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Engaging in job-related activities is associated with reductions in employment problems and improvements in quality of life in substance abusing patients

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Abstract

Reinforcement-based interventions are highly efficacious in the treatment of substance use disorders, and their benefits can extend to other areas of functioning as well. In particular, reinforcing participation in job-related activities may be useful for improving employment outcomes, which in turn may enhance quality of life and decrease substance use. These secondary analyses compared substance abusing patients randomized to reinforcement interventions (N = 185) who selected and completed two or more job-related activities during treatment versus those who did not. Patients who completed two or more job-related activities during treatment had significantly greater reductions in employment-related problems and improvements in quality of life than those who completed only one or no job-related activities, even after controlling for baseline differences that may impact employment outcomes. Further, patients who completed employment activities remained in treatment significantly longer and achieved greater durations of abstinence than those who did not. These data suggest that reinforcing job-attainment activities may have broad beneficial effects. Reinforcement interventions should be considered for enhancing employment skills training acquisition more generally.

Keywords

contingency management; substance abuse; employment; unemployment

Basic operant behavioral research demonstrates that a behavior that is reinforced will increase in frequency. Individuals who are employed can be rewarded for their efforts in a variety of forms that include direct pay, co-worker and supervisor recognition, and sense of autonomy (Segrist, 2002). Persons who are unemployed, especially those with the combination of chronic unemployment and substance abuse problems, may benefit from behavioral reinforcement interventions that are directly tied to a set of skills, sometimes labeled as “job-seeking behaviors.” These include developing resumes, searching job want ads, completing job applications, and attending vocational rehabilitation programs. The value of extensive job coaching coupled to a reward system has been recognized in settings that serve individuals with severe psychiatric and cognitive problems (Bond, Dietzen, McGrew, & Miller, 1995; Skord & Miranti, 1994). However, regular and consistent

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reinforcement is not a typical feature of entry or re-entry into the job market. The chronically unemployed experience repeated failures at their attempts toward job seeking, and when training is available, there is an absence of concomitant income and considerable uncertainty over a successful outcome. The provision of tangible reinforcement during the job seeking process, while not a substitute for retraining and career assistance, may increase the likelihood of unemployed individuals with substance abuse problems persisting in job search activities and eventually obtaining jobs.

Tangible reinforcement for job-seeking activities could come in many forms, ranging from direct cash, to the chance to win prizes (Petry, Martin, Cooney, & Kranzler, 2000), or a set amount of vouchers exchangeable for retail goods and services (Higgins, Badger, & Budney, 2000). Interventions using such reinforcers have been extensively researched in treating substance abuse disorders. Typically, drug use is monitored via urinalysis testing several times weekly, and each time the patient tests negative, he receives tangible reinforcement, i.e., a voucher or chance to win prizes. Numerous empirical studies, including multi-site national projects (Dutra et al., 2008; Peirce et al., 2006; Petry, Peirce, et al., 2005) and meta-analyses (Lussier, Heil, Mongeon, Badger, & Higgins, 2006; Prendergast, Podus, Finney, Greenwell, & Roll, 2006), point to the efficacy of reinforcement interventions in reducing drug use.

Although reinforcement is most often contingent upon submission of a drug-negative sample in substance abusing populations, reinforcers can also be provided for completion of activities related to patients' long-term goals. For example, unemployed patients may contract with a therapist each week to do specific activities related to job seeking, such as attending a vocational training meeting, completing a job application, or going to a job interview. If activities are completed and verified via return of information from employment agencies or receipts, patients earn tangible reinforcers (Petry, Tedford, & Martin, 2001). Reinforcing activity completion is more in line with standard positive reinforcement operant techniques as a specific behavior is reinforced; in contrast, when reinforcing submission of a drug-negative sample, the behaviors leading to a negative sample are obscure, i.e., non-drug use. Therefore, reinforcing concrete job-related activities may be particularly useful in promoting employment-seeking behaviors and more straightforward than reinforcing abstinence.

