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ConGam-PS: developing and evaluating a measurement tool of treatment providers' views about contingency management for gambling

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ABSTRACT

Contingency management (CM) is an evidence-based behavioral intervention highly effective at promoting behavior change. Despite evidence of its efficacy, the extension of CM to the treatment of harmful gambling has been slow. Wider dissemination of CM may be facilitated through identification of perceived obstacles and barriers. The present study developed items for a new scale, the *Contingency Management for Gambling Provider Survey* (ConGam-PS), to measure the views of gambling treatment providers of CM for gambling. In a mixed methods (qualitative and quantitative) based approach, $N = 111$ UK gambling treatment providers were surveyed about their positive, negative, and neutral beliefs about CM. Descriptive analyses found that participants were open to using and receiving training in CM, and supported research on CM for treatment of gambling. Common concerns involved the potential negative consequences for clients when incentives are withdrawn and the feasibility of objectively verifying gambling abstinence. No significant associations were found between participant characteristics and CM beliefs. Overall, there is openness toward CM among treatment providers and further research and evaluation of CM for harmful gambling is warranted.

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Contingency management; incentives; gambling; treatment; survey; mixed-methods


Introduction

Contingency management (CM) is an evidence-based, behavioral intervention highly effective at promoting behavior change in addictive behaviors (McPherson et al. 2018; Bolívar et al. 2021; Proctor 2022; Pfund et al. 2022a, 2022b; DeFulio 2023). In a CM-based intervention, which are based on principles of operant conditioning, clients earn tangible rewards (e.g. shopping vouchers) by objectively verifying adherence with pre-selected therapeutic goals such as urinalysis-monitored drug abstinence or directly recorded treatment attendance. If agreed goals are not met, rewards are withheld, and the value of any accumulated rewards may be reset. CM interventions have high efficacy and may be cost-effective with a range of addictive behaviors (Olmstead et al. 2007; Bolívar et al. 2021; Orme et al. 2023). Yet, despite this, implementation of CM in treatment for disordered or harmful gambling to date has been slow (Christensen 2013; Petry et al. 2017; Christensen et al. 2018). Recently, we identified that both treatment providers and clients were broadly supportive of the potential use of CM in gambling treatment (Dorey et al. 2022a,b). The aim of the present study was to formally survey gambling treatment providers about CM and to develop a validated screening questionnaire assessing

beliefs, attitudes and potential barriers and obstacles to wider implementation.

Addiction treatment providers generally have a positive view of CM (Rash et al. 2012), while some have concerns such as how clients might respond when the intervention is withdrawn, the perceived cost and fairness of CM, and a belief that CM fails to address the underlying causes of addiction (Kirby et al. 2006; Ritter and Cameron 2007; Gagnon et al. 2020; Oluwoye et al. 2020). It is important to measure and evaluate such concerns identified in related treatment domains to facilitate and promote the application of CM-based approaches in treatment for harmful gambling. Previously, we conducted a qualitative thematic analysis based on interviews with 30 United Kingdom (UK)-based treatment providers (Dorey et al. 2022b). We found an openness toward research on CM for gambling with some concerns that CM did not align with personal treatment philosophies (i.e. that it utilizes an external motivation to change and may not address root causes of addiction), and that CM could reinforce similar feelings and behaviors to gambling and lead to relapse. Some treatment providers also felt that certain mechanisms of CM could be manipulated by clients, either through reselling incentives or by falsifying bank statements to show abstinence from gambling.

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Concerns relating to the time and cost involved in implementing CM were also found. We also explored the views of service users (Dorey et al. 2022a) and found that clients broadly supported the use of incentives. CM was seen as a beneficial way in which to encourage attendance in treatment and in maintaining abstinence. Moreover, clients expressed concerns about possible deception and the use of CM to trigger gambling-related emotions.

The purpose of the present study was to develop items for a new scale, the *Contingency Management for Gambling – Provider Survey* (ConGam-PS), and to use it to measure the attitudes and perspectives of treatment providers. Developing and validating such a scale may help facilitate the wider dissemination and implementation of CM for other addictive disorders and permit extensions across both participant populations and jurisdictions. To do so, the *Provider Survey of Incentives* (PSI; Kirby et al. 2006) was modified for use in a gambling treatment context. The PSI consists of items relating to moral/ethical objections about the use of incentives, possible negative side effects, the practicality of incorporating CM into one's practice, potential limitations, and positive beliefs regarding tangible- and social-based forms of CM. A high level of agreement with positive statements relating to the use of CM was found among substance use treatment providers in the USA. The most prevalent concerns related to the cost of implementing the practice and the belief that CM did not address the underlying causes of addiction. Further research employed a shortened, 22-item PSI to examine the CM views of clinicians working in community mental health centers found that 77% stated they would introduce incentives to their treatment programmes if funding were available (Srebnik et al. 2013). Associations were also found between acceptability of CM and years of experience (with acceptability increasing with more years of service), as well as differences between addictions counselors and mental health clinicians in perceived acceptability. Variants of the PSI have been developed to assess clients' views of CM. Getty et al. (2022) developed the 18-item *Service User Survey of Incentives* (SUSI) to capture the beliefs of substance misuse clients in the UK and found 81% favored incentive programmes, with little evidence of negative beliefs surrounding CM. Similarly, with the *Contingency Management Beliefs Questionnaire* (CMBQ) administered to respondents in the USA, Rash et al. (2012) detected favorable views regarding CM, matched with concerns surrounding how clients will react when incentives are withdrawn.

Notwithstanding cultural and historical differences about CM development and implementation between countries, these findings indicate general support and positive opinions regarding CM for abstinence, with some reservations, among both substance-use treatment providers and clients/service users (Oluwoye et al. 2020). To facilitate wider dissemination and implementation of CM for other addictive disorders such as gambling, we sought to assess UK-based gambling treatment service providers' views. We developed the ConGam-PS to measure treatment providers' views on the use of CM-based incentives in gambling treatment to

obtain a better understanding of potential barriers and obstacles. Validation of a psychometrically robust ConGam-PS would, for instance, allow for empirical assessment of the impact of staff training in CM-based methods for gambling treatment on staff perceptions and may help identify the appropriateness or acceptability of CM among different groups of treatment providers.

