



Published in final edited form as:

J Behav Health Serv Res. 2009 April ; 36(2): 189–198. doi:10.1007/s11414-008-9145-z.

Effect of Religiosity and Spirituality on Drug Treatment Outcomes

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Abstract

This study empirically tested one component of a comprehensive model of the role of religiosity and spirituality (R/S) in drug treatment that is presented as a companion article in this special issue. Data collected from individuals dependent on heroin receiving narcotic replacement therapy were used to assess the effects of R/S on drug treatment outcomes. Based on their R and S scores, participants were assigned to one of four groups: those whose scores remained consistently high across the 12-month study period were compared to those whose scores were consistently low, increased, or decreased across the same period. Results indicated that at both study completion (12 months after admission) and 6 months after that participants in the consistently high and increasing spirituality groups self-reported significantly fewer days of heroin and cocaine/crack use than those in the consistently low group ($p < 0.05$). There were no significant differences among the religiosity groups on self-reported heroin or cocaine/crack use. Results from χ^2 analyses indicated that at 12 months the results of urinalysis for the presence of opiates, but not cocaine/crack, were dependent on spirituality group membership ($p < 0.01$) but not religiosity group membership. Results also indicated that at the 6-month follow-up, there were significantly more participants in the decreasing group who were not in maintenance treatment who had a positive urinalysis and fewer in the increasing group than would be expected if the two variables were independent ($p < 0.05$). Implications for addictions health services are discussed.

Religiosity and spirituality (R/S) have been found to be associated with better outcomes in many health domains, including among individuals with drug use disorders.^{1–4} Based on the extant literature, Longshore and colleagues⁵ constructed a comprehensive conceptual model relating the role of R/S in general physical and mental health and especially in behavioral health

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outcomes. The authors then suggested that incremental progress can be made in R/S research by adding selected and suitable measures to ongoing treatment evaluation studies.

Since one deficiency in R/S research is that many of the relevant drug treatment studies have been cross-sectional^{1,6,7} little information exists on how change in R/S is related to subsequent improvement in health. The research reported herein is one of the first to examine longitudinal relationships between R/S and drug treatment outcomes, although limited to a subset of the full conceptual model presented by Longshore and colleagues.⁵

This study took advantage of data from a randomized clinical trial comparing two medications for the long-term maintenance treatment of opiate dependence, methadone maintenance (MM) and levo-alpha-acetylmethadol (LAAM), over a 12-month period of fully subsidized maintenance treatment and at a 6-month follow-up interview. Changes in R/S scores from baseline to 12-month interview were used to assess the effects of R/S on self-reported and biologically measured heroin and cocaine/crack use at both a 12-month interview and a subsequent 6-month follow-up interview. Additionally, drug use outcomes were assessed in relation to potential mediators and moderators of these relationships, including demographics and active treatment status at both interview points. It was hypothesized, based on the conceptual model and findings from previous research, that individuals with high religiosity and spirituality scores, or those that showed significant increases in the religiosity and spirituality scores over the course of treatment would have better outcomes than those with low religiosity and spirituality scores or those whose scores decreased significantly over the course of treatment.

Methods

Participants

Individuals dependent on heroin ($N=315$) seeking narcotic replacement therapy (NRT)—either MM or LAAM—were recruited between February 1997 and January 1999 as described by Longshore and colleagues.⁸ The majority reported prior treatment (97.0%) and a history of injecting heroin (95.1%). Nearly three quarters reported injecting a combination of heroin and cocaine (known as a speedball, 74%) and daily use of heroin in the 4 weeks prior to interview (60.0%).

At the 12-month interview 92.4% were located, 91.7% were interviewed, and 76.8% submitted a sample for urinalysis. At the follow-up interview 91.1% were located, 90.5% were interviewed, and 66.3% submitted a voluntary urine sample (there were significantly more refusals to submit urine samples at the follow-up interview, see discussion in the Anglin et al. article in this special issue). Among the demographic and descriptive variables presented in Table 1, there were no differences in group composition at any of the interview points. However, the distribution of participants into racial/ethnic groups was significantly different between the two medication groups, significantly more participants self-reported their race/ethnicity as African-American in the LAAM group (43.5% versus 34.0%), whereas significantly fewer participants self-reported their race/ethnicity as Caucasian than in the MM group (16.3% versus 24.5%), $\chi^2=8.36$, $p<0.05$.

