Predicting treatment failure in pathological gambling: The role of personality traits

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HIGHLIGHTS

- Impulsivity is a significant predictor of treatment failure.
- Pathological gamblers score higher on N–Anx compared to controls.
- The ZKPQ is a useful tool for identifying PGs at risk of treatment failure.
- Personality traits are useful in deciding the clinical approach to PG.

ARTICLE INFO

ABSTRACT

Introduction: The aim of this study was twofold: First, to assess the personality profile of treatment-seeking adult outpatients with pathological gambling compared to a matched control group under the Alternative Five Factor Model perspective, and second, to determine which personality variables would predict treatment outcome.
Methods: The final total sample consisted of 44 consecutive treatment-seeking pathological gamblers (PGs) and 88 controls paired by age and sex who completed the Zuckerman–Kuhlman Personality Questionnaire (ZKPQ). Twelve months after starting an open program of individual cognitive-behavioral therapy, PGs were categorized as abstinent or treatment failure.
Results: PGs scored significantly higher on Neuroticism–Anxiety. Those who had relapsed or dropped out showed higher Impulsivity and Sensation Seeking scores. Impulsivity emerged as a significant predictor of treatment failure. Treatment-seeking PGs scored higher on Neuroticism–Anxiety and Impulsivity appeared as a risk factor of relapsing or dropping out.
Conclusions: Our findings support the importance of individual differences in personality on therapy outcomes. The ZKPQ may constitute a useful tool to identify these individual differences that might be considered when making personalized treatment decisions to improve the effectiveness and quality of treatment interventions.

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1. Introduction

Pathological gambling (PG) is characterized by an inability to resist recurrent urges to gamble excessively, despite harmful consequences to the gamblers themselves, their families and the society. Estimates indicate that 70–90% of North Americans have engaged in some form of gambling activity (Raylu & Oei, 2002), although epidemiological surveys place the prevalence rate of PG at 1–2% of the general population (Petry, 2005) suggesting that the majority of individuals who gamble do not develop PG. The discrepancy between those who gamble and do not develop PG, and those who gamble and do, has led researchers to search for vulnerability factors related to this disorder and its characteristics.

In this search for vulnerability factors, in a recent meta-analysis Maclaren, Fugelsang, Harrigan, and Dixon (2011) summarized studies on personality and pathological gambling concluding that the personality profile of pathological gamblers is similar to that of people with substance use disorders and as such, they should be treated as those having a behavioral addiction. In view of these empirical findings, the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; APA, 2013) has included several modifications to the diagnosis of pathological gambling: (a) The name of the disorder has been changed to Gambling Disorder, (b) the Gambling Disorder has been

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moved to the chapter on "Substance-Related and Addictive Disorders", (c) the threshold for diagnosing has been reduced from five criteria to four, and (d) one of the criteria has been removed: "Has committed illegal acts such as forgery, fraud, theft, or embezzlement to finance gambling".

It is known that individual differences in personality may play an important role in explaining the risk of developing and maintaining PG. Most of the research on the association between personality and PG has been conducted under the Five Factor Model (FFM) of personality pointing out that the personality profile of PG seems to be characterized by high Neuroticism, low Conscientiousness and a tendency towards low scores on Agreeableness or its facets (Bagby et al., 2007; Kaare, Mõttus, & Konstabel, 2009; Maclaren, Fugelsang, Harrigan, & Dixon, 2011; Myrseth, Pallesen, Molde, Johnsen, & Lorvik, 2009).

Although few studies have focused on the personality profile of pathological gamblers, still fewer have focused on which personality traits might predict treatment outcome (Ledgerwood & Petry, 2006). Systematic reviews on treatment outcome have found that the prevalence of relapses in pathological gambling is very high (Ledgerwood & Petry, 2006) and that dropouts from psychological treatment identified percentages ranging from 14–50% with a median of 26% (Melville, Casey, & Kavanagh, 2007). These findings are highly significant if we consider that PGs who seek treatment comprise a minority within those found in community samples (Slutske, 2006).