Over half of substance abuse treatment patients have employment difficulties (Foster, Marshall, Hooper, & Peters, 1998; Siegal et al., 1996). Substance abuse can stem from (Fergusson, Horwood, and Lynskey, 1997; Henkel, 2011), as well as lead to (Henkel, 2011), job loss. By receiving reinforcement for complying with steps related to obtaining employment, individuals with substance use disorders may be more motivated to follow through with employment activities and eventually secure jobs.

To date, relatively little research has focused on reinforcing job or skills training acquisition in substance users involved in treatment programs. Silverman and colleagues (2001) created a reinforcement-based *Therapeutic Workplace*, to which substance abusing patients gain entry by submitting drug negative urine samples. Initially, participants earn monetary-based reinforcers for attending and completing computer training activities; after they become

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proficient in data entry, they earn reinforcers that are performance-based, being associated with the volume of data they enter accurately. This *Therapeutic Workplace* is efficacious in enhancing abstinence outcomes (Silverman et al., 2001; DeFulio, Donlin, Wong and Silverman, 2009; Silverman et al., 2007) for periods up to three years in which the *Therapeutic Workplace* is in effect (Silverman et al., 2002).

Two studies conducted in a more traditional vocational rehabilitation program found reinforcement interventions efficacious in improving work-related outcomes in drug abusing veterans with significant psychiatric illnesses. In an initial pilot study, Drebing et al. (2005) randomly assigned 19 substance abusing patients with significant psychiatric conditions such as schizophrenia to a compensated work therapy program or that same program in which they received reinforcers (up to $1006 over 16 weeks) for submitting drug-negative urine samples and for taking steps toward obtaining and maintaining a job. The study-related reinforcers were independent from and in addition to any income that may have been earned from jobs. Compared to the usual work therapy condition, those in the reinforcement condition submitted more drug negative samples, engaged in more job-search activities, were more likely to obtain employment, and earned higher wages. In a larger study, Drebing et al. (2007) randomly assigned 100 veterans with comorbid psychiatric disorders and substance abuse to similar interventions as outlined above. Relative to patients in the standard vocational rehabilitation condition, those in the reinforcement condition achieved significantly longer periods of abstinence and submitted evidence of more intense job searches; they also transitioned to competitive employment faster and at higher rates. These results suggest that employment outcomes can be enhanced by adding behavioral procedures that directly reinforce activities related to job attainment.

Benefits of employment and employment-related activities may extend beyond abstinence and employment outcomes to other areas of functioning, such as quality of life. Both substance abusing (Havassy & Arns, 1998; McKenna et al., 1996) and unemployed populations (Axelsson, Andersson, Eden, & Ejlertsson, 2007; Miller & Dishon, 2006) suffer from low quality of life relative to non-substance abusing and employed populations, and the two conditions combined can have synergistic adverse effects on quality of life indices (Lozano et al., 2008). Thus, encouraging substance abusing patients to actively engage in job-related activities via reinforcement techniques may not only be associated with reductions in substance use and employment problems, but it may have broad beneficial impacts in life quality and satisfaction.

The purpose of this study was to examine the association between engaging in job-related activities and indices of substance use and psychosocial functioning. Using data from two completed studies that reinforced both drug abstinence and activity completion independently, we compared employment, substance use, and quality of life outcomes among those who chose to complete job-related activities during the course of a 12-week reinforcement intervention versus those who did not. The hypothesis was that engaging in job-related activities would be associated with reductions in employment problems, better substance use treatment outcomes, and improvements in overall quality of life.

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METHODS

Participants

The study population consisted of 185 participants, who had been randomized in two reinforcement intervention studies (Petry et al., 2004; Petry, Alessi, et al., 2005). Patients randomized to the non-reinforcement control conditions (N = 75) were excluded from the present analyses because no information was obtained regarding their participation in employment or other goal-related activities, and the published reports (Petry et al., 2004; Petry, Alessi, et al., 2005) already indicate these patients performed more poorly with respect to treatment outcomes than patients assigned to reinforcement conditions. The studies were conducted at three community-based substance abuse treatment clinics. The clinics provided similar psychosocial (non-methadone) treatment and served analogous patient populations. Study recruitment coincided with initiation of intensive outpatient treatment. Inclusion criteria for both studies were age older than 18 years and DSM-IV criteria for past-year cocaine abuse or dependence. Exclusion criteria were dementia, uncontrolled psychosis, imminent suicidality, or in recovery for pathological gambling. In recovery from pathological gambling has been a standard exclusion in prize reinforcement studies, although no evidence exists that prize reinforcement increases gambling (Petry et al., 2006; Petry & Alessi, 2010). All participants signed written informed consent, and the University Institutional Review Board approved both studies.

