous decision-making in

- long-term alcohol abstinence. *Alcohol and Alcoholism*, 47, 18-24. doi:10.1093/alcalc/agn144.
- Beracochea, D., Mons N. & David V. (2019). Targeting the glucocorticoid receptors during alcohol withdrawal to reduce protracted neurocognitive disorders. *Frontiers in Psychiatry*, 10, 580. doi: 10.3389/fpsyt.2019.00580.
- Blonigen, D. M., Timko C., Finney, J. W., Moos, B. S. & Moos, R.H. (2011). Alcoholics Anonymous attendance, decreases in impulsivity and drinking and psychosocial outcomes over 16 years: moderated-mediation from a developmental perspective. *Addiction*, 106, 2167-77. doi:10.1111/j.1360-0443.2011.03522.x.
- Blonigen, D. M., Timko, C., Moos, B. S. & Moos, R. H. (2009). Treatment, Alcoholics Anonymous, and 16-year changes in impulsivity and legal problems among men and women with alcohol use disorders. *Journal of Studies on Alcohol and Drugs*, 70, 714-725. doi:10.15288/jsad.2009.70.714.
- Brown, S. A., Irwin M. & Schuckit, M. A. (1991). Changes in anxiety among abstinent male alcoholics. *Journal of Studies on Alcohol*, 52, 55-61. doi:10.15288/jsa.1991.52.55.
- Brown, S. A., Vik P. W., Patterson T. L., Grant I. & Schuckit, M. A. (1995). Stress, vulnerability and adult alcohol relapse. *Journal of Studies on Alcohol*, 56, 538-545. doi:10.15288/jsa.1995.56.538.
- Chapman, R. (1991). Middle recovery: an introspective journey. *Addiction & Recovery*, Sept-October, 8-12.
- Chow, P. I., Portnow, S., Zhang D., Salemink E., Wiers, R. W. & Teachman, B. A. (2018). Comorbid interpretation and expectancy bias in social anxiety and alcohol use. *Anxiety, Stress and Coping*, 31, 669-685. doi:10.1080/10615806.2018.1521958.
- Courtney, K. E., Arellano R., Barkley-Levenson E., Galvan A., Poldrack, R. A., Mackillop J., Jentsch, J. D. & Ray, L. A. (2012). The relationship between measures of impulsivity and alcohol misuse: an integrative structural equation modeling approach. *Alcoholism: Clinical and Experimental Research*, 36, 923-931. doi:10.1111/j.1530-0277.2011.01635.x.
- Crews, F. T. (2008). Alcohol-related neurodegeneration and recovery: mechanisms from animal models. *Alcohol Research & Health*, 31, 377-388. doi:10.1093/alcalc/agn079.
- Crews, F. T., Buckley T., Dodd, P. R., Ende, G., Foley, N., Harper, C., ... Sullivan E. V. (2005). Alcoholic neurobiology: changes in dependence and recovery. *Alcoholism: Clinical and Experimental Research*, 29, 1504-1513. doi:10.1097/01.alc.0000175013.50644.61.
- Crews, F. T. & Nixon, K. (2009). Mechanisms of neurodegeneration and regeneration in alcoholism. *Alcohol and Alcoholism*, 44, 115-127. doi:10.1093/alcalc/agn079.
- Dyer, M. L., Heron J., Hickman, M. & Munafò, M.R. (2019). Alcohol use in late adolescence and early adulthood: the role of generalized anxiety disorder and drinking to cope motives. *Drug and Alcohol Dependence*, 204, 107480. doi:10.1016/j.drugalcdep.2019.04.044.
- Federación de Alcohólicos de la Comunidad de Madrid. (2016). *Ayúdate-Ayúdanos. Programa para pacientes y familiares de personas con problemas por el alcohol u otras drogas*. Madrid: Ediciones Mapa. ISBN 978-84-608-9611-1.
- Freyer-Rose, K. (1991). Late recovery: a process of integration. *Addiction & Recovery*, Nov-December, 20-23.
- García González, R. & Alonso Suárez M. (2002). Evaluación en programas de prevención de recaída: adaptación española del inventario de habilidades de afrontamiento (cbi) de litman en dependientes del alcohol. *Adicciones*, 14, 455-463. doi:10.1080/02791072.2002.10399968.
- Ghorbani, F., Khosravani V., Bastan, F. S. & Ardakani, R. J. (2017). The alexithymia, emotion regulation, emotion regulation difficulties, positive and negative affects, and suicidal risk in alcohol-dependent outpatients. *Psychiatry Research*, 252, 223-230. doi: 10.1016/j.psychres.2017.03.005.
- Góngora, V. & Castro Solano, A. (2011). Validación del cuestionario de significado de la vida mlq en población adulta y adolescente argentina. *Interamerican Journal of Psychology*, 45, 395-404.