Reviewing the literature on treatment outcome, specifically on relapse and dropout, Ledgerwood and Petry (2006) and Melville et al. (2007) found that personality variables such as Neuroticism and Impulsivity were associated with treatment failure. Their reviews highlighted several points to consider: (a) There is no consistent operational definition regarding what constitutes relapse and dropout in PG, (b) the field is characterized by a failure to replicate results, (c) to date, only a small number of variables have been studied in relation to the association between PG and treatment outcome, and (d) individual differences in personality may play an important role in explaining the risk of relapsing and dropping out. These authors could hardly identify a handful of studies that specifically addressed the relationship between personality and relapse or dropout. In this sense, a recent study by Ramos-Grille, Gomà-i-Freixanet, Aragay, Valero, and Vallès (2013) addressed this question. The authors researched which personality domains would predict relapse and dropout after 1-year follow-up by administering the Revised NEO Personality Inventory (NEO PI-R; Costa & McCrae, 1992) to 73 treatment-seeking slot-machine PGs attending an open program of individual cognitive-behavioral therapy. This study identified low scores on Conscientiousness as a significant predictor of relapse; whereas low scores on Conscientiousness and Agreeableness were significant predictors of dropout. These findings support the importance of differential patterns of individual differences on treatment outcome.

Trait theories of personality have attempted to associate known psychobiological mechanisms with personality traits. One of the models of personality based on a psychobiological approach is the Alternative Five Factor Model (AFFM) proposed by Zuckerman, Kuhlman, Joireman, Teta, and Kraft (1993). Factor analyses using biological markers for each hypothesized trait yielded five reliable and identifiable factors across genders: Neuroticism–Anxiety (N–Anx), Activity (Act), Sociability (Sy), Impulsive Sensation Seeking (ImpSS), and Aggression–Hostility (Agg–Host). In this model, no measures of cultural interests or intellectual styles were included because of Zuckerman's (1984) conception that basic traits should be easily comparable to traits in other species and found throughout the human lifespan. Aggression rather than Agreeableness, and Impulsive Sensation Seeking rather than Conscientiousness were included. Furthermore, the broad dimension of Extraversion was divided into the separate factors of Activity and Sociability (Zuckerman, 2002). In this AFFM, the dimension of N–Anx does not include either Impulsivity or Hostility traits, as does the NEO PI-R; instead, specific scales for these two traits are included. This conceptual and empirical differentiation may be heuristic in the conceptualization of

PG as an addictive disorder, as Impulsivity is one of the most consistently associated traits with addictive disorders (Verdejo-García, Lawrence, & Clark, 2008).

The aim of this study is twofold: First, to assess the personality profile of treatment-seeking adult outpatients with PG compared to a matched control group under the AFFM perspective; and second, to determine which personality variables would predict treatment outcome, defined as relapsing or dropping out after 1-year follow-up. From the results obtained using other models of personality assessment and paralleling the FFM with the AFFM, we hypothesized that: (a) PGs, compared to a control group, would score higher on Neuroticism–Anxiety and Impulsivity, and would show a tendency towards high scores on Aggression–Hostility, and (b) Impulsivity would predict the risk of relapsing or dropping out.

To our knowledge, no studies have been conducted with the AFFM to identify the personality profile of treatment-seeking PGs and the personality variables that might predict treatment outcomes. Identifying the personality traits that will predict those who will abstain is of great importance in attempting to maximize the effectiveness and outcome of treatment interventions.

2. Material and methods

2.1. Participants

For the purposes of this study, we used two samples matched by age and sex. The age range for both samples was from 21 to 75 years ($M_{age} = 39.84$; $SD = 13.61$), 90.9% were men. The clinical sample consisted of 44 White consecutive adult pathological gambler outpatients who sought treatment at the Pathological Gambling Unit of Consorci Sanitari de Terrassa during the period January 2011–December 2012.