The key questions that guided the present study were: (1) “what are the beliefs and objections of UK gambling treatment providers towards CM for gambling?”; (2) “what is the acceptability of incentive-based therapy, such as CM, for gambling?”; and (3) “what are the associations between treatment provider characteristics and beliefs about CM?”

Methods

Design and ethics

We used a five-step model of mixed methods scale development and validation analysis (Zhou 2019): (1) qualitative data related to the scale construct of interest is generated; (2) qualitative data is converted to scale items; (3) content-based validity of the scale items is assessed; (4) the new scale is administered, and (5) quantitative validation of the scale is conducted.

Ethical approval was received from Swansea University School of Psychology Research Ethics Committee.

Development of the contingency management for gambling – provider survey

The ConGam-PS was developed following our qualitative-led review of the efficacy of the PSI for use in gambling contexts. This qualitative scale development stage focused on drawing out the views of thirty UK based gambling treatment practitioners of CM (Dorey et al. 2022b), and based on this data we reflected on whether a new scale adapted from the PSI was needed. The sample size was adequate for identifying a range of views, with no novel material being generated in later interviews. During qualitative analysis, thematic coding was employed (Zhou 2019): codes representing views expressed by five or more participants were either reworded to new question items representing the expressed theme ($n=26$) or matched with items from the PSI ($n=12$), along with lesser supported items deemed important. For example, the code “CM could reinforce similar patterns to gambling” and related quotes reflecting issues with the use of CM resulting in feelings and thoughts leading to gambling, was reworded to create a new item: “I am concerned that providing incentives would reinforce thinking, feeling and behaviour patterns similar to gambling”. After comments from participants, some PSI items were reworded to be relevant to gambling. This resulted in a list of 38 questions. The third step involved validation of the content of scale items (Zhou 2019) by reflecting and refining the content of questions in relation to coding. The content validation process involved providing coding and candidate survey questions to three subject-matter experts (one expert

delivering CM for gambling, one behavior-analytic researcher, and one person with lived experience of gambling disorder), who gave feedback and suggestions related to both theoretic (i.e. “are the items relevant to the construct and purpose?”) and face validation (i.e. “is the wording correct and easily understood?”). Voting was used to resolve instances of disagreement that were not resolved by discussion. Two further questions were added by the expert panel, one related to cost and one related to practitioner discomfort asking about bank statements, leading to a revised questionnaire of 40 questions.

Administering the contingency management for gambling - provider survey

Participants ($n=111$) were recruited to the online survey, hosted in Qualtrics, through social media announcements, targeted recruitment emails, and flyers between March and June 2022. The survey was open to UK-based gambling treatment providers working with people receiving treatment and support for harmful gambling (see [Supplementary Materials](#)). All participants provided signed informed consent and received a £7.50 online shopping voucher by email on completion.

Quality checks were implemented with the online survey data collection protocols to identify and filter fraudulent responses (Pickering and Blaszczynski 2021) such that: (a) the survey could only be completed once from the same device, (b) location data was checked through IP monitoring post-completion, and (c) the duration it took to complete the survey was analyzed (i.e. completed survey times significantly faster than average were further scrutinized to check for “straight line” and likely inaccurate responses). In total, 3,867 responses were received to the survey. Following the implementation of quality control measures, 3,756 responses were removed from the dataset. Excluded responses consisted of the following: (a) opened the survey but did not complete the consent form ($n=828$, 21%); (b) completed the consent form but not the survey ($n=1,434$, 38%); (c) completed the survey outside of the UK ($n=376$, 10%); and (d) provided inconsistent or questionable responses ($n=1,118$, 30%). Inconsistent or questionable responses took the form of: (a) an incomplete answer to “which service provider do you work for?” ($n=487$, 13%); (b) responses with spurious service provider names ($n=160$, 4%); and (c) surveys completed in less than one minute ($n=471$, 13%). The final sample consisted of responses from $n=111$ (Table 1).

Procedure

The ConGam-PS consisted of two parts. Part A contained 12 demographic questions on gender, ethnicity, highest level of education completed, name of service provider, the UK region their work serves, employment position, the models or approaches used in their work, any personal experience of gambling harm, experience using incentives in treatment, and the number of years they had worked in the gambling

Table 1. Sociodemographic characteristics of participants ($n=111$).

	n	%
Gender		
Male	50	45%
Female	61	55%
Age		
18–29	14	13%
30–39	32	29%
40–49	32	29%
50–59	25	23%
60+	8	7%
Ethnicity		
White British	88	79%
White Irish	6	5%
Any other white background	8	7%
Mixed – White/Black Caribbean	5	5%
Mixed – White/Black African	2	2%
Black - Caribbean	1	1%
Other	1	1%
Education		
No formal qualifications	1	1%
Entry level certificate	3	3%
GCSE grade D-G	3	3%
GCSE grade A*-C	4	4%
A levels	8	7%
Certificate of HE	5	5%
Diploma of HE	15	14%
Bachelor's degree	33	30%
Master's degree	31	28%
Doctorate	8	7%
Work location (tick all that apply)		
England	55	31%
Scotland	44	25%
Wales	53	30%
Northern Ireland	24	14%
Position (tick all that apply)		
Service provider or therapist	52	35%
Supervisor	13	9%
Manager	29	19%
Trainer	11	7%
Lived experience service provider	23	15%
Other	22	15%
Approach used in work (tick all that apply)		
Cognitive behavioral therapy	60	15%
Motivational interviewing	49	12%
Humanistic	53	13%
Brain and gambling education	40	10%
Recovery model	45	11%
Relapse prevention	70	17%
Social behavior network	9	2%
Behaviorist	11	3%
3 rd wave CBT	16	4%
Psychodynamic or interpretive	16	4%
12 step	20	5%
Other	13	3%
Lived experience of gambling harm		
Yes, related to own gambling	35	32%
Yes, related to family/friend's gambling	16	14%
No	60	54%
Years worked in gambling treatment sector		
<1	18	16%
1–5	60	54%
6–10	18	16%
10+	15	14%
Prior experience using incentives in treatment		
Yes, with tangible incentives	10	9%
Yes, with social incentives	9	8%
Yes, with tangible and social incentives	10	9%
No	82	74%

*Totals may not equal due to rounding; **participants were permitted to select more than one option for location, position, and approach used in their work, so totals may add to more than 100%.

treatment sector. Participants were then provided with a brief description of what CM is, what is involved in its implementation and the mechanisms by which it works

(Supplementary Materials). In Part B, participants completed the 40-item ConGam-PS which measured beliefs relating to CM.

