Comorbid family history and personality traits in pathological gamblers compared with healthy controls

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ABSTRACT

Background: While DSM-5 classified pathological gambling as an addictive disorder, there is debate as to whether ICD-11 should follow suit. The debate hinges on scientific evidence such as neurobiological findings, family history of psychiatric disorders, psychiatric comorbidity, and personality variables.

Methods: In the “Baden-Württemberg Study of Pathological Gambling”, we compared a group of 515 male pathological gamblers receiving treatment with 269 matched healthy controls. We studied differences in sociodemographic characteristics, gambling-related variables, psychiatric comorbidity (lifetime), family history of psychiatric conditions, as well as personality traits such as impulsivity (Barrett Impulsiveness Scale), sensation seeking (Zuckerman’s Sensation Seeking Scale) and the NEO-FFI big five. Personality traits were validated in an age- and ethnicity-matched subsample of “pure” gamblers without any psychiatric comorbidity (including nicotine dependence). Data were analyzed using two-sample t-tests, Chi² analyses, Fisher’s exact test and Pearson correlation analysis, as appropriate. Bonferroni correction was applied to correct for multiple comparisons.

Results: Only 1% of the gamblers had been diagnosed with an impulse control disorder other than gambling (ICD-10). Notably, 88% of the gamblers in our sample had a comorbid diagnosis of substance dependence. The highest axis I comorbidity rate was for nicotine dependence (80%), followed by alcohol dependence (28%). Early age of first gambling experience was correlated with severity of consequences later. Compared to controls, first-degree relatives of pathological gamblers were more likely to suffer from alcohol dependence (27.0% vs. 7.4%), pathological gambling (8.3% vs. 0.7%) and suicide attempts (2.7% vs. 0.4%). Significant group differences were observed for the NEO-FFI factors neuroticism, agreeableness and conscientiousness. Gamblers were also more impulsive than controls, but did not differ from controls in terms of sensation seeking.

Conclusions: Our findings support classifying pathological gambling as a behavioural addiction in the ICD-11. This decision will have a significant impact on the approaches available for prevention (e.g. age limits) and treatment.

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1. Introduction

Pathological gambling is a psychiatric condition with lifetime prevalence estimates of almost 1.0% for Germany [1] and 1.5% worldwide [2,3]. The disorder is characterized by persistent and recurrent gambling and is associated with impaired functioning, reduced quality of life, and high rates of suicide attempts [4].

Previous epidemiological studies have reported high frequency of other comorbid disorders in pathological gamblers: Data from two large epidemiological surveys in the United States, the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) [5] and the National Comorbidity Survey Replication (NCS-R) [2] found the highest odds ratios (ORs) of DSM-IV lifetime pathological gambling and other psychiatric axis I disorders for substance use disorders, in particular nicotine dependence.

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followed by alcohol use disorders. The second highest ORs were
found for mood disorders. The German epidemiological PAGEx
study which took into consideration additional data from n = 101 gamblers undergoing inpatient treatment [6] reported
comparable results [7]. Thus, epidemiological and clinical studies
consistently found increased rates of substance use disorders in
pathological gamblers.

Patterns of familial aggregation of psychiatric disorders may
shed light on similar underlying neurobiological mechanisms.
Family history of pathological gamblers has been studied by
Dannon et al. [8]. They report higher prevalence rates for alcohol
abuse, problematic gambling, depression, and anxiety disorders in
the group of pathological gamblers and their first-degree relatives
compared to the control group. These findings were further
supported by Black et al. [9] who found a co-aggregation of
pathological gambling and substance use disorders (among other
psychiatric conditions such as affective disorders) in first-degree
relatives of pathological gamblers compared to control’s relatives.
Black et al. also reported increased rates of compulsive buying in
pathological gamblers and their first-degree relatives compared
with controls and their relatives [10]. Another study in slot
machine gamblers reports a familial co-aggregation with parental
pathological gambling but not with alcohol or tobacco depen-


A study of 517 pathological gamblers (currently gambling)
found that those with at least one problem gambling parent were
more likely to have a father with an alcohol abuse/dependence
problem, have financial and legal problems and report daily
nicotine use [12]. These findings support the assumption of a
biological predisposition for addictive behaviours in general
including gambling and substance-related addictions. In a study of
non-treatment-seeking pathological casino gamblers interview-
ed in-site, a familial aggregation of pathological gambling was
supported. The risk for being a pathological gambler increased
threefold when at least one problem gambling parent existed. In
contrast to some previous studies that recruited gamblers with
different preferred types of games and in different settings, in this
sample no familial co-aggregation of pathological gambling with
alcohol or tobacco dependence was observed [11]. Despite some
discordance, family history studies suggest a familial co-aggre-
gation of substance use disorders and ‘behavioural addictions’ such
as pathological gambling and compulsive buying in pathological
gamblers.

