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Abstract

Background—Contingency management (CM) is a widely recognized empirically-supported addiction treatment; however, dissemination and adoption of CM into routine clinical practice has been slow. Assessment of beliefs about CM may highlight key barriers and facilitators of adoption and inform dissemination efforts. In the present study, we developed a 35-item questionnaire (Contingency Management Beliefs Questionnaire; CMBQ) assessing CM beliefs and examined the relation of these beliefs to clinician characteristics and clinical practices.

Methods—The web-based study was completed by 617 substance abuse treatment providers. We examined the factor structure using exploratory factor analysis (EFA) in a randomly selected half-sample ($n = 318$) and evaluated the generalizability of the solution using confirmatory factor analysis (CFA) in the second half-sample ($n = 299$).

Results—EFA results suggested a 3-factor solution with 32 items retained; factors represented general barriers, training-related barriers, and pro-CM items. CFA results supported the solution, and reliability was good within each half-sample ($\alpha = .88$ and 0.90). Therapeutic approach, years experience in addictions field, perception of CM's research support, prior CM training, and CM adoption interest were significantly associated with the factors.

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Conclusions—Overall, participants viewed CM favorably yet endorsed barriers, indicating a need for more extensive and targeted response to the most common misperceptions in dissemination efforts.

Keywords

contingency management; treatment barriers; dissemination; adoption; technology transfer

1. Introduction

Contingency management (CM) is an operant-based, empirically-supported treatment for substance use disorders (Dutra et al., 2008; Lussier et al., 2006; Prendergast et al., 2006). Clients earn reinforcers (e.g., prizes) by completing objectively verifiable behaviors such as abstinence or treatment attendance. Like many empirically-supported treatments, dissemination of CM within the addictions field has been slow (Miller et al., 2005). Studies examining the use of empirically-supported treatments in substance abuse treatment programs suggest that CM is often among the least familiar and utilized one (Benishek et al., 2010; Herbeck et al., 2008; McGovern et al., 2004; Willenbring et al., 2004).

CM adoption has been hampered by a set of pervasive negative beliefs and attitudes. Treatment providers often express moral/ethical objections, philosophical differences, and concerns about its practicality (Cameron and Ritter, 2007; Henggeler et al., 2008; McCarty et al., 2007; Petry and Bohn, 2003; Ritter and Cameron, 2007; Willenbring et al., 2004). Treatment providers also believe CM is prohibitively costly, is unable to address underlying issues driving substance abuse, inappropriately reinforces one behavior (e.g., abstinence from a target drug) when other treatment goals are unmet (e.g., attendance, other drug use), is disruptive to the treatment process or therapeutic relationship, undermines intrinsic motivation to remain drug-free, and reflects bribery (Kirby et al., 2006).

As noted by Kirby and colleagues (2006 Kirby and colleagues (in press), many of these beliefs reflect a limited understanding of CM and suggest that dissemination might best focus on education efforts tailored to remediate the most often endorsed negative beliefs and promote adherence to the basic behavioral principles underlying CM. Fortunately, others (Petry and Bohn, 2003; Kellogg et al., 2005; Kirby et al., in press) have noted that once CM implementation has begun and treatment providers observe changes, many of the negative beliefs dissipate rapidly. These experiences (Petry and Bohn, 2003; Kellogg et al., 2005; Kirby et al., in press) suggest that simple exposure may spur diffusion of CM. However, Ducharme and colleagues (2007) did not find an effect of within-program CM exposure on adoption likelihood, and Roman et al. (2010) note limited sustainability of implementation following initial CM adoption. More work is needed to understand provider beliefs that serve as potential barriers or facilitators to CM's dissemination. Attitudes toward a treatment can have major impacts on whether and how quickly diffusion occurs. The prominent role of attitudes in models of technology transfer (Rogers, 2002; Simpson, 2002) suggests that institutional and individual attitudes should not be overlooked in the adoption of new interventions.