Items on the ConGam-PS were categorized into three themes: (1) positive beliefs (e.g. “providing incentives treats clients like adults who are responsible for their own recovery”); (2) negative beliefs (e.g. “I am concerned that providing incentives would reinforce thinking, feeling and behaviour patterns similar to gambling”); and (3) neutral beliefs (e.g. “clients need to reach a point where they want to change before they can benefit from treatment”). Responses were assessed on a five-point Likert scale (1 = *Strongly Disagree*, 5 = *Strongly Disagree*).

Data analysis

Positive (items 3, 4, 10, 11, 12, 14, 17, 18, 19, 20, 22, 28, 30, 32, 34, 37, 39 and 40) and negative (items 1, 2, 6, 7, 8, 13, 15, 16, 21, 23, 24, 26, 27, 29, 31, 33, 36 and 38) summary scores were created for each participant. Cronbach’s alpha showed good reliability for the positive and negative item subscales ($\alpha = 0.93$ and $\alpha = 0.88$, respectively). Inter-item correlations indicated that all items were worthy of retention, resulting in a decrease in the alpha if deleted.

An Exploratory Factor Analysis was conducted on the survey questions using JASP (JASP Team 2023). Two factors were specified using maximum likelihood estimation. The oblique Promax method was used to rotate the factors. The base analysis was conducted using the correlation matrix, and missing cases were excluded pairwise. Six questions were excluded from the two-factor solution (Q1, Q5, Q6, Q9, Q27, Q35). The results section reports the factor loadings and measures of model fit: Bartlett’s test for the homogeneity of variances, the Comparative Fit Index (CFI), the Root Mean Square Error of Approximation (RMSEA), and the Standardized Root Mean Square Residual (SRMR).

The proportion of participants indicating agreement, disagreement, or neutral responses to individual items on the ConGam-PS were analyzed descriptively. Chi-squared tests of association examined relationships between participant characteristics and CM beliefs. For both the positive and negative items, we categorized participants as holding a positive or negative belief toward CM based on their individual summary scores. Specifically, participants were deemed to hold a positive belief if their *positive items* average score exceeded 3 and to hold a generally negative belief if their *negative items* mean score exceeded 3. Using these positive/negative belief groupings, Chi-squared tests of association were performed using categories derived from the participant characteristics (Getty et al. 2022).

Results

Participant characteristics

Table 1 summarizes the participants’ characteristics. Most participants were female, aged between 30 and 49, of White British ethnicity, possessed at least a Bachelor’s degree, based in England, employed relapse prevention and/or CBT

informed methods, and did not have lived experience of gambling harms and no prior experience of using incentives in treatment.

The average time to complete the survey was 13.4 min ($SD = 25.4$ min).

Positive and negative beliefs

Tables 2 and 3 show the percentage of participants indicating agreement, disagreement, or neutral responses to all ConGam-PS items. The two-factor item structure of the ConGam-PS was examined with exploratory factor analysis (Table 4). The initial model was a good fit supported a two-factor solution, with only one neutral item loading to Factor 1, suggesting good discrimination of items between positive and negative factors (see Table 4).

Positive beliefs

There was a high level of agreement to the positive items, with 74% of participants indicating that they would be interested in receiving training in CM for gambling treatment. Eighty-one per cent of respondents agreed that if the research shows CM gambling is effective, they would be open to using it. Overall, 10 of the 15 positive items were agreed with by at least 60% of participants. Among the most endorsed statements were “research on CM for gambling should be done”, and “incentives are worth the cost if they work”, with 85% and 77% of participants indicating agreement, respectively.

Less frequently endorsed statements included, “asking clients to share bank statements (as proof of abstinence) would lead to greater transparency and accountability”, and “overall, I would be in favour of adding an incentive-based component to my treatment programme”, with 37% and 45% of participants indicating agreement, respectively. On average, the positive items gathered a neutral response rate of 24%. Items which took the form of clear assertions regarding CM garnered the highest level of neutral response, with 41% and 38% of participants indicating neutrality on “CM is a useful behavioural procedure when targeting abstinence”, and “CM is helpful because it helps keep clients engaged in treatment long enough for them to really learn valuable skills”, respectively.

Negative beliefs

The most frequently endorsed negative ConGam-PS item was “I am worried about what happens when incentives are withdrawn”, with 66% of participants agreeing with this statement. Other negative items which were highly endorsed were “clients will be able to cheat the system if proof of abstinence relies on sharing bank statements”, and “a reduction in the level of incentive after missed goals would have a negative impact on clients (e.g. feeling a failure)”, with 63% of participants indicating agreement for each. On average, negative survey items evoked a neutral response rate of 24%, which was identical to the positive survey items. The items which received the highest level of neutral response were

Table 2. Percentage of participants indicating agreement, disagreement, or neutral responses to Contingency Management for Gambling - Provider survey (ConGam-PS) items.