Design and procedures

The intake process included complying with a 2-week methadone induction process and completing a detailed survey. Contained in that survey, in addition to the instruments required for the clinical trial, were the religious well-being (RWB) and spirituality well-being (SWB) scales. Following the induction process, participants were randomly assigned using a 2:1 ratio to a fully subsidized 12-month treatment program, receiving either LAAM or MM.

Approximately 12 months after intake, staff conducted a 90- to 120 min interview that included the RWB and SWB. Approximately 6 months after subsidized treatment ended, participants that could be located completed a follow-up interview. Unfortunately, the RWB and SWB scales were not administered at this time-point due to an oversight by the original researchers.

Measures

The spiritual well-being scale

Data on religiosity and spirituality were taken from the spiritual well-being scale.⁹ Previous research has established the validity, reliability, and factor structure of the scale.^{10,11}

Religious well-being—Ten Likert-type statements constituted the RWB Scale. The range of the Likert-type items was from 1 (strongly disagree) to 5 (strongly agree). After reverse scoring as appropriate, each item's score was added over all 10 items to obtain the religiosity score, yielding a range from 10 to 50. This scale assessed the components of religiosity regarding a belief in and having a personal relationship with God, but did not assess many aspects of religiosity, including formal denomination membership or doctrinal beliefs.

Spiritual well-being—Ten Likert-type items constituted the SWB. The range of the Likert-type items was from 1 (strongly disagree) to 5 (strongly agree). After reverse scoring as appropriate, each item's score was added over all 10 items to obtain the Spirituality score, yielding a range from 10 to 50.

Drug use—Recent use of opiates, codeine, cocaine/crack, barbiturates, amphetamine, methamphetamine, phencyclidine, LAAM, and methadone was assessed in a voluntary urine sample taken by research staff at the 12-month and follow-up interviews. Urine samples were sent to a National Institute on Drug Abuse (NIDA) certified testing laboratory, PharmChem Laboratories, Inc. Additionally, participants completed a self-report questionnaire on the number of days they used each class of drugs during the 4 weeks prior to the 12-month and follow-up interviews. Analysis of the urine and self-report drug use data indicated that, of all of the drugs measured, only heroin and cocaine/crack were used at levels sufficient to warrant further study. In other words, none of the other drugs were used at rates that allowed for meaningful analysis.

Treatment status—Treatment status at 12 months was extracted from clinic records and urinalysis results. Treatment status at follow-up was determined by urinalysis and self-report data. Status was coded as “not in maintenance treatment” or “in maintenance treatment” at the time of the 12-month and follow-up interviews. At 12 months participants were considered to be in treatment if they were still in the subsidized research study, reported being in a different maintenance treatment program, or had metabolites for methadone or LAAM in their urine while reporting no non-prescription use of either medication. At follow-up they were considered to be in treatment if they had metabolites for methadone or LAAM in their urine while reporting no non-prescription use of either medication. While participants could have been in other types of drug treatment, analyses were limited to those who were receiving NRT medications to treat their opioid addiction and those who were not.

Analyses

Data were analyzed using the SPSS statistical software package.¹² Participants were compared on demographic and descriptive variables such as ethnicity/race and across time points (intake, 12-month, and follow-up interviews) using standard test procedures. Categorical variables were compared using χ^2 frequency analyses. Continuous variables were compared using *t*-tests and ANOVAs. When significant differences among demographics variables were found

between comparison variables, those demographic variables were entered into all analyses to control for their potential effects. All tests were conducted using an $\alpha=0.05$.

Both the religiosity and spirituality subscales of the religious and spiritual well-being (RSWB) scale were subjected to standard reliability analysis including Cronbach's α analysis and factor analysis to confirm the factor structures of the subscales.

