AKADÉMIAI KIADÓ

Journal of Behavioral Addictions

10 (2021) 3, 690–700

DOI:
10.1556/2006.2021.00043

FULL-LENGTH REPORT

Changes in gambling behaviour and related problems in clients seeking help in outpatient addiction care: Results from a 36-month follow-up study in Bavaria

ANDREAS M. BICKL[1*], LARISSA SCHWARZKOPF[1], JOHANNA K. LOY[1], BETTINA GRÜNE[2], BARBARA BRAUN-MICHL[1], PAWEL SLECZKA[3,4], JENNY CISNEROS ÖRNBERG[5] and LUDWIG KRAUS[1,5,6]

[1] IFT Institut für Therapieforschung, München, Germany

[2] German Youth Institute (DJI), Department of Youth and Youth Services, München, Germany

[3] German University of Health and Sport, Ismaning, Germany

[4] Seeburg Castle University, Seekirchen am Wallersee, Austria

[5] Department of Public Health Sciences, Centre for Social Research on Alcohol and Drugs, Stockholm University, Stockholm, Sweden

[6] Institute of Psychology, ELTE, Eötvös Loránd University, Budapest, Hungary

Received: February 9, 2021 • Revised manuscript received: June 9, 2021 • Accepted: June 13, 2021
Published online: July 28, 2021

ABSTRACT

Background and aim: Evidence on the course of gambling disorder (GD) in clients seeking help from outpatient addiction care facilities is sparse. To close this knowledge gap, this longitudinal one-armed cohort study portrays the development of GD in help-seeking clients over a 3-year timeframe. *Methods:* We investigated changes in severity of GD as well as in gambling frequency and intensity in 145 gamblers in outpatient treatment in Bavaria using generalized estimation equations (GEEs). To investigate potentially different trajectories between study participants with and without migration background (MB), additional analyses were applied with time*migration interaction. All analyses were adjusted for age, gender, education, electronic gambling machine (EGM) gambling, MB, GD, related help sought before and treatment status. *Results:* Within the entire study population, improvements in severity of GD (reduction of 39.2%), gambling intensity (reduction of 75.6%) and gambling frequency (reduction of 77.0%) were observed between baseline and 36 months of follow-up. The declines were most pronounced between baseline and follow-up 1 and stabilized thereafter. Participants with MB improved consistently less than participants without MB. *Discussion and conclusion:* Our study suggests that severity of GD and gambling patterns improve in the context of outpatient treatment. The beneficial results furthermore persist for 36 months after treatment termination. As clients with MB seem to profit less than clients without MB, improvements in outpatient gambling services to the specific needs of this clientele are required.

KEYWORDS

gambling disorder, outpatient addiction care, longitudinal study, migration background

*Corresponding author.
E-mail: bickl@ift.de

INTRODUCTION

Current studies on gambling disorder (GD) report prevalence estimates between 0.3% and 0.5% for the German adult population (Banz, 2019). Considering the severe individual and societal consequences, treatment is indispensable from an individual and societal perspective

(Becker, 2011). German outpatient addiction care facilities (OACFs) are mainly community financed offering service for individuals seeking help for addiction-related problems. The service is free of charge and provides a relatively low threshold access to highly need-driven individualized treatment. OACF services greatly differ in content alignment and staff training. The main treatment concepts consist of motivational interviewing techniques and talk therapy. Some OACFs also offer manual-based outpatient rehabilitation. These concepts mandatorily contain individual and group-based psychotherapy, debt-counselling, physician-based care, socio-therapeutic interventions, and relaxation techniques. Whenever required clients are referred to specialist inpatient or outpatient (psycho-therapeutic) interventions (Meyer & Bachmann, 2017). OACFs ease entry into the addiction care system for help-seeking individuals, allowing them to overcome shame and stigmatization (Braun, Ludwig, Kraus, Kroher, & Bühringer, 2013). Against the background of the provision of such heterogeneous treatment services, OACFs are an important key element in the addiction system, considering that they enable individual help to the greatest possible extent. Although there has been increased development and expansion of outpatient care services since the German State Gambling Treaty came into force in 2008, there is still little evidence whether the treatments fulfil their innate purpose to mitigate gambling-related problems. As OACFs are easily accessible for help-seeking clients and thus play a major role in the treatment of GD (Premper & Schulz, 2008), they require continuous and in-depth research to improve care offers, especially as follow-up data are sparse for services other than rehabilitation (Braun et al., 2013).

Metareviews have demonstrated the effectiveness of several psychological outpatient-related treatment approaches (Cowlishaw et al., 2012; Lopez Viets & Miller, 1997; Toneatto & Ladoceur, 2003), but with different methodological caveats (small sample sizes, irregular observation periods, etc.). One of the few longitudinal examples for an outpatient setting was a multimodal GD treatment approach with follow-up assessments after 6 and 12 months. In this study, treatment was associated with improvements in various areas such as gambling frequency, severity of GD, psychosocial condition or financial problems (Stinchfield & Winters, 2001). An earlier Germany-based evaluation indicated that outpatient gambling treatment is helpful, as – after an average follow-up period of 1.9 years – clients reported improved psychosocial wellbeing and mitigated gambling behaviour (J. Petry, 2001).

Several individual and environmental factors have been identified as affecting both severity of GD and GD treatment (Johansson, Grant, Kim, Odlaug, & Gotestam, 2009). In this regard, migration background (MB) plays an important role: studies in Germany found more persistent and maladaptive gambling behaviour among people with MB than among those without MB (Haß, Orth, & Lang, 2012; Kastirke, Rumpf, John, Bischof, & Meyer, 2015). Thus, there might be culture-specific usage, expectations and attitudes towards gambling or acculturation problems (Tuncay, 2010), that impact the trajectories of GD and have different requirements for effective gambling treatment.

Although research suggests that GD is a treatable condition (Cowlishaw et al., 2012; Lopez Viets & Miller, 1997; N.M. Petry 2005), it can be observed that there has been overly strong focus on the evaluation of specific treatment modalities while losing sight of the structural- and process-related variables of the client's and facilities' real-world settings (Sulkunen et al., 2018). Re-adjustment to such a level could benefit policy-making, when considering its population-wide implications.

In summary, the outpatient-embedded course of GD during and after treatment has not been comprehensively elucidated – particularly not for people with MB. Closing this knowledge gap might contribute to a better understanding of factors facilitating recovery and might help to identify subgroups of clients with distinct treatment needs. Using longitudinal data from gamblers in outpatient treatment, the present study aims to (1) identify factors that are associated with baseline gambling behaviour and problems (severity of GD, gambling intensity, gambling frequency), (2) analyse longitudinal patterns of gambling behaviour and problems and (3) investigate whether longitudinal profiles differ between people with and without MB.

METHODS

Design and setting

Data were collected within the 'Katamnese-Studie', a prospective, naturalistic cohort study covering GD in the context of German outpatient addiction care. The study was conducted within 28 Bavarian OACFs between 2014 and 2019. Participants received written questionnaires at admission and at 6-, 12-, 24- and 36-month follow-up to assess gambling behaviour, socio-demographic data, gambling-related consequences, and treatment offers sought. These data were linked to client-individual routine documentation for the German Addiction Care Statistical Service. Further details of the study design, instruments used, and methodological approach have been published elsewhere (Schwarzkopf et al., 2021).