Assessments

At study initiation, research assistants administered demographic questionnaires and checklists based on sections of the Structured Clinical Interview of DSM-IV (First, Spitzer, Gibbon, & Williams, 2002). Urine samples were tested for the presence of opioids and cocaine using OnTrak TesTstick (Varian, Inc, Walnut Creek, CA) and breath samples for alcohol using an Alco-sensor-IV Alcometer Breathalyzer (Intoximeters, St. Louis, MO).

Research assistants also administered the Addiction Severity Index (ASI; McLellan et al., 1992), which is a widely used, reliable and valid instrument that evaluates severity of problems across seven domains: employment, family/social, legal, drug, alcohol, medical, and psychiatric (Bovasso, Alterman, Cacciola, & Cook, 2001; Kosten, Rounsaville, & Kleber, 1983). Composite scores range from 0 to 1 on each domain, with higher scores reflecting greater problem severity. The ASI-employment section inquires about current employment and monthly earned income from all sources, including “under the table” work; it also provides a measure of employment problems. Scores on this index decrease when suitable jobs are obtained and maintained (McLellan, Luborsky, O’Brien, Woody, & Druley, 1982; Siegal et al., 1996). The ASI, however, does not contain any items related to participation in job-seeking activities.

The Quality of Life Inventory (QOL; Frisch, 1994) evaluates satisfaction and importance of 17 domains of life (e.g., health, work, love relationship, friendship). In each domain, a subscale score is obtained by multiplying the respondent’s rating of *importance* by his or her rating of *satisfaction*. *Importance* is rated on a three-point scale ranging from 0 (not at all important) to 2 (extremely important), and *satisfaction* is rated on a seven-point scale

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ranging from −3 (very dissatisfied) to +3 (very satisfied). Thus, subscale scores can range from −6 (i.e., extremely important and very dissatisfied) to 6 (extremely important and very satisfied). The total QOLI score is calculated by averaging all subscale scores that have *importance* ratings greater than zero. Therefore, QOLI total scores reflect well-being in up to 17 specific domains considered important from the respondent's perspective, and can range from −6 to 6, with higher scores reflecting better quality of life. This questionnaire has high test-retest reliability and correlates strongly with other measures of well being (Frisch, Cornell, Villanueva, & Retzlaff, 1992; Frisch et al., 2005).

The assessments outlined above were also administered at the end of the 12-week treatment period. Compensation was provided ($35 in Petry et al., 2004 and $30 in Petry, Alessi et al., 2005) for participation in follow-up evaluations. Overall, 77.8% of randomized participants completed the follow-up, with no differences in completion rates based on baseline characteristics, e.g., age, income, gender, race.

Procedures

All participants received standard outpatient substance abuse treatment, including relapse prevention, coping and life skills training, AIDS education, and 12-step treatment. All treatment was conducted in a group format, with sessions held on 3–4 days per week for 2–4 weeks depending upon need, followed by gradual reductions in care. In addition to standard care, all participants included in this report were randomized to a reinforcement condition. Both of the trials (Petry et al., 2004; Petry, Alessi, et al., 2005) evaluated the efficacy of two reinforcement conditions relative to standard care alone. Three of the reinforcement conditions (both conditions in the Petry et al., 2004 study and one in the Petry, Alessi et al., 2005 study) involved prize reinforcers in which participants had opportunities to win prizes valued at $1 to $100. The fourth reinforcement condition (from the Petry, Alessi et al., 2005 study) provided guaranteed escalating vouchers exchangeable for retail goods or services as reinforcers. The monetary values of expected reinforcers ranged from $80 to $800 across the four conditions, as detailed in the main trials (Petry et al., 2004; Petry, Alessi, et al., 2005). Study staff administered reinforcement procedures were trained and supervised throughout the study for consistency.