Pathological gambling was diagnosed with the National Opinion Research Center DSM-IV Screen for Gambling Problems (NODS; Gerstein et al., 1999) and the mean number of DSM-IV-TR criteria for pathological gambling met in the last three months before starting treatment was 6.9 ($SD = 1.37$). Participants were engaged in the following forms of gambling: Slot machines 90.9%; bingo 15.9%; lotteries 13.7%; Internet gambling 9.2% and table games played at casinos 2.3%. More than half of the sample (52.3%) presented co-occurring psychopathology: 20.6% had a mood disorder; 18.2% abused or were dependent on alcohol and 16.1% had an anxiety disorder.

The control sample comprised 88 subjects extracted from a more comprehensive general population sample pool, stratified by sex and age, consisting of 570 males and 599 females ranging in age from 18 to 93 years. This general population sample, which formed part of a wider study designed to obtain the Spanish norms of the ZKPQ, matched the IDESCAT Census Projections in the distribution of age and sex groups (Gomà-i-Freixanet & Valero, 2008).

2.2. Instruments

Gambling behavior was assessed with the National Opinion Research Center DSM-IV Screen for Gambling Problems (NODS, Gerstein et al., 1999). The NODS questionnaire is based on DSM-IV criteria and contains 17 lifetime items. The test–retest reliability of this instrument is 0.99 (Gerstein et al., 1999).

Before beginning treatment, participants completed an extensive clinical history comprising sociodemographic data (age, gender, race, employment, marital status, and years of schooling), data regarding their lifetime history of gambling (age of onset, duration of the gambling problem, frequency of gambling, and time and money spent gambling) and other clinical variables of interest such as abuse or dependence on alcohol, use or abuse of illegal substances and pharmacological treatment were also considered. In addition, in every treatment session and throughout the follow-up, we registered additional clinical

variables: Money spent gambling, lapse (an isolated episode of pathological gambling) or relapse, number of sessions attended and number of dropouts.

We used the Zuckerman–Kuhlman Personality Questionnaire (ZKPQ; Zuckerman et al., 1993) to assess personality. It consists of five content scales, plus an Infrequency scale. The ZKPQ has 99 dichotomous items, in sentence format and true–false response set. The five scales can be described in terms of their typical content: Neuroticism–Anxiety (N–Anx, 19 items) items describe frequent emotional upset, tension, lack of self-confidence and sensitivity to criticism. Activity (Act, 17 items) items describe the need for general activity, an inability to relax and a preference for hard and challenging work, and high energy level. Sociability (Sy, 17 items) items describe the number of friends one has and outgoingness at parties and a preference for being with others as opposed to being alone. Impulsive Sensation Seeking (ImpSS, 19 items) items involve a lack of planning and the tendency to act impulsively without thinking, and the seeking of excitement and novel experiences. The ImpSS items are general in content and do not describe specific activities such as risky sports, drinking, drugs, or having sex. These items were eliminated to avoid confusion in studies of individuals who actually engage in one or another of these activities. Aggression–Hostility (Agg–Host, 17 items) items describe a readiness to express verbal aggression; rude, thoughtless or antisocial behavior; vengefulness and spitefulness; having a quick temper and impatience with others. Three of these scales (Act, Sy and ImpSS) are divided into two subscales. The ZKPQ also includes an Infrequency scale (Infreq, 10 items). This scale, rather than being regarded as a scale in the normative sense, should only be used to detect inattention to the task or simply as a validity measure for the individual test-taker. The items are mostly exaggerated, true scored, socially desirable but unlikely to be completely true statements about anyone. This scale is highly skewed with most scores around 0 or 1.

In the present study, participants from both samples (PGs and controls) completed the Spanish version of the ZKPQ (Gomà-i-Freixanet, Valero, Puntí, & Zuckerman, 2004). This instrument has shown good psychometric properties in Spanish samples, with internal consistency alpha coefficients ranging from 0.67 to 0.84. The factorial structure has also been replicated in Spanish samples including the general population (Gomà-i-Freixanet, Valero, Muro, & Albiol, 2008) with congruence coefficients ranging from 0.84 to 0.96 (Gomà-i-Freixanet et al., 2004). This test has also demonstrated consensual validity between self- and hetero-reports (Gomà-i-Freixanet, Wismeijer, & Valero, 2005) and good discriminant validity in clinical samples meeting Borderline Personality Disorder, Attention Deficit Disorder, Substance Use Disorders or fibromyalgia (Albiol, Gomà-i-Freixanet, Valero, Vega, & Muro, 2014; Gomà-i-Freixanet, Soler, Valero, Pascual, & Pérez, 2008; Martínez et al., 2010; Valero et al., 2014). The ZKPQ also provides normative data for the general population (Gomà-i-Freixanet & Valero, 2008).