- Gorski, T. T. (1990). The cenaps model of relapse prevention: basic principles and procedures. *Journal of Psychoactive Drugs*, 22, 125-133. doi:10.1080/02791072.1990.10472538.
- Hamilton, M. (1959). The assesment of anxiety states by rating. *British Journal of Medical Psychology*, 32, 50-55. doi:10.1111/j.2044-8341.1959.tb00467.x.
- Hamilton, M. (1967). Development of a rating scale for primary depressive illness. *British Journal of Social and Clinical Psychology*, 6, 278-296. doi:10.1111/j.2044-8260.1967.tb00530.x.
- de Hooge, I. E., Zeelenberg, M. & Breugelmans, S. M. (2010). Restore and protect motivations following shame. *Cognition and Emotion*, 24, 111-127. doi:10.1080/02699930802584466.
- IBM Corporation (2013). *IBM SPSS Statistics for Windows, Version 22.0*. Armonk, New York: IBM Corporation.
- Kelly, J. F. & Yeterian, J. (2013). Mutual-help groups for alcohol and other substance use disorders. In McCrad, B. S. & Epstein, E. E. (Eds.), *Addictions: A comprehensive guidebook* (p. 500-525). New York: Oxford University Press.
- Kelly, J. F., Greene M. C. & Bergman, B. G. (2018). Beyond abstinence: changes in indices of quality of life with time in recovery in a nationally representative sample of u.s. Adults. *Alcoholism: Clinical and Experimental Research*, 42, 770-780. doi:10.1111/acer.13604.
- Kelly, J. F., Hoepfner, B., Stout, R. L. & Pagano, M. (2012). Determining the relative importance of the mechanisms of behavior change within alcoholics anonymous:

- a multiple mediator analysis. *Addiction*, 107, 289-99. doi:10.1111/j.1360-0443.2011.03593.x.
- Kelly, J. F. & Hoepfner, B. B. (2013). Does alcoholics anonymous work differently for men and women? A moderated multiple-mediation analysis in a large clinical sample. *Drug and Alcohol Dependence*, 130, 186-193. doi:10.1016/j.drugalcdep.2012.11.005.
- Kelly, J. F., Stout, R. L., Magill M., Tonigan, J. S. & Pagano, M. E. (2010a). Mechanisms of behavior change in alcoholics anonymous: does alcoholics anonymous lead to better alcohol use outcomes by reducing depression symptoms? *Addiction*, 105, 626-636. doi:10.1111/j.1360-0443.2009.02820.x.
- Kelly, J. F., Stout, R. L., Tonigan, J. S., Magill, M. & Pagano, M. E. (2010b). Negative affect, relapse, and alcoholics anonymous (aa): does aa work by reducing anger? *Journal of Studies on Alcohol and Drugs*, 71, 434-444. doi:10.15288/jsad.2010.71.434.
- Kwasnicka, D., Dombrowski S. U., White, M. & Sniehotta F. (2016). Theoretical explanations for maintenance of behaviour change: a systematic review of behaviour theories. *Health Psychology Review*, 10, 277-296. doi:10.1080/17437199.2016.1151372.
- Laudet, A. B., Becker, B., J. & White, W. L. (2009). Don't wanna go through that madness no more: quality of life satisfaction as predictor of sustained remission from illicit drug misuse. *Substance Use & Misuse*, 44, 227-252. doi:10.1080/17437199.2016.1151372.
- Laudet, A. B. & White, W. L. (2008). Recovery capital as prospective predictor of sustained recovery, life satisfaction, and stress among former poly-substance users. *Substance Use and Misuse*, 43, 27-54. doi:10.1080/10826080701681473.
- Litman, G. K., Stapleton J., Oppenheim, A. N. & Peleg, B. M. (1983). An instrument for measuring coping behaviours in hospitalized alcoholics: implications for relapse prevention treatment. *British Journal of Addiction*, 78, 269-276. doi:10.1111/j.1360-0443.1983.tb02511.x.
- Marlatt, G. A. (1990). Cue exposure and relapse prevention in the treatment of addictive behaviors. *Addictive Behaviors*, 15, 395-399. doi:10.1016/0306-4603(90)90048-3.
- Marlatt, G. A. & Gordon, J. (1985). *Relapse prevention. Maintenance strategies in the treatment of addictive behaviors*. New York: The Guilford Press.
- Marlatt, G. A. & Witkiewitz, K. (2005). Relapse prevention for alcohol and drug problems. In: Marlatt, A., Donovan, D. M (Eds), *Relapse prevention: maintenance strategies in the treatment of addictive behaviors* (2nd Ed), 1-44.
- Mons, N. & Beracochea, D. (2016). Behavioral neuroadaptation to alcohol: from glucocorticoids to histone acetylation. *Frontiers in Psychiatry*, 7, 16. doi:10.3389/fpsy.2016.00165.