In all four reinforcement conditions, participants earned reinforcement for two behaviors: (1) submitting drug negative samples, and (2) completing (and objectively verifying) non-drug related activities. The non-drug related activities could include the employment-related activities outlined below. Both reinforcement determinants (toxicology results and non-drug related activity completion) were managed independently, and total amount of reinforcement was equally divided between submission of drug-negative samples and completion of non-drug related activities in all four reinforcement conditions.

Reinforcement for abstinence—Breath samples were screened for alcohol concentration (BAC), and urine toxicology samples were tested for cocaine and opioids one to three times per week, using the testing procedures outlined earlier. To earn reinforcers, samples were required to test negative for all three substances (alcohol, opioid, and cocaine). The monetary value of the reinforcement escalated for consecutive periods of abstinence;

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the first set of negative samples resulted in one draw from the prize bowl in the prize conditions (or a $1 voucher in the voucher condition) and then increased to 2, 3, 4 draws (or vouchers) and so on. Missed or positive samples reset reinforcement earned to one draw (or a $1 voucher) for the next negative sample.

Reinforcement for completing non-drug related activities—Reinforcers were also provided for completing activities related to goals. From a needs assessment, participants selected goal areas: employment, education, family, health, housing, legal, personal improvement, recovery, social/recreation, and transportation (Petry et al., 2001). Participants were expected to complete three specific goal-related activities each week. They received reinforcers for each completed activity, verified by an objective method (e.g. receipt, pamphlet, completed form). Reinforcement was 1 draw from a prize bowl (or a $1 voucher) for each activity completed and increased weekly if all three activities were completed.

Employment activities were specifically coded as: identifying jobs in want-ads, developing a resume, obtaining or completing a job application, attending a job interview, making a follow-up call about a job possibility, going to work (or getting to work on time), talking to a supervisor about scheduling, making or attending job training or unemployment service agency appointments, getting specific information for jobs (e.g., bus schedules), and signing up for, attending, or studying for job training programs (truck driver's licenses, certified nursing assistant, baggage handling etc.). Although these activities are applicable primarily to unemployed persons, some relate to those with paid employment (going to work, getting work schedules). Employment rates and income did not differ between those who completed job-related activities or not during the course of treatment (Table 1), and many employed persons were under-employed and expressed interest in obtaining other or additional work.

All other activities were coded as non-job related. Examples included attending a doctor's appointment, a parole officer's meeting, or a 12-step meeting, writing journal entries, or visiting a museum or other community event.

Statistical analysis

Activity contracts were lost or never completed for two participants, and they were not included in the final sample, leaving 185 participants of 187 randomized to a reinforcement intervention across the two studies (Petry et al., 2004; Petry, Alessi, et al., 2005). The mean number of employment-related activities selected over the 12-week intervention was 1.4 (*SD* = 2.1), and mean completed was 1.0 (*SD* = 1.8). The number of completed employment-related activities ranged from 0–10. Overall, 68.2% (*SD* = 38.2) of employment activities were completed, compared with 60.6% (*SD* = 26.3) of all the activities selected. Seventy-six participants (41.9%) completed at least one job-related activity during treatment, and 42 (22.7%) completed at least two.

Baseline variables were compared between participants who completed 2 or more employment-related activities and those who did not using t-tests for continuous variables and Chi-square tests for dichotomous variables. This cut-point was chosen because it retained moderately large sized groups of patients whereas restricting analyses to those who completed more employment activities would substantially decrease the sample size.

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Further, the mean duration of treatment attendance was 7.2 (*SD* = 4.0) weeks, so two employment activities reflects completion of more than 1 employment-related activity per month, which was considered at least moderate engagement in job-related activities during treatment.