Study participation

Adults with sufficient German language skills and a minimum of three contacts with the respective OACF were eligible for participation. During the recruitment period (12/2014-08/2016), 1,159 incident clients were documented in the participating OACFs. Of these, all 615 persons (53.6%) meeting the inclusion criteria were invited to participate in the study. Out of these eligible persons, 199 (32.4%) provided informed consent. Of the recruited participants 15 (7.5%) subsequently withdrew their consent, 38 (17.6%) did not participate in the baseline survey and one person could not be contacted because of an unknown address. Thus, the baseline sample comprised 145 persons. Client-specific data on severity of GD, gambling behaviour (frequency and intensity), gambling activity, MB and socio-demographic data were collected.

Measures

Assessments were conducted at baseline and four consecutive waves covering a patient-individual 3-year interval (Fig. 1). Data were obtained from participants' self-reports (baseline to follow-up 4), a staff survey with employees from the participating OACFs (baseline) and facilities' routine documentation of treatment and client characteristics (baseline until end of care episode or follow-up 2, whichever came first).

Outcome variables. *Severity of GD* was assessed by calculating the sum score of DSM-5 criteria fulfilled at each assessment point with a maximum score of 9 using a DSM-5 adapted version of the Stinchfield criteria (Stinchfield, 2003). *Gambling frequency* was assessed by the average number of gambling days per week. *Gambling intensity* was assessed by the average number of hours spent gambling per gambling day. All measures stem from the participants' self-reports and refer to time since last assessment point or to the last 12 months (for baseline).

Covariables. Self-reported *gambling involvement* accounted for electronic gambling machines (EGMs), traditional casino games, lottery tickets, lotteries, pools, television lottery, class lottery, bets on horses, sports bets at licensed retailers, online sports bets, online poker/card games, other forms of online gambling, speculation on the stock exchange, illicit forms of gambling and gambling with family and friends. For each type, a utilization frequency of at least once per week was defined as regular use. As EGMs represent one of the most prominent and harmful gambling types with strong demand within the population of help-seeking individuals (Binde, 2011; Braun et al., 2013), involvement in different gambling types was dichotomized as *gambling EGMs* versus gambling any other type(s).

Educational background represents a relevant factor in GD development (Scherrer et al., 2007) as well as in treatment utilization (Braun, Ludwig, Sleczka, Buhringer, & Kraus, 2014). Self-reported educational background was assessed using the International Standard Classification of Education (ISCED) Index (UNESCO, 2012) (1. Lower secondary education; 2. Upper secondary education; 3. Post-secondary/non-tertiary education; 4. Tertiary education). Owing to the small sample size, post-secondary and tertiary education were combined into one category.

To address previous contacts with gambling care, self-reported information on *GD-related help sought before the study* (0. No; 1. Yes) was collected.

Treatment status was obtained from the facilities' routine documentation via the Germany-wide standardized core dataset of addiction care (German Centre for Addiction Issues, 2010) to differentiate between study dropout and treatment termination. For each assessment point, a trichotomized variable was created with information on clients still in treatment, regular termination and irregular termination. As information on treatment termination was only available until follow-up 2, we adopted a conservative perspective by assuming that all participants without information on date of treatment termination remained under treatment until follow-up 4.

Self-reported *MB status* indicated whether a participant had migrated to Germany her/himself or whether (s)he was born in Germany as a (grand)child of people who had immigrated into the country (Strupf, de Matos, Soellner, Kraus, & Piontek, 2017).

Self-reported age (in years) and sex were used as standard demographic covariates.

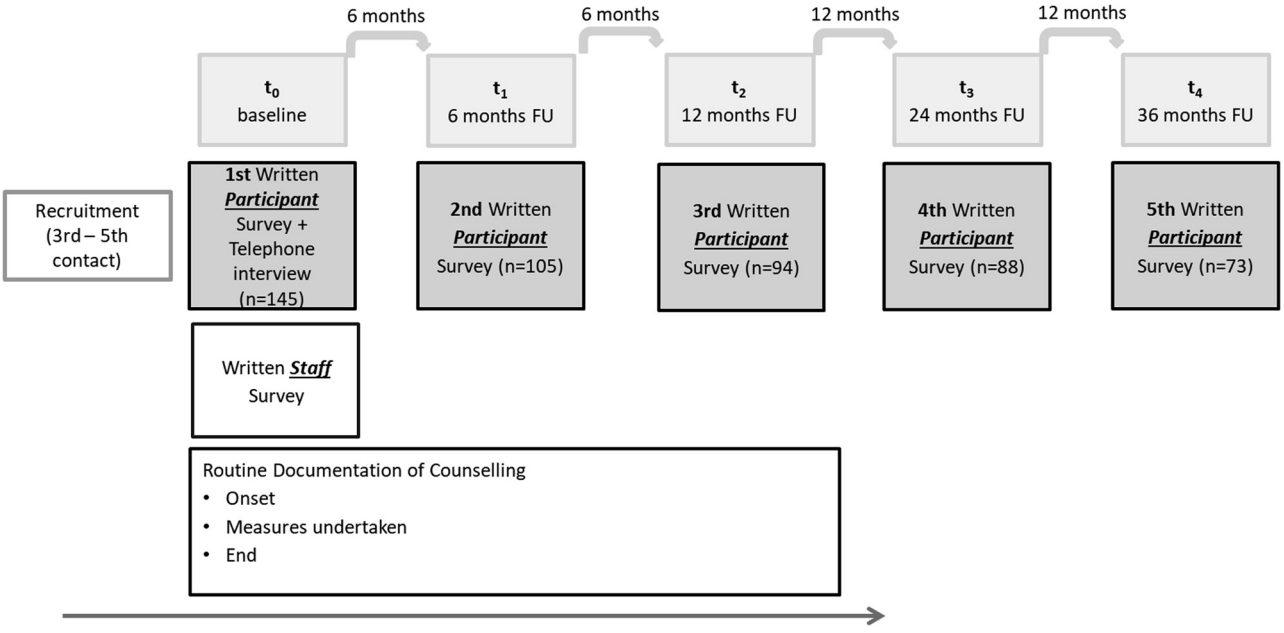

Fig. 1. Points and types of data assessment

Data analysis

The study population was characterized by summary statistics (means or percentages) at baseline comparing completers and dropouts as well as completers with and without MB regarding demographic and gambling characteristics using χ^2- and *t*-tests. Study dropouts included participants who no longer participated in any of the follow-ups.

To address impact factors at baseline, severity of GD, gambling intensity and gambling frequency were separately regressed on EGM preference, GD-related help sought before, sex (reference: female), MB, age, and education (reference: lower secondary education) using a Poisson regression model.