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Positive beliefs						
3	I would favor incentives that fund personally meaningful activities related to the client's gambling recovery	2.7	2.7	14.4	53.2	27.0
4	Providing incentives treats clients like adults who are responsible for their own recovery	5.4	18.0	25.2	43.2	8.1
10	Any source of abstinence motivation, not just internal motivation, is a good thing for treatment	3.6	14.4	20.7	45.0	16.2
11	I would be interested in receiving training in contingency management for gambling treatment.	1.8	3.6	20.7	55.0	18.9
12	Contingency management is worth the time and effort if it works	0.9	2.7	22.5	45.9	27.9
14	Incentives are worthwhile because they can get clients in the door for treatment	0.9	10.8	21.6	55.9	10.8
17	Incentives will work best when they are tailored to the individual	0.9	2.7	9.0	58.6	28.8
18	Asking clients to share bank statements (as proof of abstinence) would lead to greater transparency and accountability	9.0	24.3	29.7	27.9	9.0
19	If the research shows contingency management for gambling is effective, I would be open to using it	0.9	4.5	13.5	58.6	22.5
20	Contingency management is helpful because it helps keep clients engaged in treatment long enough for them to really learn valuable skills.	0.9	8.1	38.7	44.1	8.1
22	Incentives are worth the cost if they work	0.9	2.7	19.8	56.8	19.8
28	It makes sense to apply positive reinforcement to gambling treatment.	1.8	0.9	17.1	64.0	16.2
30	If research shows contingency management for gambling has a long-term positive impact, I would support its use.	0.9	0.9	11.7	58.6	27.9
32	If contingency management is implemented skillfully and with clear communication, barriers to implementation could be overcome.	0.9	8.1	21.6	57.7	11.7
34	Contingency management is a useful behavioral procedure when targeting abstinence.	1.8	9.9	41.4	43.2	3.6
37	Contingency management is useful when targeting treatment goals other than abstinence (e.g. session attendance, completion of activities).	0.9	9.9	26.1	55	8.1
39	Research on contingency management for gambling should be done.	0.9	1.8	11.7	50.5	35.1
40	Overall, I would be in favor of adding an incentive-based component to my treatment programme.	7.2	13.5	34.2	31.5	13.5
Negative beliefs						
1	I do not have time to administer incentives in a therapy session	13.5	40.5	35.1	9.9	0.9
2	I am concerned contingency management would lead to clients concealing gambling relapses from their treatment provider	1.8	15.3	21.6	45.0	16.2
6	Clients will be able to cheat the system if proof of abstinence relies on sharing bank statements	1.8	12.6	22.5	42.3	20.7
7	I am worried about what happens when incentives are withdrawn	1.8	14.4	17.1	48.6	18.0
8	Clients would sell/trade earned items to gamble	1.8	14.4	32.4	41.4	9.9
13	There are enough rewards in being abstinent; incentives are not necessary	7.2	31.5	34.2	19.8	7.2
15	I am concerned that providing incentives would reinforce thinking, feeling, and behavior patterns similar to gambling	3.6	25.2	19.8	36.9	14.4
16	Incentive programmes are not consistent with my approach to treatment	2.7	23.4	33.3	29.7	10.8
21	Providing incentives undermines the client's internal motivation to stay abstinent.	3.6	33.3	34.2	19.8	9.0
23	Overall, incentives have a negative effect on trust in the client/service provider relationship.	5.4	35.1	31.5	23.4	4.5
24	If you give an incentive to clients who have earned them, but not to others, it would cause conflict between clients.	7.2	33.3	22.5	31.5	5.4
26	Contingency management interventions create extra work for me.	2.7	24.3	38.7	27.0	7.2
27	There is no practical way to prove abstinence from gambling.	5.4	17.1	23.4	38.7	15.3
29	Incentives are just not right because they are rewarding the client for what they should be doing in the first place.	18.9	28.8	38.7	10.8	2.7

(continued)

Table 2. Continued.

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
31	Contingency management raises ethical issues that concern me.	4.5	20.7	31.5	31.5	11.7
33	I am concerned the service I work for could be criticized for giving incentives to people recovering from gambling.	3.6	27.9	19.8	31.5	17.1
36	A reduction in the level of incentive after missed goals would have a negative impact on clients (e.g. feeling a failure).	1.8	9.9	24.3	49.5	14.4
38	Asking clients to share bank statements (as proof of abstinence) would feel uncomfortable	2.7	14.4	21.6	35.1	26.1
Neutral beliefs						
5	I would be more supportive of contingency management for gambling if it was app-based	3.6	27.0	49.5	17.1	2.7
9	The impact of an incentive will depend on how attractive it is to the individual	0.0	2.7	12.6	61.3	23.4
25	The impact of incentives is dependent on the quality of the intervention delivered alongside it.	0.9	3.6	9.9	48.6	36.9
35	Clients need to reach a point where they want to change before they can benefit from treatment.	2.7	7.2	14.4	39.6	36.0

Table 3. Total participant responses to positive and negative survey items (n and %).

	n*	%
Positive items		
Strongly disagree	47	2%
Disagree	155	8%
Neutral	444	22%
Agree	1004	50%
Strongly agree	348	17%
Negative items		
Strongly disagree	100	5%
Disagree	463	23%
Neutral	557	28%
Agree	648	32%
Strongly agree	230	12%

*total responses equal 1998 (18 questions x 111 responses).

“contingency management interventions create extra work for me”, and “incentives are just not right because they are rewarding the client for what they should be doing in the first place”, each garnering a neutral response rate of 39%.

Associations between participant characteristics and CM beliefs

We found no association between participants' prior experience using incentives, gender, age, whether CBT was used in work, years of experience in the gambling treatment sector, or lived experience of gambling harm and positive or negative beliefs regarding CM (Table 5).

Discussion

Using a mixed-methods approach to item development and initial validation of the ConGam-PS, we measured perspectives of UK gambling treatment providers on the use of CM. In general, analysis of ConGam-PS responses identified an openness to using CM, receiving training in CM, and in support for further research on how best to adapt CM for the treatment of gambling. The present findings are an important first assessment of the beliefs of UK-based gambling treatment providers about the potential effectiveness of

CM as an adjunct psychosocial intervention for harmful gambling.