Results are less consistent as far as personality characteristics
and traits are concerned. Studies have not yet led to a consensus
on whether self-reported sensation seeking (assessed with
Zuckerman’s sensation seeking scale), for example, is more
prevalent in pathological gamblers than in non-gambling
controls, e.g. [13,14] or whether gamblers are in fact low
sensation-seekers, e.g. [15–17] – as measured in some subscales
[18]. Yet, other studies have found no differences in sensation
seeking between pathological gamblers and nongamblers, e.g.
[19–22]. A recent meta-analysis found no signs of increased
sensation seeking (assessed with different questionnaires) in
pathological gamblers versus nonpathological gambling controls
(mean weighted effect of $d = 0.04$) [23].

Similar inconsistencies have been found for impulsivity as
measured with the Barratt Impulsivity Scale. While some studies
found increased impulsivity scores in pathological gamblers using
the Barratt Impulsivity Scale [24–27], others found significant
differences only for particular subscales such as non-planning
impulsiveness, e.g. [28] or no significant differences at all, e.g.
[29–31].

With respect to the “Big Five” personality traits, studies have
consistently found subjective score differences in openness to
experience, conscientiousness, agreeableness, and neuroticism
between pathological and non-problematic gamblers [32–34].
Another study revealed significant associations between high-risk
gambling and the personality traits openness and conscientious-
ness. However, these effects disappeared when comorbid drug
intake was taken into account highlighting the importance to
control for comorbid substance use disorders [35].

In summary, distinct lines of evidence on family history of
psychiatric disorders, psychiatric comorbidity and to a lesser
extent personality variables suggest similarities between patho-
logical gambling and substance use disorders. In line with these
data, pathological gambling, previously considered as an impulse
control disorder (ICD-10; DSM-IV), has been reclassified as
behavioural addiction under the category of “addictions and
related disorders” in the DSM-5 [36].

The new classification of pathological gambling as addiction
disease in DSM-5 is however under debate within the ICD
eleventh revision [37,38]. In addition to neurobiological informa-
tion, data on family history of psychiatric disorders, psychiatric
comorbidity and personality variables can provide further
scientific evidence for a well-informed decision especially when
such information derives from a well characterized large treatment
sample of pathological gamblers.

We studied detailed sociodemographic and gambling-related
characteristics with particular focus on psychiatric comorbidity,
family history of psychiatric disorders and personality charac-
teristics of pathological gamblers in treatment. We tested the
hypothesis that pathological gamblers reveal increased rates of
comorbid substance dependence but no differences in impulse
control disorder rates. We further hypothesized that first-degree
relatives of pathological gamblers exhibit higher rates of substance
dependence compared to first-degree relatives of healthy controls.
Last but not least, we expected to see personality profiling in
pathological gamblers resembling those in alcohol dependence.
Specifically, we expected to find increased impulsivity scores [39],
differences in all big five personality dimensions of the NEO-FFI
(i.e. higher neuroticism, lower extraversion, lower openness, lower
agreeableness and lower conscientiousness; [40]) and increased
sensation seeking scores [41]. Importantly, personality character-
istics have been shown to be modulated by various factors such as
psychiatric comorbidity [42], age [43], and ethnicity [44]. In their
majority, previous studies on personality traits in pathological
gamblers did not systematically take these factors into consid-
eration, which might explain heterogeneous findings. In our study,
we therefore assessed a subsample of “pure” gamblers (no
psychiatric comorbidity, non-smokers) and compared the findings
to healthy, non-smoking controls matched for age and ethnicity.

2. Methods

2.1. Study design and participants

The “Baden-Württemberg study on pathological gambling and
related disorders” was funded for a five years period (2009–2014)
by the federal state of Baden-Württemberg in South West Germany.
Patients and controls were recruited between March 2009 and
March 2012. We investigated several aspects of gambling such as
neurobiology [45–47], genetics [48], personality and clinical
aspects. For the clinical and personality aspects addressed in this
manuscript, we included data from n = 515 pathological gamblers
and n = 269 healthy controls. The pathological gamblers were
recruited consecutively from inpatient (n = 466 including day
clinic) and outpatient (n = 49) public treatment centres following
presentation for treatment of pathological gambling. Patients from
the following institutions were included: Klinikum Reutlingen
(n = 256), ACG Hohenheim (n = 164).

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