Finally, analyses were conducted to determine if stability or change in religiosity and spirituality significantly predicted drug use at the end of 12 months of subsidized treatment and at follow-up. Based on previous research and the conceptual model proposed by Longshore and colleagues,⁵ changes in religiosity and spirituality over the 12 month treatment period were the key independent variables in this study. First, a religiosity change score was created by subtracting the religiosity score at the 12-month interview from the religiosity score at the intake interview. The procedure was repeated using the corresponding spirituality scores to create a spirituality change score. Then four groups were created for religiosity and four groups were created for spirituality: (1) those that scored at or above the mean at both interviews, referred to as the consistently high group (religiosity, $N=177$, 61.4%; spirituality $N=136$, 47.1%); (2) those that scored below the mean at both interviews, referred to as the consistently low group (religiosity, $N=33$, 11.4%; spirituality, $N=48$, 16.6%); (3) those whose score increased by one standard deviation from intake to 12-month interview, referred to as the increasing group (religiosity, $N=54$, 18.7%; spirituality, $N=78$, 27.0%); and (4) those whose score decreased by at least one standard deviation from intake to 12-month interview, referred to as the decreasing group (religiosity, $N=25$, 8.7%; spirituality, $N=27$, 9.3%). This created two new categorical variables, religiosity group and spirituality group, with four levels each. Table 2 presents R/S means and standard deviations data by group.

As self-reported heroin and cocaine/crack use were measured as continuous variables, $2 \times 2 \times 4 \times 4$ (medication group \times treatment status \times religiosity group \times spirituality group) ANOVAs were conducted on the 12-Month data and $2 \times 4 \times 4$ (treatment status \times religiosity group \times spirituality group) ANOVAs were conducted on the follow-up data to determine if religiosity and spirituality significantly predicted differences in self-reported days of heroin or cocaine/crack use in the 4 weeks prior to the interview. Based on the literature it was predicted that there would be main effects for religiosity and spirituality groups, in that those in the consistently high and increasing groups would report significantly fewer days of heroin or cocaine/crack use. When there were significant main effects for variables with more than two levels or when there were significant interactions, pairwise comparisons were conducted using independent samples t tests.

As urinalysis results were binary (positive vs. negative) χ^2 analyses were run for religiosity and spirituality groups separately to determine if urinalysis results using the samples submitted at the 12-month and follow-up interviews were dependent on religiosity or spirituality group. More specifically, it was predicted that those in the consistently high and increasing religiosity and spirituality groups would be significantly more likely to submit urine samples negative for opiates and cocaine/crack metabolites.

Results

Preliminary analysis

Preliminary data analysis results found significant mean differences on the intake measures of R/S by self-reported ethnicity/racial group, $F(3, 288)=7.05$, $MSE=80.1$, $p<0.001$. African-Americans had significantly higher mean R ($M=31.9$, $SD=4.1$) and S ($M=29.1$, $SD=3.9$) scores than either the Caucasian group (R, $M=29.2$, $SD=6.2$; S, $M=25.7$, $SD=3.7$) and the Hispanic/Latino group (R, $M=28.9$, $SD=4.1$; S, $M=27.5$, $SD=3.4$) and those that did not fall into one of

these three categories (R, $M=27.4$, $SD=3.1$; S, $M=26.7$, $SD=2.2$). These differences persisted at the 12-month measurement of R/S as well. As such, Ethnicity/Race was entered in all subsequent analyses to control for these differences. No relationships were found in R/S scores due to sex, age, or treatment status.

Scale reliability analysis

Reliability analysis revealed that both the RWB and SWB scales had good to excellent reliability. The 10 items comprising the RWB subscale had a Cronbach's $\alpha=0.92$. The 10 items comprising the SWB subscale had a Cronbach's $\alpha=0.84$. The factor analysis results using all 20 items, maximum likelihood extraction, and oblique (Direct Oblimin) rotation indicated that a two-factor solution was the most appropriate and that all items significantly loaded on to their hypothesized factors ($p<0.05$) and that the two factors were significantly correlated ($r=0.59$, $p<0.001$). Given this information, all items were retained and all 10 items that make up the RWB scale were combined to create a religiosity score and all 10 items that make up the SWB scale were combined to create a spirituality score.