To address longitudinal changes in severity of GD and gambling behaviour, unadjusted mean values for the distinct outcomes were described at each assessment point. In a second step, model-based changes were estimated and visually examined for time trends. To account for the longitudinal nature of the data, dropout and the intra-subject correlation, a generalized estimation equation (GEE) approach was chosen (Zeger & Liang, 1986), representing a marginal model with robust parameter estimates focusing on population averages instead of subject-specific trajectories (Ballinger, 2016; Zeger & Liang, 1986). As we assumed a stronger correlation of current reported gambling indicators with recent gambling behaviour than with gambling behaviour at previous time points, first-order autoregression was chosen as working correlation (Ghisletta & Spini, 2004). All outcomes were operationalized as count data and analysed using a negative-binomial regression with log-link to reduce overdispersion (Rodrıguez, 2013).

Longitudinal changes were visualized in the form of predicted probabilities (Williams, 2018) and incidence rate ratios (IRR). Analyses were adjusted for treatment status (reference: regular termination), GD-related help sought before, education (reference: lower secondary education), EGM preference, age, and sex (reference: female).

GEE analyses were repeated for the stratum with and the one without MB. Finally, a time*migration interaction term was calculated and tested using Wald χ^2-test to analyse whether longitudinal trends differed between participants with and without MB.

To examine the robustness of our results, inverse probability weighted GEE models and random-effects Poisson models were applied as sensitivity analysis (Daza, Hudgens, & Herring, 2017) (Table A2). The inverse probability weighting (IPW) procedure relies on estimating the probability of the exposure observed for a particular person and using the predicted probability as a weight in subsequent analyses to account for loss-to-follow-up bias. All statistical analyses were conducted using Stata/SE 15 (Stata Corp LP; College Station, TX, USA). An alpha level of 0.1 was used to account for the small sample size.

Ethics

The study received ethical approval from the ethics committee of the German Association of Psychology (reference number: LK092014).

RESULTS

Study participation and demographic characteristics

Baseline assessment was completed by 145 clients, 105 (72.4%) responded to follow-up 1, 94 (64.8%) to follow-up 2, 88 (60.7%) to follow-up 3 and 73 (50.3%) to follow-up 4. A total of 65 clients participated in all four follow-ups. At baseline, 29.7% ($n = 43$) had a MB. This proportion was 28.6% ($n = 30$) at follow-up 1, 28.7% ($n = 27$) at follow-up 2, 26.1% ($n = 23$) at follow-up 3 and 23.7% ($n = 17$) at follow-up 4. This corresponded to dropout rates of 33.8% for clients with MB and 66.2% for clients without MB.

As summarized in Table 1, study participants were on average 36 years old, 86.9% were male and 76.6% and had a lower educational background. At baseline, 78.4% ($n = 109$) reported gambling EGMs and 85.3% ($n = 122$) had previously sought GD-related help. Study completers and dropouts were comparable with three exceptions: dropouts were more often gambling on EGM, had a lower education level than completers and a slightly higher gambling frequency (Table 1). At follow-up 1, 14.3% ($n = 15$ of 105) and at follow-up 2 7.5% ($n = 7$ of 94) were still in treatment. At baseline, 98.6% ($n = 140$) fulfilled the DSM-5 criterion for presence of a GD. At follow-up 4, this proportion had decreased to 56.3% ($n = 40$).

Clients with and without MB did not differ with respect to age, gender, baseline gambling indicators and previous treatment. However, they had a lower education level and reported gambling more often on EGM than clients without MB (Table 2). In comparison, 10% ($n = 3$) of the 30 remaining clients with MB and 16.4% ($n = 12$) of the remaining 75 clients without MB were still in treatment at follow-up 1. For follow-up 2, the rates dropped to 3.9% ($n = 1$) for the remaining 27 clients with MB and to 9.2% ($n = 6$) for the remaining 67 clients without MB.

Factors predicting gambling behaviour and problems at baseline

The results of the Poisson regression of various risk factors are shown in Table 3. Only EGM involvement (IRR = 1.08; $P < 0.10$) and being male (IRR = 0.95; $P < 0.10$) were significantly associated with *severity of GD*. For *gambling frequency*, associations were found for MB (IRR = 0.84; $P < 0.10$) and age (IRR = 0.99; $P < 0.05$). No significant associations were found for *gambling intensity*.

Longitudinal changes in gambling behaviour

Unadjusted mean values of severity of GD, gambling intensity and gambling frequency for the entire sample and stratified for clients with and without MB revealed that the most pronounced changes took place between baseline and follow-up 1 (Table A1). These changes were consistently less pronounced among clients with MB than among clients without MB.

Table 1. Distribution of demographic variables, gambling type preference, help sought before, treatment status and gambling indicators at baseline for completers and dropouts

Variables	Baseline (n = 145)*	Completer (n = 65)*	Dropouts (n = 80)*	Comparison test	Associated probability
Gender, *n (%) of females*	19 (13.1%)	7 (10.8%)	12 (15%)	0.56[b]	0.453
Age	n = 143	n = 65	n = 78	1.10[a]	0.273
M (*SD*)	36.2 (10.7)	37.3 (11.0)	35.3 (10.5)		
Educational background, *n (%)*				12.47[b]	0.002
Lower secondary education	29 (20.0%)	9 (13.9%)	20 (25%)		
Upper secondary education	82 (56.6%)	32 (49.2%)	50 (62.5%)		
Post-secondary non-tertiary education	7 (4.8%)	6 (9.2%)	1 (1.3%)		
Tertiary education	27 (18.6%)	18 (27.7%)	9 (11.2%)		
Migration background, *n (%)*				1.43[b]	0.231
Yes	43 (29.7%)	16 (24.6%)	27 (33.8%)		
No	102 (70.3%)	49 (75.4%)	53 (66.2%)		
Most played gambling activity, *n (%)*	n = 139	n = 60	n = 79	8.61[b]	0.003
EGMs	109 (78.4%)	40 (66.7%)	62 (86.3%)		
Previous treatment for GD, *n (%)*	n = 143	n = 64	n = 79	2.61[b]	0.106
Yes	122 (85.3%)	58 (90.6%)	64 (81%)		
No	21 (14.7%)	6 (9.4%)	15 (19%)		
Treatment status at follow-up 3, *n (%)*		n = 64	n = 74	1.72[b]	0.424
Still in treatment		3 (4.7%)	6 (8.1%)		
Regular termination		26 (40.6%)	23 (31.1%)		
Irregular termination		35 (54.7%)	45 (60.8%)		
Gambling indicators					
Fulfilled criteria of GD	n = 142	n = 64	n = 78	–0.60[a]	0.553
M (*SD*)	7.9 (1.4)	7.8 (1.5)	7.9 (1.2)		
Gambling hours per day	n = 138	n = 60	n = 78	–1.19[a]	0.238
M (*SD*)	6.8 (3.5)	6.4 (3.6)	7.1 (3.4)		
Gambling days per week	n = 134	n = 58	n = 76	2.10[a]	0.038
M (*SD*)	3.7 (1.8)	3.1 (2.0)	3.4 (1.5)		

*For some analyses, n differ due to missing data and are reported separately.
[a]Student's t-test for interval variables; [b]Pearson chi-square test for ordinal and nominal variables. GD = Gambling disorder.