Two instruments (Henggeler et al., 2008; Kirby et al., 2006) have been developed to assess barriers of CM dissemination. Henggeler et al. (2008) administered a questionnaire to therapists following a CM training workshop. The questionnaire assessed the most frequent institutional, philosophical, logistical, and clinical barriers to CM adoption, although it contained few items related to training needs and competence-related issues. Kirby et al. (2006) designed a questionnaire to assess beliefs about use of tangible and social reinforcers by asking respondents to indicate their agreement with positive and negative attitudinal

statements. The relationship of these statements was not linked to their interest in adopting CM, thereby limiting the questionnaire's ability to elucidate factors that might affect the CM adoption process.

Drawing from existing questionnaires (Henggeler et al., 2008; Kirby et al., 2006), qualitative interviews assessing CM barriers (Cameron and Ritter, 2007; Kellogg et al., 2005), and our experience with CM in dissemination efforts, we developed an assessment tool to measure beliefs about CM among substance abuse treatment providers in a web-based survey. The questionnaire incorporated 1) the content domain breadth of the Henggeler et al. (2008) and Kirby et al. (2006) questionnaires, 2) items related to training and competence barriers, and 3) a rating scale to assess the importance of each statement in participants' decisions to adopt CM. We assessed dimensionality, internal consistency, and stability of the Contingency Management Beliefs Questionnaire (CMBQ) factor structure. To assess concurrent validity, we examined whether prior exposure to CM predicted scores on CMBQ factors. We predicted that training in and experience with CM would be inversely associated with perceived barriers and positively associated with beliefs favorable to CM. Demographic and clinical characteristics (e.g., therapeutic approach, years experience in addictions field) that might be related to beliefs about CM were also evaluated.

2. Method

2.1 Participants

All participants ($N = 617$) self-identified as substance abuse treatment providers, defined as individuals who treated one or more clients in the past year whose primary treatment goals related to reducing substance use.

2.2 Measures

2.2.1 Participant characteristics—We assessed demographic (e.g., gender, age, recovery status) and clinical characteristics (e.g., years experience in the field, therapeutic approach, extent of training in CM). For potentially sensitive items such as recovery status, we included a 'prefer not to answer' option.

2.2.2 Contingency Management Beliefs Questionnaire—We initially created a pool of 56-items from prior studies (Cameron and Ritter, 2007; Henggeler et al., 2008; Kellogg et al., 2005; Kirby et al., 2006) and personal experiences with CM dissemination. Six CM experts (study authors and S.M. Alessi) rated each item for importance on a 5-point scale. We retained 35 non-overlapping items with the highest average importance. These beliefs related to 1) CM's effectiveness, 2) institutional issues, 3) clinical concerns, 4) philosophical concerns, 5) training/competence issues, 6) logistical barriers, and 7) CM-supportive statements. Participants rated each item on a 5-point Likert scale ("no influence at all" to "very strong influence") according to how influential each item was to their interest in adopting CM.

2.3 Procedures

We distributed an internet link to the web-based survey to email lists of providers and professional organizations web pages (e.g., New York State Association of Alcoholism and Substance Abuse Providers; National Association of Lesbian, Gay, Bisexual, and Transgender Addictions Professionals; Addictive Behaviors Special Interest Group of the Association of Behavioral and Cognitive Therapies). Recruitment was widespread and accessed participants from 30 states. As approved by the university's Institutional Review Board, written consent was waived, but all participants indicated consent electronically before accessing the survey. Participants could opt to submit their name and contact

information for entry in a drawing for one of four $100 gift certificates for study participation. Information from the drawing was stored separately and had no link to the survey data. To limit multiple submissions by the same respondent, only one submission per computer was permitted. In addition to the 'prefer not to answer' options, we prompted skipped answers to reduce missing data.

2.3.1 Data analysis—We randomly selected approximately 50% of the sample ($n = 318$) to examine the CMBQ's factor structure using exploratory factor analysis (EFA). We then used confirmatory factor analysis (CFA) to validate the solution in the second half-sample ($n = 299$). For EFA and CFA analyses, we used a maximum likelihood estimator with standard errors robust to nonnormality. We evaluated model fit using the Satorra-Bentler chi-square, the root mean square error of approximation (RMSEA), and the standardized root mean residual (SRMR). Values approaching zero indicate better fitting models for both the RMSEA and SRMR. Common guidelines for RMSEA suggest values >0.10 indicate poor fit, <0.08 indicate acceptable fit, and <0.05 indicate close fit (Browne and Cudeck, 1992). SRMR values <0.10 are generally considered acceptable (Hu and Bentler, 1999).