- Oquendo, M., Baca-García E., Graver, R., Morales M., Montalvan, V. & Mann, J. (2001). Spanish adaptation of the Barratt impulsiveness scale (BIS-11). *European Journal of Psychiatry*, 15, 147-55.
- Patton, J. H., Stanford, M. S. & Barratt, E. S. (1995). Factor structure of the Barratt impulsiveness scale. *Journal of Clinical Psychology*, 51, 768-774. doi:10.1002/1097-4679(199511)51:6<768::AID-JCLP2270510607>3.0.CO;2-1.
- Rubio, G., Marín M., Arias, F., López-Trabada, J. R., Iribarren, M. Alfonso S., ... de Fonseca, F. R. (2018). Inclusion of alcoholic associations into a public treatment programme for alcoholism improves outcomes during the treatment and continuing care period: a 6-year experience. *Alcohol and Alcoholism*, 32, 1681-1687. doi:10.1093/alcalc/agx078.
- Rubio, G., Urosa, B. & Santo Domingo, J. (1998). Validación de la escala de intensidad de la dependencia al alcohol. *Psiquiatría Biológica*, (Supl 1), 44-47.
- Substance Abuse and Mental Health Services Administration. (2011). *SAMHSA announces a working definition of "recovery" from mental disorders and substance use disorders*. Retrieved at <https://store.samhsa.gov/sites/default/files/d7/priv/pep12-recdef.pdf>.
- Sobell, L.C., Sobell M.B., Leo, G. I. & Cancilla, A. (1988). Reliability of a timeline method: assessing normal drinkers' reports of recent drinking and a comparative evaluation across several populations. *British Journal of Addiction*, 83, 393-402. doi:10.1111/j.1360-0443.1988.tb00485.x.
- Stautz, K. & Cooper, A. (2013). Impulsivity-related personality traits and adolescent alcohol use: a meta-analytic review. *Clinical Psychology Review*, 33, 574-592. doi:10.1016/j.cpr.2013.03.003.
- Steger, M. F., Frazier, P., Kaler, M. & Oishi, S. (2006). The meaning in life questionnaire: assessing the presence of and search for meaning in life. *Journal of Counseling Psychology*, 53, 80-93. doi:10.1037/0022-0167.53.1.80.
- Stockwell, T., Murphy, D. & Hodgson, R. (1983). The severity of alcohol dependence questionnaire: its use, reliability and validity. *British Journal of Addiction*, 78, 145-155. doi:10.1111/j.1360-0443.1983.tb05502.x.
- Tonigan, J. S., McCallion, E. A., Frohe, T. & Pearson, M. R. (2017). Lifetime alcoholics anonymous attendance as a predictor of spiritual gains in the relapse replication and extension project (RREP). *Psychology of Addictive Behaviors*, 31, 54-60. doi:10.1037/adb0000235.
- Ugochukwu, C., Bagot, K. S., Delaloye, S., Pi, S., Vien, L., Garvey, T., ... Ishak, W. W. (2013). The importance of quality of life in patients with alcohol abuse and dependence. *Harvard Review of Psychiatry*, 21, 1-17. doi:10.1097/hrp.0b013e31827fd8aa.
- Venner, K. L., Matzger, H., Forcehimes, A. A., Moos, R. H., Feldstein S.W., BWillenbring, M. L. & Weisner, C. (2006). Course of recovery from alcoholism. *Alcohol-*

- ism: Clinical and Experimental Research*, 30, 1079-1090. doi:10.1111/j.1530-0277.2006.00121.x.
- White, W. L. (2012). *Recovery/remission from substance use disorders: an analysis of reported outcomes in 415 scientific reports, 1868–2011 (Drug & Alcohol findings Review Analysis)*. Pittsburgh, PA: Philadelphia Department of Behavioral Health and Intellectual Disability Services and the Great Lakes Addiction Technology Transfer Center.
- Wilcox, C.E., Pearson, M. R. & Tonigan, J. S. (2015). Effects of long-term aa attendance and spirituality on the course of depressive symptoms in individuals with alcohol use disorder. *Psychology of Addictive Behaviors*, 29, 382-391. doi:10.1037/adb0000053.
- Witkiewitz, K., Wilson, A. D., Pearson, M. R., Montes, K. S., Kirouac, M., Roos, C. R., ... Maisto, S. A. (2019). Profiles of recovery from alcohol use disorder at three years following treatment: can the definition of recovery be extended to include high functioning heavy drinkers? *Addiction*, 14, 69-80. doi:10.1111/add.14403.]
- Worley, M. J., Tate, S.R. & Brown, S. A. (2012). Mediation relations between 12-step attendance, depression and substance use in patients with comorbid substance dependence and major depression. *Addiction*, 107, 1974-1983. doi:10.1111/j.1360-0443.2012.03943.x.