2.3. Procedure

In this naturalistic follow-up study, the criteria for admission were: (a) Meeting diagnostic criteria for PG according to the DSM-IV-TR (DSM-IV-TR; APA, 2000), (b) age ≥ 18 years, and (c) not suffering from any acute or severe psychotic disorder (i.e., acute psychosis, manic episodes or schizophrenia). Patients completed the assessment instruments before beginning treatment.

All PGs attended a protocolized program treatment consisting mainly of individual cognitive-behavioral therapy for pathological gambling aimed at achieving abstinence from gambling. The program was conducted by a clinical psychologist with wide experience in cognitive-behavioral therapy for PGs. Treatment lasted 6-months and consisted of 40-minute sessions on a weekly basis, each comprising psychoeducation, motivational interviewing, stimulus control, cognitive restructuring and relapse prevention. After treatment, there was a 6-month follow-up period consisting of a monthly session.

Once the follow-up was finished, patients were categorized into two categories: Abstinent or treatment failure. Within the category of treatment failure, relapses and dropouts were included. Relapse was defined as more than two isolated episodes of gambling during the 12-month follow-up or one episode with a loss of control quantified as a total expense higher than a week of gambling prior to entering treatment (Echeburúa, Fernández-Montalvo, & Báez, 2001; Ledgerwood & Petry, 2006; Ramos-Grille et al., 2013). Dropout was defined as client-initiated termination occurring without discussion with the therapist, or when the therapist believes the client is in need of further therapy but the client quits (Sylvain, Ladouceur, & Boisvert, 1997). Only a few number of participants relapsed ($n = 8$; 18%) or dropped out from treatment ($n = 14$; 32%), making not feasible to generate independent categories.

As stated above, to test for the clinical specificity of the dimensional personality profile, the PG sample was matched subject to subject with a normal-range sample which acted as a control group. We used a case–control design randomly selecting two controls for each case, matched by age and gender (Gomà-i-Freixanet, Soler, Valero, Pascual, & Pérez, 2008). Control subjects answered the questionnaires anonymously, and only demographic data such as age, gender and educational level were recorded. All respondents participated voluntarily in the study and did not receive any remuneration for their participation.

This study was performed in accordance with the Declaration of Helsinki guidelines (WMA, 2008) and the Research Ethics Committee of Consorci Sanitari de Terrassa approved the protocol. All participants provided written informed consent after receiving a detailed description of the study and were free to withdraw at any time.

2.4. Data analyses

Data analyses followed two steps: Descriptive and predictive analyses. In the first step, we performed means, standard deviations and Cronbach's alphas. We tested differences between groups using two-tailed independent Student's t-test and calculated Cohen's d. Subsequently, in order to calculate the specific contribution of each personality variable to treatment failure, we conducted a logistic regression analysis. All the statistical tests were bilateral and the assumed alpha risk was 5%. We used the statistical package SPSS Version 20.0.

3. Results

The final total sample consisted of 132 participants (44 PGs and 88 controls). Pathological gamblers had a mean of 10.09 years ($SD = 3.23$) of schooling and 52.3% were employed. In line with other studies (e.g., Myrseth et al., 2009) PGs attained significantly lower levels of schooling ($\chi^2 = 17.98$, $p = .001$) than controls. Regarding marital status, 61.3% were married, 25% were single and the remaining 13.7% were separated, divorced or widowed. The mean duration of the gambling problem was 10.91 years ($SD = 10.59$) and the mean age of onset was 24.73 years ($SD = 8.62$). Few participants ($n = 12$; 27.3%) were taking pharmacological treatment (20.4% selective serotonin reuptake inhibitor antidepressants and 15.9% benzodiazepines). One year after starting treatment, 50% of the patients were abstinent, and 68% had completed treatment.