Participants endorsed several potential ethical concerns about CM, supporting previous findings (Kirby et al. 2006; Getty et al. 2019, 2022; Gagnon et al. 2020; Dorey et al. 2022a,b). That is, 63% agreed that clients might sell or trade incentives and could ‘cheat the system’ if evidence of abstinence relied on sharing bank statements. Hypothetically, if clients sought to sell or trade their vouchers then this may involve delays between the provision of vouchers by the researchers and the cash alternative as many clients in CM studies choose to accumulate their earnings until the end of the study (Bickel et al. 2010). While it is theoretically possible that a client might sell or swap their online vouchers and in so doing have untraceable small amounts of cash to gamble with, we contend that this is highly unlikely. Notwithstanding this, it is possible to mitigate any risk of fraud by requiring treatment staff to purchase requested items for clients - who may or may not then be tempted to sell the items for cash; the evidence from CM for substance use disorders suggests this is highly unlikely (Rothfleisch et al. 1999; Festinger et al. 2005; Petry et al. 2014, 2013; Bolívar et al. 2021). Obviously, there is a need to protect against fraud when using incentive-based procedures like CM, and while there is no evidence to suggest that CM procedures are more subject to fraud than other programmes (Ranganathan and Lagarde 2012; Bolívar et al. 2021; Proctor 2022), this ethical concern remains a potential barrier to wider dissemination.

Relatedly, 61% agreed that asking clients to share bank statements as proof of abstinence from gambling would feel uncomfortable. This concern may be a key barrier to the wider implementation of CM in gambling treatment settings; that is, to provide evidence of abstinence from gambling, clients may be asked to produce itemized bank statements and explain cash withdrawals in order to receive their scheduled incentive (Christensen et al. 2018). Importantly, incentives to avoid fraud must act in the same way for clients in recovery from gambling harm as they do for others without a history of harmful gambling. Moreover, the risk of fraud is

Table 4. Factor loadings of the ConGam-PS.

	Factor 1	Factor 2	Uniqueness
Positive items			
Q30	0.812		0.370
Q12	0.787		0.388
Q19	0.786		0.382
Q39	0.758		0.473
Q22	0.757		0.398
Q20	0.687		0.460
Q40	0.686		0.324
Q11	0.661		0.547
Q14	0.659		0.594
Q17	0.631		0.656
Q34	0.609		0.502
Q3	0.580		0.713
Q4	0.571		0.575
Q32	0.568		0.504
Q37	0.541		0.635
Q28	0.488		0.754
Q18	0.488		0.726
Q25*	0.446		0.831
Q10	0.443		0.613
Q13	-0.401		0.577
Negative items			
Q31		0.730	0.347
Q21		0.685	0.418
Q33		0.685	0.555
Q15		0.669	0.473
Q23		0.607	0.428
Q26		0.573	0.726
Q7		0.558	0.696
Q24		0.526	0.728
Q36		0.518	0.776
Q38		0.478	0.783
Q8		0.440	0.764
Q2		0.435	0.680
Q29		0.427	0.651
Q16		0.417	0.570

Note. *Neutral item. See [Supplementary Materials](#) for breakdown of individual ConGam-PS items. Applied rotation method is promax. The model showed a good fit with the data, $\chi^2(780, N=701) = 2470.96, p < .001, CFI = .82, RMSEA = .06, SRMR = .07$.

further reduced when CM is used to incentivise recovery-oriented goals in situations where clients are highly motivated to change and give consent to achieve pre-agreed treatment goals and hence contact a wider range of naturally occurring reinforcers to sustain their recovery (Proctor 2022). Despite this, it is clear that more work is needed to better understand potential fraud with the use of CM and the impact of any gambling-related crime on treatment (Petry et al. 2013; Adolphe et al. 2019). Future studies of CM for gambling should determine whether these concerns are justified, and if so, how the intervention can be adapted to meet clients' needs and evaluate other objective indices of gambling abstinence such as spousal corroboration of non-gambling and enrollment in harm reduction measures such as installing blocking software and self-exclusion, and the impact on treatment outcomes (Christensen et al. 2018; Pickering et al. 2018).

We identified greater support among UK providers for the use of CM when targeting treatment goals other than abstinence, such as session attendance or completion of pre-agreed activities, than for abstinence alone. This is noteworthy as it suggests a feasible means of introducing CM within gambling treatment settings, and one that avoids the potential challenges related to using bank statements as evidence of abstinence, would be to incentivise completion of target behaviors other than abstinence. Support for this approach stems from our related finding that most providers agreed or strongly agreed that incentives will work best when tailored to the client. Adopting an individualized approach to treatment is consistent with the observation that many clients believe recovery includes engaging in activities alternative to gambling (Pickering et al. 2020) and may help reduce the percentage of clients who prematurely

Table 5. Chi-squared Associations between positive and negative beliefs toward CM and participant characteristics*.

	Positive beliefs toward CM			Negative beliefs toward CM		
	Agree n (%)	Disagree n (%)	Chi-square	Agree n (%)	Disagree n (%)	Chi-square
Prior experience using incentives						
Yes	27 (93%)	2 (7%)	$\chi^2(1)=1.164 P= 0.281$	18 (62%)	11 (38%)	$\chi^2(1)=0.745 P= 0.388$
No	70 (85%)	12 (15%)		58 (71%)	24 (29%)	
Gender						
Male	46 (92%)	4 (8%)	$\chi^2(1)=1.756 P= 0.185$	31 (62%)	19 (38%)	$\chi^2(1)=1.763 P= 0.184$
Female	51 (84%)	10 (16%)		45 (74%)	16 (26%)	
Age						
18–29	11 (79%)	3 (21%)	$\chi^2(4)= 2.718 P= 0.606$	12 (86%)	2 (14%)	$\chi^2(4)= 6.078 P= 0.193$
30–39	29 (91%)	3 (9%)		19 (59%)	13 (41%)	
40–49	29 (91%)	3 (9%)		21 (66%)	11 (44%)	
50–59	22 (88%)	3 (12%)		20 (80%)	5 (20%)	
60+	6 (75%)	2 (25%)		4 (50%)	4 (50%)	
Models used in work						
CBT	52 (87%)	8 (13%)	$\chi^2(1)=2.481 P= 0.150$	39 (65%)	21 (35%)	$\chi^2(1)=0.736 P= 0.081$
Non-CBT	45 (88%)	6 (12%)		37 (73%)	14 (27%)	
Years of experience in gambling treatment						
<1	18 (100%)	0 (0%)	$\chi^2(3)= 5.603 P= 0.133$	11 (61%)	7 (39%)	$\chi^2(3)= 1.351 P= 0.717$
1–5	53 (88%)	7 (12%)		43 (72%)	17 (28%)	
6–9	15 (83%)	3 (17%)		13 (72%)	5 (28%)	
10+	11 (73%)	4 (27%)		9 (60%)	6 (40%)	
Lived experience of gambling harm						
Yes	46 (90%)	5 (10%)	$\chi^2(2)=0.829 P= 0.086$	39 (76%)	12 (24%)	$\chi^2(2)= 3.045 P= 0.166$
No	51 (85%)	9 (15%)		37 (62%)	23 (38%)	