Model-based predictions for the three gambling indicators

For all three indicators, statistically significant reductions between baseline and follow-up 4 were observed with changes being most pronounced between baseline and follow-up 1 ($P < 0.05$) (Table A2). In the subsequent follow-ups, values stabilized at around the level of follow-up 1 (Fig. 2a–c).

Moreover, there was a statistically significant time*MB interaction for severity of GD ($P < 0.01$) and gambling intensity ($P < 0.05$), but not for *gambling frequency* ($P > 0.1$), indicating different profiles of clients with and without MB. As portrayed in Fig. 3a and b, clients without MB experienced a more sustained decline in severity of GD and gambling intensity. In contrast, clients with MB experienced a minor decline between baseline and follow-up 1, but values stayed rather stable across the subsequent follow-ups. As depicted in Fig. 3c, the reduction in gambling frequency was less pronounced in clients with MB. Only clients without MB experienced a sustained reduction after follow-up 1, whereas there was a slight upwards trend in clients with MB from follow-up 2 onwards. However, these differences were not statistically significant.

Sensitivity analysis

The weighted GEE models and random-effects Poisson models by and large confirmed the results of the main analysis with some exceptions (Table A2).

Weighted GEE: For *gambling* severity, being still in treatment gained statistical significance, education levels lost statistical significance and MB and gender lost statistical significance. For *gambling intensity*, EGM preference gained statistical significance and an irregular termination lost statistical significance. For *gambling frequency*, being still in treatment gained statistical significance, MB gained statistical significance and age lost statistical significance. Wald χ^2-tests for the time*migration interaction term became more pronounced.

Random-effects Poisson model: For *gambling severity*, previous treatment and education levels lost statistical significance. For *gambling* intensity, EGM preference gained statistical significance and previous treatment and irregular termination lost statistical significance. For *gambling frequency*, MB gained statistical significance and age lost statistical significance. Again, Wald χ^2-tests for the time*migration interaction term became more pronounced.

Table 2. Distribution of demographic variables, gambling type preference, help sought before, treatment status and gambling indicators for clients with and without MB

Variables	MB (n = 43)*	Without MB (n = 102)*	Comparison test[a]	Associated probability
Gender, *n (%) of females*	7 (16.3%)	12 (11.85)	0.54[b]	0.462
Age	n = 43	n = 100	0.72[a]	0.473
M (*SD*)	35.2 (10.3)	36.6 (10.9)		
Educational background, *n (%)*			13.01[b]	0.005
Lower secondary education	16 (37.2%)	13 (12.8%)		
Upper secondary education	22 (51.2%)	60 (58.8%)		
Post-secondary non-tertiary education	1 (2.3%)	6 (5.9%)		
Tertiary education	4 (9.3%)	23 (22.6%)		
Most played gambling activity, *n (%)*	n = 43	n = 96	5.55[b]	0.019
EGMs	39 (90.7%)	70 (72.9%)		
Previous treatment for GD, *n (%)*	n = 41	n = 102	0.26[b]	0.609
Yes	34 (82.9%)	88 (86.3%)		
No	7 (17.1%)	14 (13.7%)		
Treatment status at follow-up 3, *n (%)*	n = 38	n = 100	4.00[b]	0.135
Still in treatment	0	9 (9%)		
Regular termination	13 (34.2%)	36 (36%)		
Irregular termination	25 (65.8%)	55 (55%)		
Gambling indicators				
Fulfilled criteria of GD	n = 43	n = 99	–1.75[a]	0.083
M (*SD*)	8.2 (1.0)	7.8 (1.5)		
Gambling hours per day	n = 43	n = 95	0.41[a]	0.682
M (*SD*)	6.6 (3.3)	6.8 (3.6)		
Gambling days per week	n = 40	n = 94	1.56[a]	0.122
M (*SD*)	3.4 (1.8)	3.9 (1.7)		

*For some analyses, n differ due to missing data and are reported separately.
[a]Student's t-test for interval variables; [b]Pearson chi-square test for ordinal and nominal variables. GD = Gambling disorder. MB = Migration background

DISCUSSION

The present study investigated trends in gambling behaviour and severity of GD in clients seeking help for gambling-related problems in Bavarian OACFs over a period of 3 years. Analyses found that EGM preference was associated with higher severity of GD at baseline, whereas MB was associated with lower gambling frequency. Longitudinal observations demonstrated short- as well as medium-term reduction in severity of GD and gambling involvement among gamblers in outpatient addiction treatment. These reductions were less pronounced in clients with MB than in clients without MB.

Explanations of these findings must consider the design-related caveat of the Katamnese study as a one-armed observational study, rendering the resulting trends suggestive rather than causal in nature. Different reviews in (un-) controlled settings have already demonstrated that GD is a treatable condition and that individuals respond well to treatment modalities. Thus, it was concluded that behavioural changes are most likely to be attributable to treatment (Ladouceur, 1994; Lopez Viets & Miller, 1997; Toneatto & Ladoceur, 2003). However, the phenomenon of spontaneous remission, which is not unusual among people with GD (Slutske, Blaszczynski, & Martin, 2009), may introduce the risk of overestimating longitudinal changes in uncontrolled designs. According to the literature, spontaneous remission appears to be more likely among people with GD who have little or no recourse to professional help at all (with low rates of 10–20% for people with previous recourse to professional help) and for those with only minor signs of pathological gambling behaviour (Meyer et al., 2011; Slutske, 2006; Toneatto et al., 2009). As the characteristics of GD and the psychosocial burden of people seeking outpatient treatment resemble those of people in inpatient treatment (Braun et al., 2013), spontaneous remission presumably played a minor role in our sample, especially when looking at our DSM-5 score of 7.9 at baseline. Based on previous evidence and acknowledging the possibility of spontaneous remission, we assume that the reductions in gambling indicators observed in our study mark a threshold for the effect of the outpatient intervention under controlled conditions.

In our sample, completers had a higher education status than dropouts. Regarding the association between ongoing treatment status and education, this results rather from the generally long study period than higher problem awareness among the better educated, as indicated by our sensitivity analyses. In addition, results indicate that those with MB had a slightly higher problem severity at baseline than those without MB, which is consistent with the general observation that there is a higher proportion of problematic

Table 3. Poisson regression of demographic variables, gambling involvement and GD-related help sought before on gambling indicators at baseline

Variables	Severity of GD Poisson (IRR)	Gambling hours per day Poisson (IRR)	Gambling days per week Poisson (IRR)
Gender			
Female	REF	REF	REF
Male	0.95*	0.98	0.97
	(0.03)	(0.13)	(0.11)
Age	1.00	0.99	0.99**
	(0.00)	(0.00)	(0.00)
Educational background			
Lower secondary education	REF	REF	REF
Upper secondary education	0.98	0.94	0.89
	(0.03)	(0.11)	(0.10)
Post-secondary/ tertiary education	1.03	0.84	1.02
	(0.04)	(0.12)	(0.13)
Migration background			
No	REF	REF	REF
Yes	1.03	0.95	0.84*
	(0.03)	(0.09)	(0.09)
EGMs (Dummy)			
Everything besides EGM	REF	REF	REF
EGM player	1.08*	0.88	0.94
	(0.05)	(0.11)	(0.10)
Previous treatment for GD			
No	REF	REF	REF
Yes	1.02	0.91	0.85
	(0.03)	(0.09)	(0.09)
Observations	133	133	129

Standard errors in parentheses; *** $P < 0.01$, ** $P < 0.05$, * $P < 0.10$. GD = Gambling disorder. IRR = Incidence rate ratio

gamblers among individuals who themselves or whose antecedents immigrated than among individuals who did not (Williams, Volberg, & Stevens, 2012).