Self-reported drug use by group results

Heroin use

12-month interview: The results of the $2 \times 2 \times 4 \times 4 \times 4$ ANOVA revealed a significant main effect for spirituality group on the mean days of self-reported days of heroin use, $F(3, 234)=5.4$, $MSE=95.5$, $p<0.001$ (see Table 3). Results from the pairwise comparisons indicated that those in the consistently low group reported significantly more heroin use than those in the consistently high group, $t(182)=2.55$, $p<0.05$, and increasing group, $t(124)=3.32$, $p<0.001$. Additionally, those in the decreasing group reported significantly more heroin use than those in the consistently high, $t(161)=1.72$, $p<0.05$, and those in the increasing group, $t(103)=1.96$, $p<0.05$. There were no significant differences between the consistently low and decreasing groups or between the consistently high and increasing groups.

Follow-up interview: The results of the $2 \times 2 \times 4 \times 4 \times 4$ ANOVA on the follow-up data revealed a significant main effect for spirituality group on the mean days of self-reported days of heroin use in the 4 weeks prior to the follow-up interview, $F(3, 174)=5.9$, $MSE=128.6$, $p<0.001$ (see Table 3). Results from the pairwise comparisons indicated that those in the consistently low group reported, on average, significantly more days of heroin use in the previous 4 weeks than the consistently high group, $t(175)=2.59$, $p<0.01$, and increasing group, $t(117)=2.94$, $p<0.01$. Additionally, those in the decreasing group reported significantly more heroin use than those in the consistently high group, $t(154)=2.73$, $p<0.01$, and the increasing group, $t(96)=3.15$, $p<0.001$. There were no significant differences between the consistently high and increasing groups or consistently low and decreasing groups.

Cocaine/crack

12-month interview: The results of the $2 \times 2 \times 4 \times 4 \times 4$ ANOVA revealed a significant main effect for spirituality group on the mean days of self-reported cocaine/crack use, $F(3, 234)=8.48$, $MSE=45.18$, $p<0.001$ (see Table 3). Results from the pairwise comparisons indicated that the consistently low group self-reported significantly more cocaine/crack use than the consistently high group, $t(182)=2.12$, $p<0.05$, and the increasing group, $t(124)=3.79$, $p<0.001$. Additionally, the consistently high group self-reported significantly more cocaine/crack use than the increasing group, $t(212)=2.13$, $p<0.05$. There was no significant difference between the consistently low group and the decreasing group.

There were two other significant main effects. There was a main effect of medication group, with those in the methadone group reporting significantly less cocaine/crack use ($M=1.95$, $SD=$

5.15) than the LAAM group ($M=3.31$, $SD=8.06$), $F(1, 234)=4.02$, $MSE=45.18$, $p<0.05$. There was also a significant main effect of race/ethnicity on cocaine/crack use, $F(3, 234)=4.14$, $MSE=45.18$, $p<0.01$. Those in African-American group ($M=4.63$, $SD=9.8$) reported significantly more cocaine/crack use than Caucasian group ($M=1.17$, $SD=5.3$), $t(138)=2.63$, $p<0.01$, and Hispanic/Latino group ($M=1.06$, $SD=2.9$), $t(178)=2.47$, $p<0.01$, but not the other group ($M=3.79$, $SD=7.61$).

Follow-up interview: The results of the $2 \times 2 \times 4 \times 4 \times 4$ ANOVA on the follow-up data revealed a significant main effect for spirituality group on the mean days of self-reported cocaine/crack use in the 4 weeks prior to the follow-up interview, $F(3, 132)=7.4$, $MSE=46.2$, $p<0.001$ (see Table 3). Results from the pairwise comparisons indicated that those in the consistently low group reported significantly more cocaine/crack use than the consistently high group, $t(175)=3.18$, $p<0.001$. Additionally, the consistently low group reported significantly more days of cocaine/crack use than the increasing group, $t(117)=3.54$, $p<0.001$. Those in the decreasing group did not significantly differ from any of the other groups.

Urinalysis by group results

Opiates

12-month interview: The results of the χ^2 analyses wherein religiosity and spirituality groups and the opiate urinalysis results were compared indicated that urinalysis results were dependent on spirituality but not religiosity group membership. More specifically, significantly, more participants in the consistently low spirituality group had an opiate-positive urinalysis result and significantly more participants in the increasing spirituality group had an opiate-negative urinalysis result than would be expected if the two variables were not dependent on each other, $\chi^2=11.96$, $p<0.01$ (see Table 3). The results indicated that religiosity group membership and urinalysis results were independent variables.