Age, age of onset and duration of the gambling problem were not significantly correlated with any of the personality variables, with correlations ranging from $r = -.01$ to $r = .23$. Treatment failure was independent of: Gender (Fisher's exact test, $p = .61$), age ($t = 0.43$; $p = .671$), age of onset ($t = 0.24$, $p = .810$), duration of the gambling problem ($t = 1.59$, $p = .119$), used/abused illegal substances ($\chi^2 = 1.20$, $p = .273$), absence/presence of psychopathological co-occurrence ($\chi^2 = 2.28$, $p = .131$) and pharmacological treatment (Fisher's exact test, $p = .721$).

Means, standard deviations, Cronbach's alphas, t-test and Cohen's d are reported in Table 1. Comparing the PG group to the control group,

Table 1
Mean differences of the ZKPQ scales between PG and control group, Cronbach's alphas and Cohen's d.

ZKPQ scales	PG (n = 44)			Control (n = 88)					
	M	SD	α	M	SD	α	t	p	Cohen's d
N–Anx	9.16	5.22	.87	6.09	4.31	.81	3.37	.001	0.64
Act	8.07	2.98	.66	7.82	3.25	.71	0.43	.669	0.08
Sy	6.64	4.42	.79	6.48	3.38	.79	0.21	.834	0.04
ImpSS	9.27	5.01	.81	8.00	3.98	.83	1.47	.147	0.28
Imp	4.16	2.70	–	2.93	2.03	–	2.66	.010	0.51
SS	5.11	3.06	–	5.06	2.82	–	0.09	.933	0.02
Agg–Host	7.70	3.27	.71	7.17	3.21	.74	0.89	.373	0.16
Infreq	1.90	1.99	–	2.28	1.92	–	1.04	.298	0.19

Note: PG = pathological gambling; N–Anx = Neuroticism–Anxiety; Act = Activity; Sy = Sociability; ImpSS = Impulsive Sensation Seeking; Agg–Host = Aggression–Hostility; Infreq = Infrequency.

the former scored significantly higher on Neuroticism–Anxiety ($t = 3.37$, $p = .001$) and on Impulsivity ($t = 2.66$, $p = .010$). Neuroticism–Anxiety was the only dimension that remained significant after adjusting for the level of education. The absence of significant differences between the two groups on the Infrequency scale (measuring careless responding) and the low scores on this scale (around 0 or 1) gives additional validity to the obtained data in the PG group. Internal consistency alphas of the five scales of the ZKPQ for the PG sample ranged from 0.66 to 0.87, with a mean of 0.77. These reliability estimations were similar to those obtained in other clinical populations using the ZKPQ (Gomà-i-Freixanet, Soler, Valero, Pascual, & Pérez, 2008; Ball, 1995).

Regarding correlations among personality variables in the PG group, coefficients ranged from 0.04 to 0.42, with a mean correlation of 0.24.

Table 2 shows the means, standard deviations, t-tests and Cohen's d of the abstinent and treatment failure group of pathological gamblers. The abstinent group showed significant lower scores on Impulsive Sensation Seeking ($p = .014$) and its Imp ($p = .028$) and SS ($p = .042$) subscales.

In view of the significant differences observed between the two treatment outcome groups, we carried out a logistic regression analysis in order to reduce the presence of probable false positives. In the regression analysis (see Table 3), the dependent variable examined was the risk of treatment failure (coded as 0 per abstinence group and 1 per treatment failure group), including the ZKPQ variables as predictors and using a conditional entrance to select the variables for the final model. The obtained final model was significant ($\chi^2_{(1)} = 5.01$, $p = .025$). The only variable retained by the model was Impulsivity ($p = .033$), with high scores being associated with a higher probability of being endorsed in the treatment failure group.

Table 2
Means, standard deviations, t-test and Cohen's d of ZKPQ scales and subscales by treatment outcome.