Four primary outcomes were defined a priori: changes in ASI-employment composite scores, changes in QOL scores, weeks retained in treatment, and longest duration of abstinence (LDA). To examine changes in severity of employment problems over time, post-treatment ASI-Employment scores were subtracted from baseline ASI-Employment scores, such that positive change scores represented improvements in employment functioning while negative change scores indicated worsening in employment problems over time. Change scores, rather than raw scores, were used because they were normally distributed and took into consideration baseline scores. Changes in QOL scores were similarly derived, but in these cases negative change scores indicated improved QOL over time. When overall differences in QOL scores were significant, post-hoc tests evaluated differences on individual QOL subscale scores. Holm's (1979) procedure was used to correct for multiple comparisons, and between-group differences that remain significant after adjusting for multiple comparisons are noted.

Time in treatment was calculated in weeks and ranged from 0–12. LDA was defined as the greatest number of consecutive weeks of objectively verified abstinence from alcohol, cocaine, and opioids, and it also ranged from 0 to 12 weeks. Positive samples for one or more substances (alcohol, cocaine or opioids), unexcused absences, or missed samples broke the string of abstinence. None of the above outcomes differed significantly between the reinforcement conditions evaluated in the main studies (Petry et al., 2004; Petry, Alessi, et al., 2005), and therefore all reinforcement conditions were combined for the purposes of these analyses.

General Linear Model univariate analyses of covariance were used to evaluate the association between completing employment activities and the four outcome measures. Employment activities completed, gender, age, baseline ASI-drug, and baseline ASI-medical scores were included as covariates or fixed factors (for dichotomous measures). Total number of activities completed during treatment was entered as a continuous weighted variable because it controlled for overall "motivation" or ability to complete activities (i.e., a person who remained in treatment just 2 weeks had only 6 activities and hence would be less likely to complete 2 employment-related activities than someone who was in treatment all 12 weeks). For the substance use outcomes, data were available for 100% of participants. For ASI-employment and QOL change scores, 47 participants failed to complete the follow-up or had missing data on one or more items so these analyses were conducted twice: initially including only those with full data, and secondly coding 0 (no change in ASI-employment or QOL scores) for those with missing data. All analyses were conducted in SPSS v. 15. Effects were considered statistically significant when two-tailed *p* values were $< .05$.

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RESULTS

As shown in Table 1, participants who completed two or more employment-related activities were generally similar to those who did not with respect to demographic characteristics. However, those who completed employment activities had lower ASI-medical and ASI-drug scores at baseline than those who did not, so subsequent analyses controlled for these differences as well as gender and age, which are related to employment difficulties.

Even after controlling for other variables that could impact outcomes, completing employment activities during treatment was significantly and positively associated with reductions in severity of employment problems as assessed by the ASI (Table 2). When only participants for whom full data were available were included (n = 138), the change in ASI-employment change scores was significantly higher (indicating improvement in functioning) among those who completed more employment activities during treatment. Gender was also significantly related to changes in ASI-employment scores, F (1, 132) = 12.39, $p < .001$, with males showing virtually no change over time, and females demonstrating a worsening in scores between pre- and post-treatment.

When patients with missing data were considered to have no change in employment problems over time, results were similar. Completing employment activities was again significantly associated with changes in ASI-Employment scores, F (1, 169) = 4.96, $p < .05$, along with gender, F (1, 169) = 14.83, $p < .001$, but no other variables impacted changes in employment composite scores over time.

Completing employment activities was also significantly associated with improvements in QOL from pre- to post-treatment. Including just patients with full data (n = 138), completing employment activities was the only variable significantly predictive of overall QOL change scores. Substituting 0's, indicative of no change in quality of life scores, for those with missing post-treatment data again resulted in only one significant predictor of change scores —completion of employment activities, F (1, 169) = 18.51, $p < .001$.

Table 3 shows pre- and post-treatment means and standard deviations for overall QOL scores and the 17 specific indices of QOL for participants who completed versus those who did not complete two or more employment activities during treatment. After controlling for baseline ASI-medical and employment scores, age, gender, and total activities during treatment, completion of employment activities was related to changes in specific QOL indices, including work, self regard, philosophy of life, and love.

Completing employment activities was also significantly associated with substance use outcomes (Table 2). Participants who completed employment activities remained in treatment longer and achieved longer durations of continuous abstinence than those who did not. Baseline ASI-drug scores were also significantly and inversely associated with durations of abstinence achieved, F (1, 169) = 10.46, $p < .001$, but no other variables were related to abstinence duration, and none were associated with treatment retention.