The EFA was conducted using an oblique (promax) rotation. We anticipated up to a 7-factor solution corresponding with the seven content domains we believed comprised the CMBQ, but we examined a range of factor solutions (Fabrigar et al., 1999). The scree plot (Cattell, 1966), Velicer's (1976) minimum average partial (MAP) test, parallel analysis (Horn, 1965), model fit, and solution interpretability informed the range of retained factors. The MAP test and parallel analysis (with 1000 raw data permutations) were conducted using syntax from O'Connor (2000). *A priori* retention criteria for items were factor loadings of 0.32 or greater on a primary factor and low (< .30) loadings on all other factors (Tabachnick and Fidell, 2001).

3. Results

3.1 Questionnaire Completion

Of the 728 individuals consenting to participate, 111 terminated the study early (during demographics) and did not provide any data on the CMBQ. Using available data from noncompleters ($n = 70$–111 depending on variable), we compared completers ($N = 617$) and noncompleters for differences in demographic and background characteristics. The groups did not differ in terms of age, recovery status, perception of CM's research support, treatment setting (e.g., inpatient, outpatient), or personal therapeutic approach (all ps > .05). Completers were more likely to be male, $\chi^2(1, n = 704) = 5.55$, $p = .018$, and have personal experience with CM, $\chi^2(1, n = 728) = 11.63$, $p = .001$, than noncompleters. Remaining analyses used data from completers ($N = 617$) only. Missing data (i.e., skipped questions) were minimal (<6%) for completers.

3.2 Treatment Provider Characteristics

Table 1 provides demographic and clinical characteristics for the two randomly selected half-samples of providers. The half-samples were similar in terms of gender, age, years experience in the addictions field, recovery status, treatment setting, therapeutic approach, and personal experience with CM (ps > .05). About 50% of participants reported some experience using reinforcers with clients; however, most (72%, 214/296 individuals reporting experience with reinforcers) used no cost or very low cost reinforcement (< $25 per client) and nearly all (90%) reported using magnitudes below $100 per client.

3.3 Exploratory Factor Analysis

Initial review (MAP test, parallel analysis, etc.) suggested a final solution containing 2–6 factors. The 4, 5, and 6 factor solutions each contained one factor with no substantially loading items. The 2-factor and 3-factor solutions produced viable results. In the 2-factor solution, simple structure was obtained with all CM barriers loading on the primary factor and all pro-CM items loading on the second factor.

Table 2 displays factor loadings for the 3-factor solution, which had a significantly improved fit relative to the 2-factor model, Satorra-Bentler (2001) scaled $\Delta\chi^2(33) = 255.20$, $p < .001$. Items are ordered by highest mean endorsement within each factor and significant factor loadings are underlined. We retained 32 of the 35 items based on *a priori* criteria (excluded items located at bottom of Table 2). The 3-factor solution represented a primary factor (F1) containing all barriers except training-related barriers, which loaded on the second factor (F2). All pro-CM items loaded on the third factor (F3).

Given improved model fit compared to the 2-factor solution and evidence that F2 items related to the F1 and F3 factors differently, we proceeded with the 3-factor solution. The final 3-factor, 32-item model had acceptable fit: Satorra-Bentler $\chi^2(403) = 851.15$, $p < .001$, RMSEA = 0.059, SRMR = 0.045. The items accounted for 96%, 91%, and 97% of the variance in each factor, respectively. F1 (general barriers) and F2 (training barriers) correlated significantly, r ($n = 318$) = 0.44, $p < .001$. F3 (pro-CM items) was not correlated with F1 ($r = -0.04$), but correlated moderately with F2, $r = 0.10$, $p = .02$. Mean inter-item correlations and ranges were 0.33 (0.11–0.65), 0.47 (0.27–0.66), and 0.53 (0.34–0.86) for F1, F2, and F3, respectively. Reliability for the whole scale (Chronbach's $\alpha = 0.88$) and each of the individual factors was adequate (F1: $\alpha = 0.90$; F2: $\alpha = 0.78$; F3: $\alpha = 0.92$). Deletion of item 31 ('agency support') would increase alpha of F2 to 0.82; however, given the small number of items loading on F2 and the acceptable factor loadings and inter-item correlations, we chose to retain this item.