Our findings support existing evidence on the high-risk potential of EGMs for the development of problematic gambling behaviour over time (Breen & Zimmerman, 2002; Dowling, Smith, & Thomas, 2005), as an association was found for gambling severity. Game characteristics such as event frequency, short payoff intervals, control illusions and near misses disguised as wins are evident in this form of gambling, enhancing problematic gambling behaviour (Schüll, 2012). However, no associations between EGM involvement and gambling intensity or frequency were found, which can be explained in the sense that the characteristics of EGMs do not automatically entice to more frequent and intense gambling sessions and that a more differentiated view on gambling types within their context might be the key. However, lower baseline frequency was found for clients with MB than for clients without MB. The reason for this counterintuitive association remains unclear, considering that particular offers of the gambling industry seem to fit well with the leisure time behaviour of certain cultural milieus, such as for example the tearoom-resembling design of betting rooms (Tuncay, 2010). Nevertheless, different characteristics of milieu- and culture-specific conditions (e.g. disposable income, social networks, language barriers, cultural dimensions such as stigmatization) in association with culture-specific gambling practices could lead to such differences.

Our longitudinal analysis identified sustained improvements in gambling frequency, gambling intensity and a reduction in the severity of GD, with changes being most pronounced 6 months after enrolment and reductions remaining rather stable over subsequent follow-ups. Similar improvements were observed in other longitudinal substance disorder treatment studies such as the MATCH study (Babor & Del Boca, 2003). Motivation and willingness to change were reported to be significant predictors of change. Since these are particularly enhanced by motivational therapy approaches often used in outpatient therapy, an immediate learning effect can be theorized, which is likely to manifest itself in behavioural changes in the early stage of treatment before stabilization takes place. The subsequent stabilization presumably reflects a tapping of client-individual potentials and a completion of the treatment-related learning curve.

Our results can also be compared with an earlier outpatient study, using a multidimensional success criterion (Klepsch et al., 1989). Patients were classified as successful when, subjectively and retrospectively, both their gambling behaviour and their psychosocial adjustment improved by at least 25% compared with the time before outpatient treatment. Based on three samples (1. $n = 28$; 2. $n = 84$; 3. $n = 50$), success rates of 40–54% were found in relation to the overall sample. Even though our reduction rates of 39.2% for gambling severity, 75.6% for gambling intensity and 77% for gambling frequency might be overoptimistic considering the imperfectly solved issue of model overdispersion, they point in a similar direction. Given the sparse research body on medium-term outcomes of outpatient gambling treatment, our results indicate an empirically evident success of outpatient treatment.

It must be noted that, at the end of the study, more than half the participants (56.3%) still fulfilled the diagnostic criteria for GD, with an even higher rate (93.8%) for clients with MB. When considering the high dropout rates in the outpatient sector (Braun et al., 2013), it becomes clear that outpatient therapy seems to have its limits. Owing to the serious nature of the problem, it can be assumed that further treatment is needed in most cases.

Clients with and without MB profited from outpatient gambling treatment. However, clients with MB improved less and were also less stable than clients without MB, particularly between follow-up 2 and follow-up 4. Using the prevalence of individuals with MB in the general population as reference, Rommel and Köppen (2016)

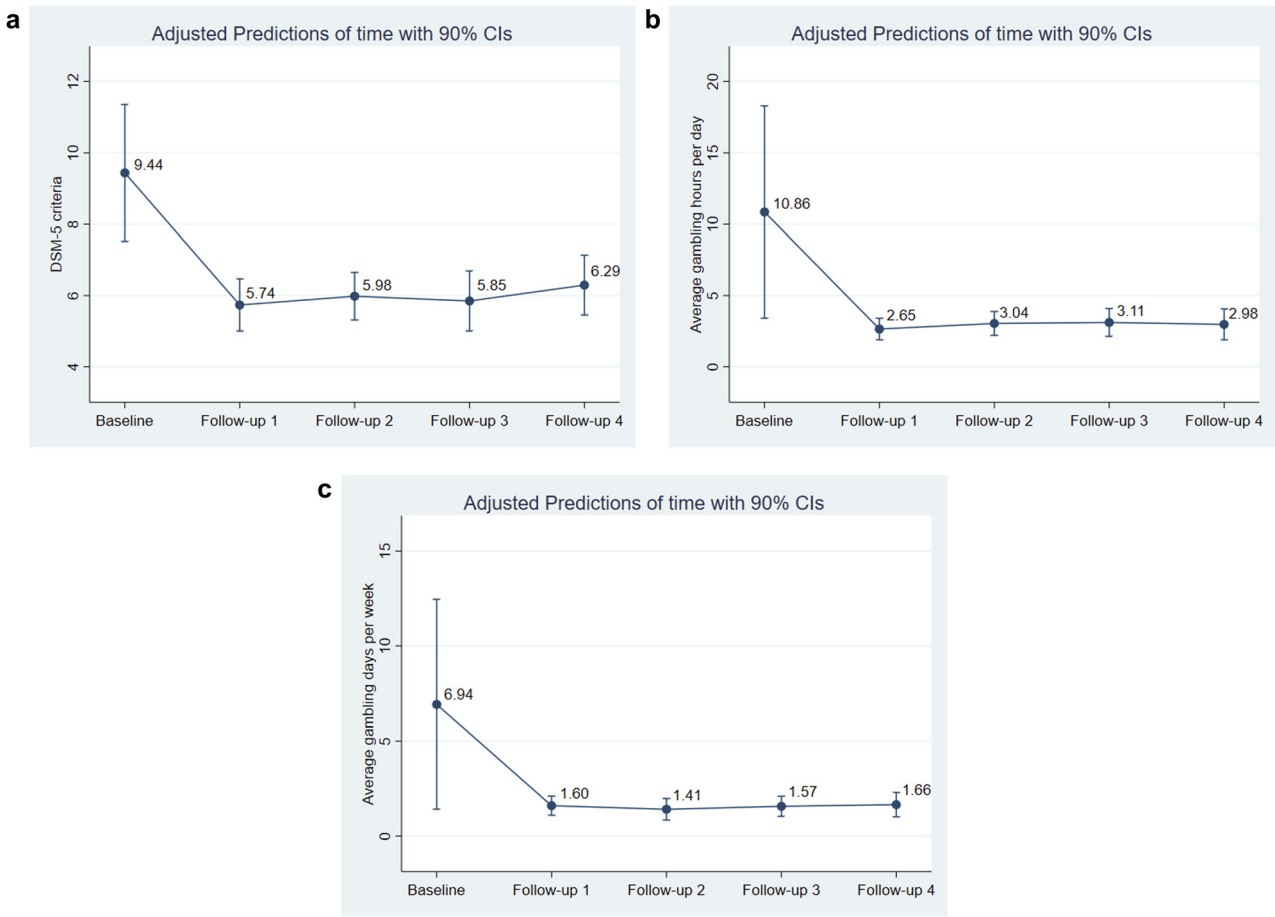

Fig. 2. a: Model-based trajectory of severity of GD. b: Model-based trajectory of gambling intensity. c: Model-based trajectory of gambling frequency