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DISCUSSION

Completing two or more job-related activities during participation in a reinforcement-based intervention provided in the context of substance abuse treatment was associated with reductions in employment problems. This effect was significant, even after controlling for other variables that may independently impact outcomes, including total number of activities completed throughout treatment. These data are consistent with other studies that explicitly reinforced job-related activities in dual-diagnosis veterans participating in vocational rehabilitation programs (Drebing et al., 2005, 2007), and they extend benefits of reinforcing job-related activities to more general substance abuse treatment populations.

The severity of employment problems in this sample was high. At time of initiating substance abuse treatment, only about a third of these patients had worked in the past month, and the average annual income was well under $10,000. Over half the participants elected to engage in one or more activities designed to improve their employment situation, and over 20% completed two or more such activities. Completing two or more employment activities was consistently associated with improved outcomes across a number of domains including reductions in employment problems, better substance use outcomes, and improvements in quality of life indices. In total, ten patients started new jobs during the course of treatment, and nine of them were in the group that completed two or more employment-related activities. Completing two or more job-related activities improved work quality of life changes scores, but it also extended to other areas such as self regard, philosophy of life, and love. As employment is consistently related with global benefits in overall functioning (Ross & Mirowsky, 1995), these data suggest that reinforcing employment activities may have wide-reaching benefits.

Although numerous benefits of engaging in employment-related activities were found, some limitations to the study design may impact interpretations of the findings. This study was a retrospective analysis of patients who had been randomized to reinforcement interventions, and it compared those who chose to versus those who chose not to complete any, or only one, employment-related activities as part of their treatment plan. Thus, this study does not speak to the efficacy of reinforcement-based interventions in enhancing outcomes. Patients self-selected the types of activities they wanted to do each week, and patients more motivated across a range of dimensions may have been more likely to select and complete employment activities than those who were not. To control for the impact of motivation to complete activities generally, the total number of activities completed during treatment was included in the regression analyses. Even after controlling for this and other potentially confounding variables, number of employment activities emerged as a strong and consistent predictor of improved outcomes.

Nevertheless, patients may have engaged in activities without being explicitly reinforced for doing so. The process underlying selecting and reviewing specific work related activities weekly may improve outcomes, even without tangible reinforcement. Thus, future studies are needed to isolate the effective ingredients of reinforcement interventions with respect to improving employment and related outcomes.

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The number of patients who completed large numbers of employment activities was small, and more pronounced effects may occur if patients were reinforced to engage in work related activities more regularly, e.g., weekly instead of once or twice per month on average. On the other hand, it is also possible that an exclusive focus on employment activities may be counterproductive in that the number of meaningful employment activities one can complete in a one week period may be low. For example, only a limited number of job positions may be available for which patients with few employment skills can apply, especially in rural areas. By partnering directly with employment agencies, the array of possible activities may be expanded to include greater attention to and emphasis on vocational rehabilitation and training services, which may ultimately extend job possibilities.

Results from this study may also not generalize to non-substance abusing populations, or those who are not actively seeking substance abuse treatment. Non-substance abusing individuals may, or may not, benefit from weekly activity contracting. Further, long-term effects were not evaluated. Despite these limitations, data from this study in conjunction with previous reports (Drebing et al., 2005, 2007) suggest that reinforcing work-related activities using behavioral approaches has a strong potential for improving employment outcomes, as well as related areas of functioning. These results call for more systematic evaluation of reinforcement-based interventions in improving job seeking skills in unemployed populations.

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Table 1

Characteristics of participants who did and did not complete two or more employment-related activities.