*Participants were defined as having an overall agreement with positive or negative items if their summary score was greater than 3 (Likert scale 1= strongly disagree, 5= strongly agree), and as having an overall disagreement if their summary score was less than 3.

discontinue treatment (Pfund et al. 2021, 2022a). The feasibility and effectiveness of CM for sustaining recovery from gambling and increasing treatment retention certainly warrants future empirical attention.

Another concern was the belief that certain aspects of CM could trigger feelings resembling gambling (Dorey et al. 2022a,b). Indeed, over half of respondents agreed they were concerned that providing incentives would reinforce thinking, feeling, and behavior patterns similar to gambling. While it would be helpful to better understand this viewpoint through qualitative analysis of lived experience, CM and gambling behavior are quite distinct, particularly given the absence of any probabilistic schedule in the former and the intermittent, operant nature of winning and losing in the latter (Delfabbro et al. 2023). Moreover, there is no evidence from the use of CM in the treatment of SUDs that it increases gambling (Petry et al. 2014). Clearly, while a more nuanced understanding of providers' views of this perceived similarity would benefit the wider dissemination of CM for gambling it is important to track any potential impact on gambling behavior.

With 74% of treatment providers having no prior experience of using incentives, the high level of neutral responses (24% for positive and negative items, respectively) may suggest an absence of *any* beliefs about CM and a general openness to learn more about the potential effectiveness of CM as an adjunct treatment approach for clients in recovery from harmful gambling (Gagnon et al. 2020). We also identified an openness among UK treatment providers to introducing CM for gambling into their treatment practices, with 81% of respondents stating that if research shows it to be effective, they would be open to using it, and 74% indicating they would be interested in receiving training in CM. Once the evidence base has grown and CM shown to be effective, then ethical barriers may dissolve and the further extension of CM to gambling treatment become straightforward. Quality CM training and education will be important in equipping service providers with the knowledge of how CM works, what is involved, and how clients can benefit (Kirby et al. 2012; Rash et al. 2012; Oluwoye et al. 2020). Offering and evaluating training opportunities on attendees' views of CM for gambling may improve perceived acceptability and facilitate wider dissemination (Kirby et al. 2012; Rash et al. 2012). Similarly, assessing clients' views of CM may aid treatment development and garner support from providers with the greatest resistance. Leickly et al. (2019) interviewed clients following a CM trial targeting abstinence from alcohol and found they were appreciative and enthusiastic about receiving prizes, reporting that it helped them to stay abstinent, and increased personal accountability, awareness of their drinking, and the motivation to change (see also, Neale et al. 2016). In this way, investigating perceptions of CM may prove helpful in developing new treatments for harmful gambling and provide a framework for comprehensive evaluation.

Participants felt that the resource implications and costs of including CM in their treatment programmes was justified; only 10% agreed that "I do not have time to administer

incentives in a therapy session", and 76% agreed that "incentives are worth the cost if they work". Given the likely budgetary constraints under which many gambling treatment providers operate, illustrating the cost-effectiveness of CM for gambling (Olmstead and Petry 2009; Bolívar et al. 2021; Shearer et al. 2023) and the potential savings to be made by decreasing treatment dropout and relapse (Pfund et al. 2021, 2022b) may support wider dissemination.

In conclusion, this is the first mixed-methods item development study to explore treatment providers' views of CM for gambling. Using the newly developed ConGam-PS, openness to employing CM for gambling was found, with support for training and future research. Noteworthy concerns about ethical considerations and potential negative consequences when incentives are withdrawn warrant further research. We found no evidence of insurmountable objections to CM among treatment providers. Further psychometric evaluation of the ConGam-PS with confirmatory factor analysis with large samples would help show generalizability. Further development and modification of the scale by for example incorporating versions based solely on CM for activities completion or treatment attendance may have significant impact on treatment outcomes. Overall, further development of CM as an efficacious, adjunct treatment in psychosocial interventions for gambling will help expand the evidence base and increase the range of available treatment options.

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Authors' contributions

LD, SD, AH, JM, RM and DC contributed to concept and design. JM collected and analyzed the data. All authors were contributors to writing the manuscript and read and approved the final manuscript.

Ethical statement

Ethical approval was obtained from the School of Psychology Research Ethics Committee, Swansea University and all participants provided informed consent.

Disclosure statement

The authors report there are no competing interests to declare.

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Data availability statement

The data that support the findings of this study are available from the corresponding author, upon reasonable request.