reported German born clients with MB to be over-represented in OACFs. This suggests that MB per se is not an obstacle to accessing outpatient gambling care. Rather, treatment offers may not fully match the (culture-)specific needs of clients with MB (Rommel & Köppen, 2016). For instance, in the treatment of gamblers from an oriental background, community-driven life constellations, role patterns, cultural standards of conduct, concepts such as honour, shame and religion as a value-giving system ought to be addressed in the treatment setting to foster effective understanding, trust building and change in behaviour (Bensel & Tuncay, 2013). Furthermore, language barriers often impede identification of the client's needs, which limits treatment success. Improvements may be achieved through the provision of culture-specific and multilingual information material, telephone hotlines and online offer-raising. Finally, the integration of therapists specialized in culturally sensitive therapy could reduce language and cultural barriers (Raylu & Oei, 2004).

Limitations and strengths

In addition to the observational uncontrolled design, other limitations of our study need to be considered. During recruitment in 28 Bavarian OACFs over one year, clients with insufficient language skills and clients with less than three contacts had to be excluded from the study resulting in a baseline sample of only 145 clients. The latter criterion was chosen to exclude clients with ambiguous willingness to undergo comprehensive care. Although the dropout rate was satisfactory (50.3% at follow-up 4), prediction models resulted in quite large confidence intervals and thus not significant results, even though visualizations of the longitudinal gambling patterns suggest structural differences. Moreover, although we accounted for the distribution of our count data outcomes by choosing a negative-binomial assumption, our models suffered from overdispersion resulting in overestimation of baseline values. Hence, the level of change is most probably overestimated. Third, in the absence of full information on treatment termination, we cannot fully exclude the possibility that the observed stabilization of all three gambling indicators in the mid-term was the result of ongoing treatment rather than an indicator of the sustainability of short-term treatment. However, as the comparison of completers and dropouts regarding treatment status as well as additionally checked treatment status*time interaction terms showed no statistical significance, this influence is considered negligible.

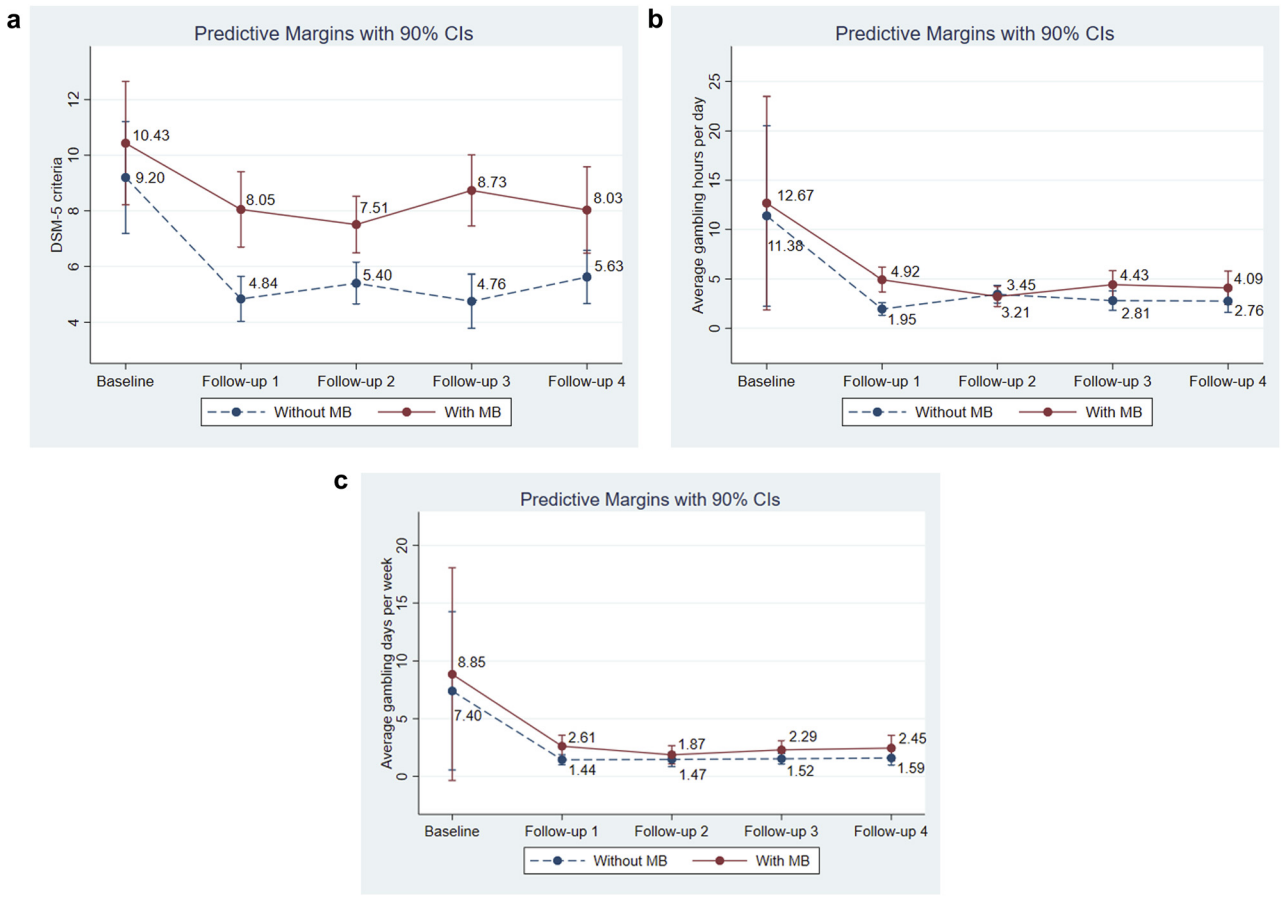

Fig. 3. a: Model-based trajectory of severity of GD by MB status. b: Model-based trajectory of gambling intensity by MB status. c: Model-based trajectory of gambling frequency by MB status

The main strength of our study is its unique focus on outpatient gambling care, contributing insight to the entire spectrum of care services provided within the German health and social care system. Furthermore, it provides information over a period of 3 years after treatment initiation, which is a longer follow-up period than usually applied in research on inpatient gambling care (Müller et al., 2017; J. Petry 2001). Moreover, the naturalistic design of our study has a high degree of external validity as it follows help-seeking clients in a real-world setting. Finally, with a time span of 36 months of follow-up, the study mirrors a longer follow-up period than most previous studies (J. Petry 2001; Steffen, Werle, Steffen, Steffen, & Steffen, 2012).