ZKPQ scales	Abstinent n = 22		Treatment failure n = 22				
	M	SD	M	SD	t	p	Cohen's d
N–Anx	7.82	4.99	10.50	5.21	1.74	.089	0.53
Act	7.41	3.00	8.73	2.86	1.49	.144	0.45
Sy	6.86	4.30	6.41	4.62	0.34	.737	0.10
ImpSS	7.45	4.83	11.09	4.61	2.56	.014	0.77
Imp	3.27	2.90	5.05	2.21	2.28	.028	0.69
SS	4.18	2.72	6.05	3.15	2.10	.042	0.64
Agg–Host	6.82	3.02	8.59	3.35	1.85	.072	0.55
Infreq	1.86	1.61	1.95	2.34	0.15	.881	0.04

Note: N–Anx = Neuroticism–Anxiety; Act = Activity; Sy = Sociability; ImpSS = Impulsive Sensation Seeking; Imp = Impulsivity; SS = Sensation Seeking; Agg–Host = Aggression–Hostility; Infreq = Infrequency.

Table 3
Logistic regression analysis output of ZKPQ scales in the abstinent vs. treatment failure group.

Scale	B	p	Odds ratio	95% CI
Impulsivity	0.27	0.033	1.30	1.02, 1.67
Constant	−1.11	0.071	0.33	

Note: Abstinent = 0, treatment failure = 1, CI = confidence interval.

4. Discussion

The purpose of this study was twofold: First, to assess for the first time the personality profile of adult treatment-seeking PGs compared to normal-range controls under the AFFM and second, to determine which ZKPQ personality variables would predict treatment failure in treatment-seeking pathological gamblers after a 1-year follow-up. To our knowledge, no studies have ever been conducted using the AFFM to identify traits involved in treatment-seeking PGs and their influence on treatment outcomes.

The clinical and sociodemographic characteristics of our sample were similar to other studies conducted in Spain with PGs (Álvarez-Moya et al., 2011; Jiménez-Murcia et al., 2010; Ramos-Grille et al., 2013). Compared to the control group, PGs scored significantly higher on Neuroticism–Anxiety and Impulsivity, however Impulsivity dropped out after adjusting for the level of education. Our results corroborate those of other studies using the NEO PI-R (Kaare et al., 2009; Myrseth et al., 2009) comparing treatment-seeking PGs to a control group, pointing out that the personality profile of PGs seeking treatment seems to be mainly characterized by high scores on Neuroticism. The repeated finding of high scores on Neuroticism gives strength to the results of the meta-analysis by Maclaren, Fugelsang, Harrigan, and Dixon (2011), stating that PG is a symptom of psychopathology that goes beyond a simple deficit of impulse control. In our study, we did not find significant differences in Impulsive Sensation Seeking or in Aggression–Hostility, traits which seem to be more specific to externalizing forms of psychopathology and specifically of substance abuse (Ball, 2005). These different patterns of personality characterization may arise because PG is a heterogeneous disorder with great variability justifying a theoretically based classification into distinct subtypes (Blaszczynski & Nower, 2002; Ledgerwood & Petry, 2010). In this regard, within the PG population, those who seek treatment are a minority and typically score high on Neuroticism. It is plausible that in a treatment-seeking sample, subjects with mood and anxiety problems would be over-represented (i.e., the emotionally vulnerable subtype), while those showing high Impulsivity and antisocial traits (i.e., the antisocial-impulsivist subtype) would be under-represented (MacLaren, Best, Dixon, & Harrigan, 2011). This fact might explain the different patterns found depending on the sample characteristics (treatment-seeking vs. community samples).

Sociodemographic data such as age, age of onset and duration of the gambling problem were not significantly correlated with any of the personality scales. Regarding treatment outcome, no associations were found between treatment failure and the following variables: Gender, age, age of onset, duration of the gambling problem, used/abused illegal substances, psychopathological comorbidity and being under pharmacological treatment. On a bivariate analysis level, comparing abstinent vs. treatment failure group, the former scored significantly lower on ImpSS and on its two subscales Impulsivity and Sensation Seeking. Regarding results predicting treatment outcome, when we tested for the discriminant power of the ZKPQ, the subscale that best predicted treatment failure was Impulsivity. Comparing abstinent vs. treatment failure group, although Imp and SS differed significantly, at a multivariate level, SS dropped out due to the statistical significance of Imp that remained in the model. The obtained results indicate that high scores on Impulsivity emerge as a significant predictor of relapse or dropout. Assessing the degree of correspondence between the traits evaluated by the Five Factor Model (NEO PI-R) and the Alternative Five Factor Model (ZKPQ),