Follow-up interview: The initial χ^2 analyses indicated no dependencies between the spirituality groups or the religiosity groups and the opiate urinalysis results, however, when the data were filtered by removing those still in maintenance treatment at the time of the follow-up interview, there were some significant dependencies. More specifically, there were significant dependencies among those not in maintenance treatment between the spirituality groups and the results of the opiate urinalysis, however, there were no dependencies for those in maintenance treatment. There were significantly more participants who were not in treatment in the decreasing group who had a positive urinalysis and less in the increasing group than would be expected if the two variables were independent, $\chi^2=8.55$, $p<0.05$ (see Table 3). Even after filtering the data in this way, the religiosity group and the urinalysis results continued to be independent from each other.

Cocaine/crack

12-month and follow-up interviews: The results of the χ^2 analyses wherein religiosity and spirituality groups and cocaine/crack urinalysis results were compared indicated that the variables were not dependent on each other (see Table 3). In other words, religiosity and spirituality group memberships and urinalysis results were independent variables.

Discussion

From a review of the literature, Longshore and colleagues⁵ developed a comprehensive model to link relevant concepts pertinent to R/S and drug treatment outcomes and to guide further research on R/S, health, services utilization, and outcomes. The R/S measures in this study were minimal as a result of being secondary to the primary purpose of the parent research project. The research results reported here apply only to the direct effects of R/S on drug

treatment outcomes with an assessment of the potential moderating factors of sex, race, and treatment status. Despite these restrictions, the measures and findings contribute to the incremental testing of the model proposed by Longshore and colleagues.⁵

The results indicated that participants that had high or increasing scores on a measure of spirituality from intake to 12-month interview self-reported fewer days of heroin use after controlling for demographic, descriptive, and treatment level variables. Similarly, spirituality group and urinalysis results were linked to each other, in that those with increasing spirituality scores were more likely to submit a urine sample that was negative for recent opiate use and those with consistently low spirituality scores were more likely to submit a urine sample that was positive. The measure of religiosity had no demonstrable effects on drug use outcomes. This relationship, however, may have been revealed had a more thorough assessment of religiosity been conducted. Given the literature review presented by Longshore and colleagues,⁵ the proposed model to guide further R/S study, and the present findings, advances in health services research in this area may have a practical framework for incremental development.

Like the majority of secular drug treatment programs, the NRT program in which the research was conducted had no specific services directed toward improving R/S well-being, although participants were encouraged to attend self-help meetings. Thus the emergence of a “natural” relationship between spirituality and outcomes acknowledges that health outcomes may be improved by including specific spirituality components in treatment (though this observed relationship could have been driven by a third common variable, as is the case with all other observed relationships). Collectively, these and other findings demonstrate the potential for clinical practices to be devised that promote and enhance the R/S well-being of clients.

As noted in the report on the development of the conceptual model (see Longshore et al.⁵), religiosity and spirituality are highly correlated (0.59 in this study), however, many people view themselves as spiritual while not religious. In this study, spirituality was an important predictor of reductions in drug use while in treatment and at the follow-up interview, whereas religiosity was not. This supports that religiosity and spirituality should be analyzed as separate constructs in subsequent research. Additionally, increases in spirituality scores over time were as predictive of reductions in drug use over time as consistently high scores, indicating that finding methods for increasing spirituality during drug treatment could improve long-term drug treatment outcomes. Finally, membership in a particular spirituality group was predictive of drug use at the follow-up interview, indicating the stability of this relationship over time for many in this group.

The emergence of a significant relationship between spirituality and 12-month and follow-up drug use outcomes suggests that further research using more heterogeneous samples of drug users and more diverse drug treatment modalities would likely be a fruitful area of scientific inquiry. Additionally, research is warranted on other aspects of the model for its further development, and, when possible, a comprehensive testing of its components.

Limitations

The sample was restricted to treatment-seeking individuals dependent on heroin participating in narcotic replacement therapy; therefore, generalization beyond this population is limited. The R/S measures were brief and did not assess all of the aspects of R/S dimensions recommended by Longshore and colleagues.⁵ For instance the measure of religiosity only focused on belief in and a personal relationship with God. More complete assessments of R/S and other measures of the potential mediating and moderating variables were not obtained. Such measures may have diminished the effect sizes of the noted relationships. Finally, there was no information on participation in 12-step group meetings during the treatment process.