As displayed in Table 2, F1 statements with highest mean endorsement included item 20 ("worried about what happens once contingencies are withdrawn"), item 8 ("CM is expensive"), and item 1 ("research evidence does not apply to everyday clinic populations"). For F2, item 16 ("want more training before implementing CM") and item 27 ("no one has experience to supervise CM") were the highest endorsed statements. Among pro-CM statements, item 6 ("useful for goals other than abstinence"), item 18 ("any source of motivation is good"), and item 35 ("keeps clients engaged long enough to learn valuable skills") were among the highest endorsed items. Overall, mean within-person ratings for pro-CM statements ($M = 3.46$, $SD = 0.91$) were higher than barrier items (ps $< .001$; F1: $M = 2.42$, $SD = 0.71$; F2: $M = 2.86$, $SD = 1.06$).

3.4 Confirmatory Factor Analysis

Using CFA, we examined the generalizability of the 3-factor, 32-item EFA solution in the second randomly selected half-sample ($n = 299$). Factor variances were fixed to one and factor loadings were freely estimated. Table 2 displays factor loadings and R-squared for each item. All factor loadings exceeded 0.32 with the exception of item 1 ('research evidence does not apply to clinic populations'), which had a factor loading of 0.30. About 70% of providers reported that this item has some, strong or very strong influence in their decision to adopt CM. This substantial endorsement suggests that even treatment providers familiar with CM's research support may discount this research as inapplicable to everyday clinic populations. Despite the low CFA factor loading, we chose to retain the item given its conceptual importance to CM diffusion efforts and satisfactory loading in the EFA.

The CFA model fit was reasonable, $\chi^2(461) = 1017.02$, $p < .001$, RMSEA = 0.064, SRMR = 0.079, but modification indices suggested significant correlation in the error variances of adjacent pro-CM items (F3). With the addition of these error covariances, model fit improved, $\chi^2(455) = 827.03$, $p < .001$, RMSEA = 0.052, SRMR = 0.077. Correlations between F1 and F2 (0.70, *SE* =0.04) and F2 and F3 (0.15, *SE* =0.08) were significant. Inter-item correlations and ranges for the second half-sample were 0.37 (0.05–0.66), 0.45 (0.23–0.59), and 0.59 (0.43–0.88) for F1, F2, and F3, respectively. Reliabilities were acceptable for the whole scale (Chronbach's α = 0.90) and each of the individual factors (F1: α = 0.91; F2: α = 0.77; F3: α = 0.94). Within-person means across the three factors differed significantly (*ps* < .001). Participants endorsed higher means for the pro-CM factor (*M* = 3.47, *SD* = 0.91) than general barriers (*M* = 2.45, *SD* = 0.74) or training barriers (*M* = 2.88, *SD* = 1.01).

3.5 Covariate Models

We examined factor associations with selected covariates: age, years experience in addictions field, personal therapeutic approach (12-step [referent], cognitive-behavioral treatments [CBT], Motivational, Other), recovery status (not in recovery [referent], in recovery, prefer not to answer), CM used in clinic (none versus any), personal experience with CM (none versus any), extent of prior CM training, and CM adoption interest. We first assessed whether individual covariates independently predicted the scores on the three factors. We eliminated recovery status from further models given nonsignificant associations with all three factors in these single covariate models. The remaining covariates were entered simultaneously, with the three CMBQ factors regressed on all covariates.

Table 3 presents the standardized regression coefficients (RMSEA = 0.06, SRMR = 0.07). Underlined coefficients indicate significant paths. Relative to participants reporting a predominantly 12-step approach, individuals reporting CBT and motivational approaches were less likely to endorse both general (F1) and training (F2) barriers to CM adoption. Those with 'other' therapeutic approaches responded similarly as compared to individuals endorsing a 12-step approach for general (F1) barriers, but were less likely to endorse training (F2) barriers. Prior training in CM was negatively associated with both barriers factors (F1, F2), and those with prior CM experience were less likely to endorse training-related (F2) barriers. Interest in adopting CM was negatively associated with general barriers (F1) and positively associated with training barriers (F2) and pro-CM (F3) factors.