CONCLUSIONS AND FURTHER RESEARCH

In conclusion, our study revealed that severity of GD as well as gambling frequency and intensity declined in the context of outpatient gambling treatment. These improvements also persisted medium-term, suggesting that outpatient gambling care has beneficial implications even after termination. As these beneficial effects can only be interpreted in terms of relative improvements, it is important to clarify which clients need more intensive treatment than others. The focus switch on treatment regimes instead of on gross effects could therefore help to enable a more targeted treatment offer.

Finally, the broad range of different outpatient care offers apparently does not yet address the needs of individuals with MB equally as well as those without MB. Further understanding of socio-cultural background conditions for people with MB and potential barriers to successful gambling care are therefore of utmost importance to further develop meaningful care concepts for this target group.

Funding sources: This study was conducted in the context of the Bavarian Coordination Centre for Gambling Issues (Bayerische Landesstelle Gluecksspielsucht (LSG)). The LSG is funded by the Bavarian State Ministry of Public Health and Care Services. The State of Bavaria provides gambling services (lotteries, sports betting and casino games) within the State gambling monopoly via the State Lottery Administration and provided funding for the Bavarian Coordination Centre for Gambling Issues as an unrestricted grant. Support for LK and JCÖ came from the Swedish programme grant 'Responding to and Reducing Gambling Problems – Studies in Help-seeking, Measurement, Comorbidity and

Policy Impacts' financed by the Swedish Research Council for Health, Working Life and Welfare (Forte), grant number 2016-07091.

Authors' contribution: LK, BG and BBM designed the study including data to be assessed and measures to be applied. AB and LS conducted the statistical analyses and wrote the first draft of the manuscript. All authors critically contributed to earlier drafts of the manuscript and approved the final version of the paper.

Conflict of interest: The authors report no financial or other relationship relevant to the subject of this article.

Acknowledgments: The authors thank the participating outpatient care facilities of the Bavarian Competence Network of Gambling Issues for smooth cooperation in the context of conducting the study. We especially acknowledge the study participants' willingness to take part in the 'Katamnese-Studie' from enrolment to end of follow-up. We furthermore express our heartfelt thanks to our colleagues Lucia Sedlacek, Francesca Linke and Marieke Neyer, who provided advice and support in conducting the study or drafting this paper.

SUPPLEMENTARY MATERIAL

Supplementary data to this article can be found online at https://doi.org/10.1556/2006.2021.00043.

REFERENCES

Babor, T. F., & Del Boca, F. K. (2003). *Treatment matching in alcoholism*. Cambridge University Press.

Ballinger, G. A. (2016). Using generalized estimating equations for longitudinal data analysis. *Organizational Research Methods*, *7*(2), 127–150. https://doi.org/10.1177/1094428104263672.

Banz, M. (2019). *Glücksspielverhalten und Glücksspielsucht in Deutschland. Ergebnisse des Surveys 2019 und Trends* (BZgA-Forschungsbericht). Köln: Bundeszentrale für gesundheitliche Aufklärung. https://doi.org/10.17623/BZGA:225-GS-SY19-1.0.

Becker, T. (2011). *Soziale Kosten des Glücksspiels in Deutschland*. Retrieved from Hohenheim: https://glucksspiel.uni-hohenheim.de/fileadmin/einrichtungen/glucksspiel/Oekonomie/SozialeKostenDesGlucksspiels_Internet.pdf.

Bensel, W., & Tuncay, M. (2013). Beratung und Behandlung von Glücksspielern mit türkisch-orientalischem Migrationshintergrund. *Differentielle Behandlungsstrategien bei pathologischem Glücksspielen. Lambertus: Freiburg i. Br*, 156–168.

Binde, P. (2011). What are the most harmful forms of gambling? Analyzing problem gambling prevalence surveys. *Rapport nr.: CEFOS Working Papers 12*.

Braun, B., Ludwig, M., Kraus, L., Kroher, M., & Bühringer, G. (2013). Ambulante Suchthilfe für pathologische Glücksspieler in Bayern: Passung zwischen Behandlungsbedarf und -angebot. *Suchttherapie*, *14*(01), 37–45. https://doi.org/10.1055/s-0032-1323802.

Braun, B., Ludwig, M., Sleczka, P., Buhringer, G., & Kraus, L. (2014). Gamblers seeking treatment: Who does and who doesn't? *Journal of Behavioral Addictions*, *3*(3), 189–198. https://doi.org/10.1556/JBA.3.2014.3.7.

Breen, R. B., & Zimmerman, M. (2002). Rapid onset of pathological gambling in machine gamblers. *Journal of Gambling Studies*, *18*(1), 31–43. https://doi.org/10.1023/A:1014580112648.

Cowlishaw, S., Merkouris, S., Dowling, N., Anderson, C., Jackson, A., & Thomas, S. (2012). Psychological therapies for pathological and problem gambling. *Cochrane Database Systematic Review*, *11*, CD008937. https://doi.org/10.1002/14651858.CD008937.pub2.

Daza, E. J., Hudgens, M. G., & Herring, A. H. (2017). Estimating inverse-probability weights for longitudinal data with dropout or truncation: The xtrccipw command. *The Stata Journal*, *17*(2), 253–278. https://doi.org/10.1177/1536867X1701700202.

Dowling, N., Smith, D., & Thomas, T. (2005). Electronic gaming machines: Are they the "crack-cocaine"of gambling? *Addiction*, *100*(1), 33–45. https://doi.org/10.1111/j.1360-0443.2005.00962.x.

German Centre for Addiction Issues. (2010). *Deutscher Kerndatensatz zur Dokumentation im Bereich der Suchtkrankenhilfe. Definitionen und Erläuterungen zum Gebrauch*. Retrieved from https://www.suchthilfestatistik.de/fileadmin/user_upload_dshs/methode/KDS/Manual_KDS_bis_2017.pdf.

Ghisletta, P., & Spini, D. (2004). An introduction to generalized estimating equations and an application to assess selectivity effects in a longitudinal study on very old individuals. *Journal of Educational and Behavioral Statistics*, *29*(4), 421–437. https://doi.org/10.3102/10769986029004421.

Haß, W., Orth, B., & Lang, P. (2012). Zusammenhang zwischen verschiedenen Glücksspielformen und glücksspielassoziierten Problemen: Ergebnisse aus drei repräsentativen Bevölkerungs-Surveys der Bundeszentrale für gesundheitliche Aufklärung (BZgA). *Sucht*, *58*(5), 333–345. https://doi.org/10.1007/s10899-008-9088-6.

Johansson, A., Grant, J. E., Kim, S. W., Odlaug, B. L., & Gotestam, K. G. (2009). Risk factors for problematic gambling: A critical literature review. *Journal of Gambling Studies*, *25*(1), 67–92. https://doi.org/10.1007/s10899-008-9088-6.

Kastirke, N., Rumpf, H. J., John, U., Bischof, A., & Meyer, C. (2015). Demographic risk factors and gambling preference may not explain the high prevalence of gambling problems among the population with migration background: Results from a German Nationwide survey. *Journal of Gambling Studies*, *31*(3), 741–757. https://doi.org/10.1007/s10899-014-9459-0.