References

- Adolphe A, Khatib L, van Golde C, Gainsbury SM, Blaszczynski A. 2019. Crime and gambling disorders: a systematic review. *J Gambl Stud.* 35(2):395–414. doi: [10.1007/s10899-018-9794-7](https://doi.org/10.1007/s10899-018-9794-7).
- Bickel WK, Jones BA, Landes RD, Christensen DR, Jackson L, Mancino M. 2010. Hypothetical intertemporal choice and real economic behavior: delay dis-counting predicts voucher redemptions during contingency-management procedures. *Exp Clin Psychopharmacol.* 18(6):546–552. doi: [10.1037/a0021739](https://doi.org/10.1037/a0021739).
- Bolívar HA, Klemperer EM, Coleman SRM, DeSarno M, Skelly JM, Higgins ST. 2021. Contingency management for patients receiving medication for opioid use disorder: a systematic review and meta-analysis. *JAMA Psychiatry.* 78(10):1092–1102. doi: [10.1001/jamapsychiatry.2021.1969](https://doi.org/10.1001/jamapsychiatry.2021.1969).
- Christensen DR, Witcher CSG, Leighton T, Hudson-Breen R, Ofori-Dei S. 2018. Piloting the addition of contingency management to best practice counselling as an adjunct treatment for rural and remote disordered gamblers: study protocol. *BMJ Open.* 8(4):e018804. doi: [10.1136/bmjopen-2017-018804](https://doi.org/10.1136/bmjopen-2017-018804).
- Christensen DR. 2013. Contingency management literature review: application to problem gambling counselling. *Gambl Res.* 25:3–17.
- DeFulio A. 2023. Dissemination of contingency management for the treatment of opioid use disorder. *Perspect Behav Sci.* 46(1):35–49. doi: [10.1007/s40614-022-00328-z](https://doi.org/10.1007/s40614-022-00328-z).
- Delfabbro P, King D, Parke J. 2023. The complex nature of human operant gambling behaviour involving slot games: structural characteristics, verbal rules and motivation. *Addict Behav.* 137:107540. doi: [10.1016/j.addbeh.2022.107540](https://doi.org/10.1016/j.addbeh.2022.107540).
- Dorey L, McGarrigle J, May RJ, Hoon AE, Dymond S. 2022a. Client views of contingency management in gambling treatment: a thematic analysis. *Int J Environ Res Public Health.* 19(24):17101. doi: [10.3390/ijerph192417101](https://doi.org/10.3390/ijerph192417101).
- Dorey L, Christensen DR, May R, Hoon AE, Dymond S. 2022b. Gambling treatment service providers' views about contingency management: a thematic analysis. *Harm Reduct J.* 19:19. doi: [10.1186/s12954-022-00600-0](https://doi.org/10.1186/s12954-022-00600-0).
- Festinger DS, Marlowe DB, Croft JR, Dugosh KL, Mastro NK, Lee PA, Dematteo DS, Patapis NS. 2005. Do research payments precipitate drug use or coercion participation? *Drug Alcohol Depend.* 78(3):275–281. doi: [10.1016/j.drugalcdep.2004.11.011](https://doi.org/10.1016/j.drugalcdep.2004.11.011).
- Gagnon M, Guta A, Payne A. 2020. "Setting people up for success and then failure"—health care and service providers' experiences of using prize-based contingency management. *Subst Abuse Treat Prev Policy.* 15(1):1–6. doi: [10.1186/s13011-020-00316-z](https://doi.org/10.1186/s13011-020-00316-z).
- Getty CA, Morande A, Lynskey M, Weaver T, Metrebian N. 2019. Mobile telephone-delivered contingency management interventions promoting behaviour change in individuals with substance use disorders: a meta-analysis. *Addiction.* 114(11):1915–1925. doi: [10.1111/add.14725](https://doi.org/10.1111/add.14725).
- Getty CA, Weaver T, Lynskey M, Kirby KC, Dallery J, Metrebian N. 2022. Patients' beliefs towards contingency management: target behaviours, incentives and the remote application of these interventions. *Drug Alcohol Rev.* 41(1):96–105. doi: [10.1111/dar.13314](https://doi.org/10.1111/dar.13314).
- JASP Team. 2023. JASP (Version 0.17.1) [Computer software].
- Kirby KC, Benishek LA, Dugosh KL, Kerwin ME. 2006. Substance abuse treatment providers' beliefs and objections regarding contingency management: implications for dissemination. *Drug Alcohol Depend.* 85(1):19–27. doi: [10.1016/j.drugalcdep.2006.03.010](https://doi.org/10.1016/j.drugalcdep.2006.03.010).
- Kirby KC, Carpenedo CM, Stitzer ML, Dugosh KL, Petry NM, Roll JM, Saladin ME, Cohen AJ, Hamilton J, Reese K, et al. 2012. Is exposure to an effective contingency management intervention associated with more positive provider beliefs? *J Subst Abuse Treat.* 42(4):356–365. doi: [10.1016/j.jsat.2011.09.004](https://doi.org/10.1016/j.jsat.2011.09.004).
- Leickly E, Skalisky J, Angelo FA, Srebnik D, McPherson S, Roll JM, Ries RK, McDonell MG. 2019. Perspectives on a contingency management intervention for alcohol use among consumers with serious mental illness. *Psychiatr Rehabil J.* 42(1):26–31. doi: [10.1037/prj0000330](https://doi.org/10.1037/prj0000330).
- McPherson SM, Burduli E, Smith CL, Herron J, Oluwoye O, Hirchak K, Orr MF, McDonell MG, Roll JM. 2018. A review of contingency management for the treatment of substance-use disorders: adaptation for underserved populations, use of experimental technologies, and personalized optimization strategies. *Subst Abuse Rehabil.* 9:43–57. doi: [10.2147/SAR.S138439](https://doi.org/10.2147/SAR.S138439).
- Neale J, Tompkins CN, Strang J. 2016. Qualitative evaluation of a novel contingency management-related intervention for patients receiving supervised injectable opioid treatment. *Addiction.* 111(4):665–674. doi: [10.1111/add.13212](https://doi.org/10.1111/add.13212).
- Olmstead TA, Petry NM. 2009. The cost-effectiveness of prize-based and voucher-based contingency management in a population of cocaine- or opioid-dependent outpatients. *Drug Alcohol Depend.* 102(1–3):108–115. doi: [10.1016/j.drugalcdep.2009.02.005](https://doi.org/10.1016/j.drugalcdep.2009.02.005).
- Olmstead TA, Sindelar JL, Petry NM. 2007. Clinic variation in the cost-effectiveness of contingency management. *Am J Addict.* 16(6):457–460. doi: [10.1080/10550490701643062](https://doi.org/10.1080/10550490701643062).
- Oluwoye O, Kriegel L, Alcover KC, McPherson S, McDonell MG, Roll JM. 2020. The dissemination and implementation of contingency management for substance use disorders: a systematic review. *Psychol Addict Behav.* 34(1):99–110. doi: [10.1037/adb0000487](https://doi.org/10.1037/adb0000487).
- Orme S, Zarkin GA, Luckey J, Dunlap LJ, Novak MD, Holtyn AF, Toegel F, Silverman K. 2023. Cost and cost-effectiveness of abstinence contingent wage supplements. *Drug Alcohol Depend.* 244:109754. doi: [10.1016/j.drugalcdep.2022.109754](https://doi.org/10.1016/j.drugalcdep.2022.109754).
- Petry NM, Alessi SM, Olmstead TA, Rash CJ, Zajac K. 2017. Contingency management treatment for substance use disorders: how far has it come, and where does it need to go? *Psychol Addict Behav.* 31(8):897–906. doi: [10.1037/adb0000287](https://doi.org/10.1037/adb0000287).
- Petry NM, Blanco C, Stinchfield R, Volberg R. 2013. An empirical evaluation of proposed changes for gambling diagnosis in the DSM-5. *Addiction.* 108(3):575–581. doi: [10.1111/j.1360-0443.2012.04087.x](https://doi.org/10.1111/j.1360-0443.2012.04087.x).
- Petry NM, Kolodner KB, Li R, Peirce JM, Roll JM, Stitzer ML, Hamilton JA. 2014. Prize-based contingency management does not increase gambling. *Drug Alcohol Depend.* 140(3):208–212. doi: [10.1016/j.drugalcdep.2005.11.023](https://doi.org/10.1016/j.drugalcdep.2005.11.023).
- Pfund RA, Ginley MK, Boness CL, Rash CJ, Zajac K, Witkiewitz K. 2022a. Contingency management for drug use disorders: meta-analysis and application of Tolin's criteria. *Clin Psychol Sci Practice.* Advance online publication. doi: [10.1037/cps0000121](https://doi.org/10.1037/cps0000121).
- Pfund RA, Ginley MK, Rash CJ, Zajac K. 2022b. Contingency management for treatment attendance: a meta-analysis. *J Subst Abuse Treat.* 133:108556. doi: [10.1016/j.jsat.2021.108556](https://doi.org/10.1016/j.jsat.2021.108556).
- Pfund RA, Peter SC, McAfee NW, Ginley MK, Whelan JP, Meyers AW. 2021. Dropout from face-to-face, multi-session psychological treatments for problem and disordered gambling: a systematic review and meta-analysis. *Psychol Addict Behav.* 35(8):901–913. doi: [10.1037/adb0000710](https://doi.org/10.1037/adb0000710).
- Pickering D, Blaszczynski A. 2021. Paid online convenience samples in gambling studies: questionable data quality. *Int Gambl Stud.* 21(3):516–536. doi: [10.1080/14459795.2021.1884735](https://doi.org/10.1080/14459795.2021.1884735).
- Pickering D, Keen B, Entwistle G, Blaszczynski A. 2018. Measuring treatment outcomes in gambling disorders: a systematic review. *Addiction.* 113(3):411–426. doi: [10.1111/add.13968](https://doi.org/10.1111/add.13968).
- Pickering D, Spoelma MJ, Dawczyk A, Gainsbury SM, Blaszczynski A. 2020. What does it mean to recover from a gambling disorder? Perspectives of gambling help service users. *Addict Res Theory.* 28(2):132–143. doi: [10.1080/16066359.2019.1601178](https://doi.org/10.1080/16066359.2019.1601178).
- Proctor SL. 2022. Rewarding recovery: the time is now for contingency management for opioid use disorder. *Ann Med.* 54(1):1178–1187. doi: [10.1080/07853890.2022.2068805](https://doi.org/10.1080/07853890.2022.2068805).
- Ranganathan M, Lagarde M. 2012. Promoting healthy behaviours and improving health outcomes in low- and middle-income countries: a review of the impact of conditional cash transfer programmes. *Prev Med.* 55 Suppl: s 95–S105. doi: [10.1016/j.ypmed.2011.11.015](https://doi.org/10.1016/j.ypmed.2011.11.015).