4. Discussion

The present study developed a questionnaire of beliefs about CM in relationship to provider interest in adopting this practice, established its psychometric properties, and examined the association of provider characteristics to the derived factors. The study had three main findings. First, the CMBQ demonstrated stable, reliable psychometric properties across randomly selected half-samples. Second, treatment providers viewed CM favorably, even while acknowledging several adoption barriers. Third, several variables were associated with CM beliefs, including prior CM training, experience with CM, interest in adopting CM, and treatment allegiance.

EFA and CFA results of the CMBQ supported a 32-item, 3-factor structure corresponding to general barriers, training-related barriers, and CM-supportive statements. The measure was stable and reliable across the half-samples. Despite generally favorable views of CM, participants endorsed a number of influential barriers including: 1) the applicability of CM's research support to clinic populations, 2) clients' behavior after the contingencies are withdrawn, and 3) expense of CM. Beliefs that CM undermines internal motivation and does not address the underlying cause of addiction, although pertinent, were not among the top

endorsed barriers as found in the Kirby et al. (2006 Kirby et al. (in press) studies. Difference across studies may be a product of sampling, a reflection of ongoing education regarding CM, or related to different rating scales (i.e., agreement in Kirby et al. [2006, in press] versus influence on adoption in the present study). If related to rating scales, these differences across studies may imply that philosophical barriers, while highly prevalent, are less influential in decisions to adopt CM. We note that many of the barriers (e.g., research applicability, logistical barriers, leadership support) are common to other treatments (Roman et al., 2010; Willenbring et al., 2004). Training efforts will likely need to address both these global barriers and those more specific to CM.

Addressing common misperceptions early in dissemination efforts may facilitate adoption. For example, training might address the applicability of CM's research to typical client populations by emphasizing that much of CM's research has been conducted in community substance abuse treatment clinics (Lott and Jencius, 2009; Peirce et al., 2006; Petry et al., 2000; 2004; 2005a; 2005b; 2006). Further, providers' attention might be drawn to research suggesting that CM appears to work equally well and in some cases better in populations viewed as highest risk for treatment failure, such as those with multiple substance disorders, prior treatment attempts, and psychiatric comorbidities (Alessi et al., in press; Byrne and Petry, 2011; Ford et al., 2007; Rash et al., 2008ab; Weinstock et al., 2007). Fortunately, our results suggest that prior training is associated with less endorsement of CM barriers. Interestingly, prior CM experience was associated with fewer training-related barriers, but not general barriers. These results are consistent with the findings of Ducharme et al. (2007) who found no effect of exposure to CM on adoption likelihood. Future work might assess the extent that training and experience in CM is effective in changing beliefs, as well as whether this questionnaire is sensitive to change over time.

Interest in adopting CM was associated more with positive beliefs about CM and recognition of training and competence needs than perceptions of general barriers. This recognition of training needs bodes well for the careful development and execution of CM protocols that are consistent with behavioral principles. In this study, many providers reported incorporating reinforcers in their practice (e.g., certificates of completion, group leadership status). About 50% of providers indicated that they used CM with clients; however, 72% of these providers indicated that their total amount of reinforcement available per client was less than $25. These practices indicate recognition of the potential value of reinforcement; however, magnitude of reinforcement is an important parameter in the efficacy of CM (Lussier et al., 2006). Unaware providers may develop negative attitudes toward CM when rewards do not produce expected results. Educational efforts need to clearly delineate the differences between the use of rewards versus a systematic application of reinforcement via CM. Materials that stress these differences, including the importance of specific parameters (e.g., magnitude, frequency, and immediacy of reinforcement), may yield better CM protocols and outcomes.

Among clinical characteristics, allegiances to CBT and motivational enhancement approaches were related to less endorsement of CM barriers, while practitioners identifying 12-step as their primary treatment approach endorsed greater barriers. These results are consistent with those of Ducharme et al. (2010) who identified 12-step allegiance as a significant barrier to use of tangible reinforcers. Such findings represent a challenge to CM dissemination given the dominance of 12-step approaches in the United States addiction treatment system (Roman and Johnson, 2004). Fortunately, provider attitudes toward new approaches can change with brief education presentations, even among those with 12-step treatment allegiance (Goddard, 2003).