Klepsch, R., Hand, I., Wlazlo, Z., Fischer, M., Friedrich, B., & Bodek, D. (1989). Langzeiteffekte multimodaler Verhaltenstherapie bei krankhaftem Glücksspielen. III.: Zweite prospektive Katamnese der Hamburger Projekt-Studie. *Suchtgefahren*, *35*, 35–49.

Ladouceur, R. (1994). *The psychology of gambling: By Michael B.* New York: Walker Pergamon Press, 1992. In: Pergamon.

Lopez Viets, V. C., & Miller, W. R. (1997). Treatment approaches for pathological gamblers. *Clinical Psychology Review*, *17*(7), 689–702. https://doi.org/10.1016/s0272-7358(97)00031-7.

Meyer, G., & Bachmann, M. (2017). *Spielsucht. Ursachen, Therapie und Prävention von glücksspielbezogenem Suchtverhalten* (4th ed.). Berlin: Springer.

Meyer, C., Rumpf, H. J., Kreuzer, A., de Brito, S., Glorius, S., Jeske, C., Westram, A. (2011). *Pathologisches Glücksspielen und Epidemiologie (PAGE): Entstehung, Komorbidität, Remission und Behandlung. Endbericht an das Hessische Ministerium des Innern und für Sport*. Lübeck: University of Greifswald.

Müller, K., Wölfling, K., Dickenhorst, U., Beutel, M., Medenwaldt, J., & Koch, A. (2017). Recovery, relapse, or else? Treatment outcomes in gambling disorder from a multicenter follow-up study. *European Psychiatry*, *43*, 28–34. https://doi.org/10.1016/j.eurpsy.2017.01.326.

Petry, J. (2001). Übersicht aller katamnestischer Studien zur ambulanten und stationären Behandlung von "Pathologischen Glücksspielern" in Deutschland. [Review of follow-up studies of outpatient and inpatient "pathological gamblers" in Germany]. *Verhaltenstherapie & Verhaltensmedizin*, *22*(2), 103–121.

Petry, N. M. (2005). Pathological gambling: Etiology, comorbidity, and treatment (*Vol. 2*). Washington, DC: American Psychological Association.

Premper, V., & Schulz, W. (2008). Komorbidität bei Pathologischem Glücksspiel. *Sucht*, *54*(3), 131–140. https://doi.org/10.1463/2008.03.03.

Raylu, N., & Oei, T. P. (2004). Role of culture in gambling and problem gambling. *Clinical Psychology Review*, *23*(8), 1087–1114. https://doi.org/10.1016/j.cpr.2003.09.005.

Rodrıguez, G. (2013). Models for count data with overdispersion. *Addendum to the WWS*, *509*.

Rommel, A., & Köppen, J. (2016). Migration und Suchthilfe–Inanspruchnahme von Leistungen durch Menschen mit Migrationshintergrund. *Psychiatrische Praxis*, *43*(02), 82–88. https://doi.org/10.1055/s-0034-1387291.

Scherrer, J. F., Slutske, W. S., Xian, H., Waterman, B., Shah, K. R., Volberg, R., & Eisen, S. A. (2007). Factors associated with pathological gambling at 10-year follow-up in a national sample of middle-aged men. *Addiction*, *102*(6), 970–978. https://doi.org/10.1111/j.1360-0443.2007.01833.x.

Schüll, N. D. (2012). *Addiction by design: Machine gambling in Las Vegas*. Princeton, NJ: Princeton University Press.

Schwarzkopf, L., Loy, J. K., Braun-Michl, B., Grune, B., Sleczka, P., & Kraus, L. (2021). Gambling disorder in the context of outpatient counselling and treatment: Background and design of a prospective German cohort study. *International Journal of Methods in Psychiatric Research*, n/a(n/a), e1867. https://doi.org/10.1002/mpr.1867.

Slutske, W. S. (2006). Natural recovery and treatment-seeking in pathological gambling: Results of two US national surveys. *American Journal of Psychiatry*, *163*(2), 297–302. https://doi.org/10.1176/appi.ajp.163.2.297.

Slutske, W. S., Blaszczynski, A., & Martin, N. G. (2009). Sex differences in the rates of recovery, treatment-seeking, and natural recovery in pathological gambling: Results from an Australian community-based twin survey. *Twin Research and Human Genetics*, *12*(5), 425–432. https://doi.org/10.1375/twin.12.5.425.

Steffen, D. V., Werle, L., Steffen, R., Steffen, M., & Steffen, S. (2012). Long-term effectiveness of psychodynamic outpatient treatment of addiction. *Fortschritte der Neurologie-psychiatrie*, *80*(7), 394–401. https://doi.org/10.1055/s-0031-1299081.

Stinchfield, R. (2003). Reliability, validity, and classification accuracy of a measure of DSM-IV diagnostic criteria for pathological gambling. *American Journal of Psychiatry*, *160*(1), 180–182. https://doi.org/10.1176/appi.ajp.160.1.180.

Stinchfield, R., & Winters, K. C. (2001). Outcome of Minnesota's gambling treatment programs. *Journal of Gambling Studies*, *17*(3), 217–245. https://doi.org/10.1023/A:1012268322509.

Strupf, M., de Matos, E. G., Soellner, R., Kraus, L., & Piontek, D. (2017). Drinking behaviour among individuals of different origins in Germany: A comparison of individuals with and without a migration background. *Suchttherapie*, *18*(2), 90–97. https://doi.org/10.1055/s-0042-111197.

Sulkunen, P., Babor, T. F., Ornberg, J. C., Egerer, M., Hellman, M., Livingstone, C., Room, R. (2018). *Setting limits: Gambling, science and public policy*. Oxford University Press.

Toneatto, T., Cunningham, J., Hodgins, D., Adams, M., Turner, N., & Koski-Jannes, A. (2009). Recovery from problem gambling without formal treatment. *Addiction Research & Theory*, *16*(2), 111–120. https://doi.org/10.1080/16066350801923638.

Toneatto, T., & Ladoceur, R. (2003). Treatment of pathological gambling: A critical review of the literature. *Psychological Addictive Behavior*, *17*(4), 284–292. https://doi.org/10.1037/0893-164X.17.4.284.

Tuncay, M. (2010). Wettbüro statt Teestube. Glücksspiel bei Migranten aus dem orientalischen Kulturraum. *Konturen. Fachzeitschrift zu Sucht und sozialen Fragen*, *5*, 2010.

UNESCO. (2012). *International standard classification of education: ISCED 2011*. UNESCO Institute for Statistics Montreal.

Williams, R. (2018). Using the Margins command to estimate and interpret adjusted predictions and marginal effects. The Stata Journal: Promoting Communications on Statistics and Stata, *12*(2), 308–331. https://doi.org/10.1177/1536867x1201200209.

Williams, R. J., Volberg, R. A., & Stevens, R. M. G. (2012). *The population prevalence of problem gambling: Methodological influences, standardized rates, jurisdictional differences, and worldwide trends*. Ontario: Problem Gambling Research Centre and the Ontario Ministry of Health and Long Term Care.

Zeger, S. L., & Liang, K.-Y. (1986). Longitudinal data analysis for discrete and continuous outcomes. *Biometrics*, 121–130. https://doi.org/10.2307/2531248.