Variables	< 2 Employment activities	≥ 2 Employment activities	Test value (*df*)	*p* value
N	143	42		
Reinforcement condition, % (n)			χ^2 (3) = 4.45	.22
Low prizes (Petry et al., 2004)	26.6 (38)	16.7 (7)		
Usual prizes, (Petry et al., 2004)	22.4 (32)	14.3 (6)		
Prizes (Petry et al., 2005a)	25.2 (36)	31.0 (13)		
Vouchers (Petry et al., 2005a)	25.9 (37)	38.1 (16)		
Clinic, % (n)			χ^2 (2) = 3.33	.19
Clinic A	11.2 (16)	21.4 (9)		
Clinic B	46.2 (66)	35.7 (15)		
Clinic C	42.7 (61)	42.9 (18)		
Women, % (n)	57.3 (82)	59.5 (25)	χ^2 (1) = 0.06	.80
Hispanic, % (n)	11.2 (16)	7.1 (3)	χ^2 (1) = 0.58	.45
Race, % (n)			χ^2 (2) = 1.03	.60
Caucasian	25.2 (36)	21.4 (9)		
African American	60.8 (87)	69.0 (29)		
Other	14.0 (20)	9.5 (4)		
Age (years)	35.67 ± 7.43	34.95 ± 5.27	*t*(183) = 0.59	.56
Education (years)	11.64 ± 1.58	11.64 ± 1.01	*t*(183) = 0.00	.99
Past year income[a] (dollars)	$7,644 ± 11,537	$5,794 ± 9,100	*t*(183) = 0.96	.34
Worked ≥1 day in last month	34.3 (49)	28.6 (12)	χ^2 (1) = 0.48	.49
Typical employment status in past 3 years, % (n)			χ^2 (2) = 4.13	.25
Employed full time	45.2 (61)	56.4 (22)		
Employed part time	25.2 (34)	10.3 (4)		
Unemployed	28.0 (40)	31.0 (13)		
Other	5.6 (8)	7.1 (3)		
Married (%)	9.8 (14)	9.5 (4)	χ^2 (1) = 0.00	.96
Dependence, % (n)				
Cocaine	87.4 (125)	78.6 (33)	χ^2 (1) = 2.04	.15
Alcohol	45.5 (65)	50.0 (21)	χ^2 (1) = 0.27	.60
Heroin	20.3 (29)	19.0 (8)	χ^2 (1) = 0.03	.86
Addiction Severity Index scores				
Employment	0.74 ± 0.30	0.80 ± 0.29	*t* (183) = −1.15	.25
Medical	0.23 ± 0.33	0.10 ± 0.24	*t* (183) = 2.39	.02
Alcohol	0.20 ± 0.21	0.17 ± 0.17	*t* (183) = 0.70	.49
Drug	0.17 ± 0.09	0.14 ± 0.08	*t* (183) = 1.87	.05
Legal	0.13 ± 0.21	0.11 ± 0.18	*t* (183) = 0.80	.43
Family/social	0.22 ± 0.25	0.15 ± 0.21	*t* (183) = 1.69	.09
Psychiatric	0.25 ± 0.22	0.21 ± 0.21	*t* (183) = 1.05	.29

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Variables	< 2 Employment activities	≥ 2 Employment activities	Test value (*df*)	*p* value
Number of activities completed during treatment	14.7 ± 12.6	26.3 ± 10.5	*t* (182) = 5.45	<.001

Data are means and standard deviations unless noted

[a]Values were log transformed before analyses.

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Table 2

Treatment outcomes of participants who did and did not complete two or more employment activities.

Treatment Outcomes	< 2 Employment activities	≥ 2 Employment activities	Test value (*df*)	*p* value
ASI-Employment change scores	0.04 ± 0.21	0.10 ± 0.23	F (1, 132) = 3.67	.05
Total Quality of Life change scores	0.03 + 1.93	−0.63 + 1.81	F (1, 132) = 13.95	.001
Treatment retention (in weeks)	6.6 ± 3.9	9.5 ± 2.9	F (1, 169) = 3.88	.05
Longest duration of abstinence (in weeks)	5.1 ± 4.4	8.7 ± 4.1	F (1, 169) = 10.46	.001

Values represent means and standard deviations. Statistical tests control for total number of activities completed, gender, age, and baseline Addiction Severity Index drug and medical scores.

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Table 3

Pre- and post-treatment Quality of Life Inventory scores in participants who did and did not complete two or more employment-related activities.