Although this study focused on providers' beliefs regarding CM, middle and upper management attitudes will also be important to adoption of new technologies (Simpson, 2002). Without adequate support (i.e., provision of training for staff, recognition of time demands), clinical staff are unlikely to successfully implement CM. In addition, providers may also have to contend with negative public opinion about CM. Harm reduction strategies, such as needle exchange and supervised injection sites, face similar obstacles (e.g., Anderson, 1991), but experience with these strategies appears to ameliorate many concerns (Salmon et al., 2007; Thein et al., 2005). Public opinion change about CM will likely be driven by educational materials challenging misperceptions, as well as highlighting the cost-effectiveness of CM and ethical considerations of withholding efficacious treatments. System-level changes, including the ability to integrate CM within existing payment systems, are needed. As noted by Roll et al. (2009), behavioral interventions for autism faced considerably difficulties in gaining recognition by payors, but ultimately succeeded through community education and persistent grass-roots efforts. These experiences may provide guidance for CM-related initiatives.

Strengths of this study were the inclusion of a large, nationwide sample of treatment providers representing those with and without prior exposure to CM. The large sample permitted assessment of the stability of the CMBQ factor structure using separate half-samples, which supports factor structure generalizability. This questionnaire builds on prior measures by expanding coverage of barriers and assessing these barriers in relation to adoption interest. Administrators may find the CMBQ useful as an agency-level measure of providers' barriers. Education materials and trainings could then be tailored to address the most commonly raised concerns within the agency.

Limitations included: 1) use of a web-based survey may reduce generalizability of the results due to sampling bias (e.g., volunteer effect); 2) early termination of the survey occurred in about 15% of the respondents and these respondents were less likely to have experience with reinforcers than those who continued; 3) many of the respondents may have been solicited from email list serves maintained by CM experts, biasing the sample to more CM-experienced providers who may have more favorable impressions toward CM than addiction providers as a whole, and 4) the sample had relatively few providers who identified 12-step as their primary approach. The use of an on-line survey and the recruitment strategies may have predisposed the sample towards clinicians at academic medical centers and hospitals. Individuals in these settings may be more receptive to and aware of research developments, including those related to CM, and may have skewed the sample toward favorable impressions of CM. The underrepresentation of clinicians with 12-step orientations may also be related to methodological approach. Further validation of the questionnaire is needed using representative samples, including those with larger proportions of 12-step providers, those with less CM experience, and administrators. Additional research should also address whether similar relationships between prior training and CM experience exist in samples with less favorable opinions about CM.

Nonetheless, this study developed a questionnaire of positive and negative beliefs about CM and assessed the influence of these beliefs on decisions to adopt CM into clinical practice. The questionnaire was stable and reliable across randomly selected half-samples. Results suggested that providers in this sample view CM favorably overall, although they maintained a number of misperceptions. Ongoing educational efforts can target these barriers while simultaneously highlighting the advantages of CM to more effectively promote the adoption of CM in community substance abuse treatment programs.

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Table 1

Demographic and Background Characteristics for the Randomly Selected Half-samples

Variable	EFA Sample (n = 318)	CFA Sample (n = 299)	Statistic	p
Female	67%	64%	$\chi^2(1) = 0.41$	.52
Age (years)			$\chi^2(4) = 2.93$	.57
18–30	14%	12%		
31–40	21%	23%		
41–50	27%	22%		
51–60	27%	31%		
Over 60	11%	12%		
Years experience in addictions			$\chi^2(4) = 3.37$	.50
≥ 1 year	6%	7%		
2–5 years	24%	23%		
6–10 years	23%	18%		
11–20 years	28%	27%		
> 20 years	20%	24%		
Recovery status			$\chi^2(2) = 2.58$	.28
Not in recovery	66%	72%		
In recovery	27%	23%		
Prefer not to answer	7%	5%		
Treatment setting			$\chi^2(3) = 0.04$	1.00
Methadone Maintenance Clinic	12%	11%		
Residential/inpatient SA	25%	26%		
Outpatient SA	40%	39%		
Other	24%	24%		
Personal therapeutic approach			$\chi^2(3) = 7.50$	.06
12-step	8%	11%		
Cognitive Behavioral	52%	46%		
Motivational Enhancement	21%	27%		
Other	20%	16%		
Any prior experience using reinforcers	50%	46%	$\chi^2(1) = 0.77$	.38
Extent of prior CM training			$\chi^2(6) = 4.08$	.66
None	42%	46%		
Less than 1 hour	11%	9%		
1–2 hours	14%	15%		
3–5 hours	10%	11%		
6–8 hours	8%	6%		
9–16 hours	4%	3%		
More than 16 hours	10%	10%		
Of those with prior reinforcer experience:	**n = 158**	**n = 138**		