Conscientiousness and ImpSS loaded on the same factor with strong convergence between them (Zuckerman et al., 1993). This convergence is consistent with the results reported by Ramos-Grille et al. (2013) in that low scores on Conscientiousness (NEO PI-R) emerged as a significant predictor of relapse and dropout. Therefore, the results obtained in both studies with two different models of personality point in the same direction, indicating that Impulsivity is a prominent trait in predicting the risk of relapse or dropout in PG. These results appear to align PG to addictive disorders, given that high levels of self-reported Impulsivity are also found to be predictive of relapse in substance use disorders (Ball, 1995; Nieva et al., 2011; Rogers, Moeller, Swann, & Clark, 2010).

All in all, it appears that N–Anx scores are higher in treatment-seeking pathological gamblers compared to controls, and Impulsivity is a risk factor of treatment failure. Pathological gamblers with high scores on Impulsivity may be at a higher risk of relapsing and may make decisions on the spur of the moment (including the decision of when or how much to wager) without adequately weighing up all the options and consequences. For many gamblers, high Impulsivity may make it difficult to benefit from treatment because the excitement of gambling is immediate while the reward of treatment is long-term (Ledgerwood & Petry, 2006). Patients with these personality characteristics are less likely to complete treatment and to benefit from psychotherapy, and are therefore prone to dropout and/or relapse (Leblond, Ladouceur, & Blaszczynski, 2003; Smith et al., 2010).

Our results need to be considered in light of some limitations. Firstly, the small sample size did not allow generating relapsed and dropped out categories; and all participants were treatment-seeking which may affect the generalizability of our findings to PGs in the general population. Secondly, most of the patients were men, making it advisable to check for the applicability of these findings to female pathological gamblers. Finally, as comorbidity was assessed by a clinical interview, Axis-II was not specifically assessed.

5. Conclusions

Our findings stress the importance of individual differences in personality on PG and their influence on therapeutic outcome (e.g., Aragay et al., in press; Blaszczynski & Nower, 2002; Ledgerwood & Petry, 2010; Milosevic & Ledgerwood, 2010; Ramos-Grille et al., 2013). According to empirical findings and the new classification of DSM-5, behavioral addictions and substance dependence seem to have similarities at the phenotypic and genotypic level (Leeman & Potenza, 2012; Potenza, 2014; Tonioni et al., 2014). A better understanding of the personality characteristics that place particular individuals at risk of being endorsed with a diagnosis of addictive disorder and/or of treatment failure will be vital to develop new treatments as well as to tailor the existing ones. Therefore, an in-depth assessment of the personality profile to identify individuals at risk of treatment failure will allow more effective interventions at the early stages of therapy. Applying specific strategies and tailoring protocols to suit individual needs and vulnerabilities might provide additional tools to decrease the risk of relapsing and dropping out (Daughters, Lejuez, Lesieur, Strong, & Zvolensky, 2003). Our results indicate that the ZKPQ may constitute a useful tool to identify those treatment-seeking PGs who may be at risk of treatment failure. Personality traits might be considered when taking personalized treatment decisions to tailor interventions according to patients pre-existing personality traits in order to improve effectiveness and quality of treatment, and to reduce the high health care costs associated with the continued relapses, dropouts and chronicity. Clinicians might consider PGs with high scores in Imp as being at risk of prematurely dropping out of treatment or relapse. Therefore, those patients with this personality profile would benefit from an increase in the number of sessions of psychological treatments strongly emphasizing motivational enhancement and relapse prevention. Proactive action to address these issues would equip clinicians and patients with tools to cope with

treatment failure. Further investigations addressing the issues raised above are needed to understand and treat failure in pathological gambling.

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