Variables	< 2 Employment activities	≥ 2 Employment activities	Test value (*df*)	*p* value
Overall scores			F (1, 132) = 13.95	<.001*
Pre-treatment	1.63 ± 2.05	1.38 ± 1.88		
Post-treatment	1.71 ± 2.15	2.09 ± 1.92		
Subscale scores				
Work scores			F (1, 132) = 12.62	.001*
Pre-treatment	0.45 ± 3.45	−0.12 ± 3.98		
Post-treatment	0.81 ± 3.33	1.21 ± 3.43		
Standard of living scores			F (1, 132) = 5.54	.02
Pre-treatment	0.72 ± 3.30	0.17 ± 3.69		
Post-treatment	1.27 ± 2.88	1.15 ± 3.47		
Home scores			F (1, 132) = 7.97	.005
Pre-treatment	1.18 ± 3.43	1.52 ± 3.49		
Post-treatment	1.34 ± 3.53	1.95 ± 3.69		
Love scores			F (1, 132) = 9.66	.002*
Pre-treatment	1.71 ± 3.47	0.83 ± 3.70		
Post-treatment	1.40 ± 3.60	2.23 ± 3.32		
Friendship scores			F (1, 132) = 5.36	.02
Pre-treatment	2.11 ± 2.80	1.33 ± 2.53		
Post-treatment	1.90 ± 2.88	2.31 ± 2.65		
Recreation scores			F (1, 132) = 4.58	.03
Pre-treatment	1.26 ± 2.62	0.98 ± 2.16		
Post-treatment	1.29 ± 2.41	1.31 ± 2.25		
Self-regard scores			F (1, 132) = 21.32	<.001*
Pre-treatment	2.01 ± 3.20	1.45 ± 3.21		
Post-treatment	2.31 ± 2.74	2.69 ± 3.04		
Philosophy of life scores			F (1, 132) = 9.40	.003*
Pre-treatment	2.16 ± 2.75	1.57 ± 2.97		
Post-treatment	2.34 ± 2.63	2.90 ± 2.59		
Learning scores			F (1, 132) = 4.52	.04
Pre-treatment	2.05 ± 3.09	1.91 ± 3.15		
Post-treatment	1.93 ± 2.88	2.46 ± 2.47		
Creativity scores			F (1, 132) = 3.21	.08
Pre-treatment	1.49 ± 2.53	1.14 ± 2.53		
Post-treatment	1.58 ± 2.26	1.80 ± 2.17		
Social service scores			F (1, 132) = 1.07	.30
Pre-treatment	1.71 ± 2.54	1.24 ± 2.45		
Post-treatment	1.65 ± 2.35	1.46 ± 2.36		

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Variables	< 2 Employment activities	≥ 2 Employment activities	Test value (*df*)	*p* value
Civic action scores			*F* (1, 132) = 2.40	.12
Pre-treatment	0.62 ± 1.89	0.38 ± 1.85		
Post-treatment	0.98 ± 1.88	1.05 ± 2.04		
Community scores			*F* (1, 132) = 4.77	.03
Pre-treatment	1.20 ± 2.64	0.91 ± 2.72		
Post-treatment	1.23 ± 2.71	1.39 ± 3.03		
Neighborhood scores			*F* (1, 132) = 2.15	.15
Pre-treatment	1.20 ± 2.86	0.60 ± 2.53		
Post-treatment	1.29 ± 2.71	1.03 ± 2.87		
Relationship with children			*F* (1, 132) = 0.41	.52
Pre-treatment	3.16 ± 3.20	3.21 ± 3.09		
Post-treatment	3.27 ± 3.22	3.95 ± 2.56		
Relationship with relatives			*F* (1, 132) = 1.07	.30
Pre-treatment	2.18 ± 3.08	2.48 ± 2.64		
Post-treatment	2.45 ± 2.88	3.28 ± 2.77		
Health scores			*F* (1, 132) = .02	.90
Pre-treatment	1.44 ± 3.67	2.48 ± 3.13		
Post-treatment	1.88 ± 3.15	2.00 ± 3.33		

Values represent group means and standard deviations. Statistical tests evaluated change scores and controlled for total number of activities completed, gender, age, and baseline Addiction Severity Index drug and medical scores.

* Notes significant effects after correcting for multiple comparisons using Holm's (1979) procedure.