Type of reinforcer used[a]

Variable	EFA Sample (*n* = 318)	CFA Sample (*n* = 299)	Statistic	*p*
Social (non-monetary)	62%	67%	$\chi^2(1) = 0.93$	.34
Clinic privileges	31%	40%	$\chi^2(1) = 2.53$	.11
Vouchers	10%	12%	$\chi^2(1) = 0.61$	.44
Prizes	43%	37%	$\chi^2(1) = 1.13$	.29
Typical magnitudes of available reinforcement (per client)[b]			$\chi^2(8) = 7.72$	.46
$0 (non-monetary reinforcement only)	38%	47%		
Less than $10	16%	11%		
$10–25	15%	17%		
$25–50	11%	7%		
$50–100	9%	9%		
$100–300	4%	6%		
$300–500	3%	1%		
More than $500	2%	1%		
Target behaviors[a]				
Attendance	84%	75%	$\chi^2(1) = 3.05$	.08
Abstinence	60%	59%	$\chi^2(1) = 0.02$	.90
Activities	39%	38%	$\chi^2(1) = 0.02$	.88
Clinic behaviors	55%	50%	$\chi^2(1) = 0.76$	.38

Notes.

[a] Respondents could select more than one option.

[b] Percentages do not add to 100% due to missing data. EFA and CFA samples were randomly selected half-samples from the total 617 participants. Participants were self-identified substance abuse treatment professionals. EFA = exploratory factor analysis, CFA = confirmatory factor analysis, SA = substance abuse.

Table 2

EFA and CFA Results

CMBQ items	EFA Results (n = 318)				CFA Results (n = 299)			
	Mean (SE)	Factor Loadings			Factor Loadings			R²
		F1	F2	F3	F1	F2	F3	
20. I am worried about what happens once the contingencies are withdrawn.	2.95 (1.19)	0.42	0.20	0.18	0.66			0.44
8. CM is expensive (e.g., cost of prizes, vouchers).	2.94 (1.20)	0.37	0.11	0.05	0.51			0.26
1. The research evidence about CM's effectiveness does not apply to everyday clinic populations.	2.86 (1.05)	0.39	0.06	0.16	0.29			0.09
3. Clients might sell/trade earned items for drugs.	2.79 (1.23)	0.43	0.14	0.05	0.51			0.26
12. Providing prizes/vouchers undermines the clients' internal motivation to stay sober.	2.56 (1.24)	0.59	0.03	0.01	0.72			0.51
26. CM doesn't address the underlying cause of addiction.	2.54 (1.29)	0.62	0.15	−0.12	0.78			0.61
25. I believe it is not right to give rewards for abstinence if clients are not meeting other treatment goals (e.g., group attendance).	2.51 (1.32)	0.61	0.16	−0.11	0.72			0.53
9. I am not convinced by the research about CM's effectiveness with substance abusers.	2.45 (1.18)	0.68	−0.07	−0.08	0.69			0.47
19. CM interventions create extra work for me.	2.42 (1.13)	0.57	−0.04	0.12	0.56			0.32
24. CM might cause arguments among clients (e.g., when some get prizes and other do not).	2.38 (1.22)	0.56	0.23	0.01	0.71			0.50
13. I do not have time to administer voucher/prizes in a therapy session.	2.25 (1.15)	0.66	−0.07	−0.01	0.66			0.44
15. Clients will view CM as patronizing.	2.20 (1.11)	0.75	0.02	−0.03	0.73			0.53
28. The community wouldn't understand (i.e., clinic will look bad for giving rewards to substance abusers).	2.20 (1.21)	0.61	0.19	−0.07	0.69			0.47
14. My clinical experience with recovering addicts is more important than any research evidence.	2.11 (1.09)	0.69	−0.23	0.01	0.51			0.26
7. I find CM distasteful because it is basically paying someone to do what they should do already.	2.03 (1.09)	0.70	−0.09	−0.22	0.78			0.61
4. A lot of my clients are already abstinent at intake, so they don't need CM.	1.95 (0.99)	0.47	−0.08	−0.02	0.41			0.17
32. Our clinic rules prevent urine screening.	1.67 (1.16)	0.41	0.08	0.01	0.35			0.12
16. I want more training before implementing CM.	3.32 (1.29)	0.14	0.57	0.19		0.67		0.45
27. Currently, no one in my facility has the experience to supervise CM.	2.87 (1.45)	0.15	0.74	−0.06		0.78		0.62
22. I don't feel qualified or properly trained to administer CM interventions.	2.85 (1.35)	0.15	0.71	0.02		0.77		0.60
31. My agency/supervisors/administrators do not support CM (e.g., do not provide training, resources).	2.38 (1.35)	0.30	0.35	0.01		0.50		0.25
18. Any source of motivation, including extrinsic motivation, is good if it helps get clients involved and responding to treatment.	3.74 (1.09)	−0.10	0.02	0.68			0.79	0.62
6. CM is useful when targeting treatment goals other than abstinence (attendance, activities).	3.62 (1.02)	−0.03	−0.04	0.74			0.74	0.55
35. CM is helpful because it helps keep clients engaged in treatment long enough for them to really learn valuable skills.	3.59 (1.14)	−0.12	0.08	0.85			0.88	0.77