- Rash CJ, Petry NM, Kirby KC, Martino S, Roll J, Stitzer ML. 2012. Identifying provider beliefs related to contingency management adoption using the contingency management beliefs questionnaire. *Drug Alcohol Depend.* 121(3):205–212. doi: [10.1016/j.drugalcdep.2011.08.027](https://doi.org/10.1016/j.drugalcdep.2011.08.027).
- Ritter A, Cameron J. 2007. Australian clinician attitudes towards contingency management: comparing down under with America. *Drug Alcohol Depend.* 87(2–3):312–315. doi: [10.1016/j.drugalcdep.2006.08.011](https://doi.org/10.1016/j.drugalcdep.2006.08.011).
- Rothfleisch J, Elk R, Rhoades H, Schmitz J. 1999. Use of monetary reinforcers by cocaine-dependent outpatients. *J Subst Abuse Treat.* 17(3):229–236. doi: [10.1016/s0740-5472\(99\)00006-9](https://doi.org/10.1016/s0740-5472(99)00006-9).
- Shearer J, Metrebian N, Weaver T, Goldsmith K, Strang J, Pilling S, Mitcheson L, Day E, Dunn J, Glasper A, et al. 2023. The cost-effectiveness of financial incentives to achieve heroin abstinence in individuals with heroin use disorder starting new treatment episodes: a cluster randomized trial-based economic evaluation. *Value Health.* 26(5):658–665. doi: [10.1016/j.jval.2022.11.021](https://doi.org/10.1016/j.jval.2022.11.021).
- Srebnik D, Sugar A, Coblenz P, McDonell MG, Angelo F, Lowe JM, Ries RK, Roll J. 2013. Acceptability of contingency management among clinicians and clients within a co-occurring mental health and substance use treatment program. *Am J Addict.* 22(5):432–436. doi: [10.1111/j.1521-0391.2013.00333.x](https://doi.org/10.1111/j.1521-0391.2013.00333.x).
- Zhou Y. 2019. A mixed methods model of scale development and validation analysis. *Measurement.* 17(1):38–47. doi: [10.1080/15366367.2018.1479088](https://doi.org/10.1080/15366367.2018.1479088).