CMBQ items	Mean (SE)	EFA Results (n = 318) Factor Loadings			CFA Results (n = 299) Factor Loadings			R^2
		F1	F2	F3	F1	F2	F3	
33. CM focuses on the good in clients' behavior, and not just what went wrong.	3.56 (1.24)	−0.02	0.08	0.67			0.78	0.61
11. CM is good for clients because they get excited about their treatment and progress.	3.55 (1.10)	0.09	−0.19	0.78			0.82	0.67
29. CM is worth the time and effort if it works.	3.53 (1.19)	−0.12	0.08	0.72			0.74	0.55
30. I am in favor of adding CM interventions to our existing substance abuse treatment services.	3.48 (1.23)	−0.18	0.05	0.72			0.72	0.52
34. CM helps clients get sober so that they can work on other aspects of treatment.	3.47 (1.15)	−0.13	0.17	0.79			0.85	0.73
5. CM is useful when targeting abstinence.	3.47 (1.10)	0.07	−0.03	0.72				0.47
17. CM will help get clients in the door (e.g., motivate them to come to treatment).	3.22 (1.25)	0.11	−0.08	0.65			0.79	0.51
10. CM is good for the client-counselor relationship.	3.10 (1.17)	0.19	−0.19	0.66			0.64	0.42
Items not retained:								
2. I can't bill for the extra work and effort involved in CM.	2.68 (1.30)	0.28	0.11	0.02	-	-	-	-
21. CM is not consistent with the predominant approach at my facility.	2.54 (1.28)	0.43	0.36	−0.08	-	-	-	-
23. CM is difficult to implement.	2.34 (1.11)	0.53	0.32	0.07	-	-	-	-

Note. Underlined items represent significant factor loadings per *a priori* criteria (≥0.32).

Table 3

CFA Model Regression Coefficients (n = 299)

Covariates	Factor 1: General Barriers	Factor 2: Training-related Barriers	Factor 3: Pro-CM Items
Age	−0.07	−0.08	−0.01
Years experience in addiction field	−0.08	0.04	−0.05
Personal therapeutic approach (12-step = referent)			
Cognitive Behavioral	<u>−0.41</u>	<u>−0.60</u>	−0.29
Motivational Enhancement	<u>−0.61</u>	<u>−0.35</u>	−0.08
Other	−0.23	<u>−0.50</u>	−0.34
CM used by other clinicians at primary worksite (relative to none)	−0.001	−0.002	−0.002
Prior experience using reinforcers (relative to none)	−0.16	<u>−0.55</u>	−0.09
Amount of prior CM training	<u>−0.28</u>	<u>−0.38</u>	0.06
CM adoption interest	<u>−0.13</u>	<u>0.16</u>	<u>0.57</u>

Notes. Underlined standardized coefficients are significant at $p < .05$.