While there are some limits on generalizability of these findings, the study provides useful preliminary information on the effect of R/S on drug treatment outcomes.

Implications for Addictions Health Services

As noted, religiosity and spirituality have been issues relatively neglected in addiction health services research. The conceptual model proposed by Longshore and colleagues⁵ and the research findings reported herein conform to those reported in extant literature. The current findings highlight the importance of addressing religious and spiritual beliefs and behaviors and how they may influence the treatment process, especially for clients likely to be responsive to such interventions. Applications of the findings suggest a need for greater sensitivity to these issues on the part of both researchers and treatment providers. Accordingly, the provision of services designed to promote, enhance, and sustain aspects of R/S directed toward improved outcomes could benefit providers, clients, and society as a whole. Efforts to disseminate research findings, provide appropriate professional training, and evaluate applications of various empirically derived methods within community settings are warranted.

Acknowledgments

Data collection and analysis were supported by grants R01 DA10422 and R03 DA023131 from the National Institute on Drug Abuse (NIDA). Dr. Anglin is also supported by NIDA Senior Research Scientist Award K05 DA00146.

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Table 1

Descriptive data

	Intake	12-month interview	12-month urinalysis	Follow-up interview	Follow-up urinalysis
N	315	289	242	285	209
Sex (%)					
Male	70.8	70.2	72.1	70.2	71.6
Female	29.2	29.8	27.9	29.8	28.4
Race/ethnicity (%) ^a					
African-American	40.3	40.1	42.2	40.7	38.9
Caucasian	19.1	18.3	17.6	17.5	17.5
Latino/Hispanic	34.9	35.3	34.8	35.8	37.9
Other	5.7	6.3	5.4	6.0	5.7
Sample descriptives (M (SD))					
Age	45.1 (7.4)	45.9 (7.4)	46.3 (7.4)	46.6 (7.2)	47.1 (7.4)
Religiosity	30.7 (4.3)	30.5 (4.4)	30.4 (4.4)	—	—
Spirituality	29.1 (3.4)	28.7 (3.6)	28.6 (3.5)	—	—
Self-reported days of drug use in the 30 days prior to interview (M (SD))					
Heroin	22.3 (11.1)	6.2 (10.1)	6.9 (10.5)	8.0 (11.3)	9.2 (11.6)
Cocaine	4.6 (9.6)	2.8 (7.2)	3.3 (7.7)	2.9 (7.7)	3.1 (7.9)

^aData were aggregated into these four primary categories to make statistical analyses possible. All differences across samples were non-significant except for drug use data, with 12-month and follow-up interview values significantly lower than baseline values ($p < 0.05$)

Table 2
Religiosity and spirituality mean scores and standard deviations by group

	Religiosity			Spirituality		
	Percent	Intake	12-Month	Percent	Intake	12-Month
Total N=289						
Consistently high	61.4	29.4 (1.3)	29.4 (1.2)	47.1	28.0 (1.8)	28.1 (1.6)
Increasing	18.7	25.3 (3.5)	29.7 (3.5)	27.0	24.2 (2.8)	29.0 (2.3)
Consistently low	11.4	23.5 (2.7)	23.8 (2.7)	16.6	23.7 (1.9)	23.9 (2.1)
Decreasing	8.7	30.1 (2.9)	25.4 (3.1)	9.3	28.7 (2.6)	24.0 (2.6)

Scores on the scales range from 10 to 50

Table 3
Summary of drug use results by spirituality group^a

	Consistently High	Increasing	Consistently Low	Decreasing
<i>12-month drug interview</i>				
Sample size (<i>n</i>)	136	78	48	27
Heroin use				
Self-reported days use M (SD)	6.0 (1.28)	4.2 (1.35)	12.1 (1.97)	12.3 (2.31)
% positive urinalysis	63.2%	45.2%	78.0%	65.2%
Cocaine/crack use				
Self-reported days use M (SD)	1.0 (3.42)	2.9 (7.40)	5.9 (10.42)	2.4 (5.93)
% positive urinalysis	19.8%	17.7%	31.7%	17.4%
<i>Follow-up drug interview</i>				
Sample size (<i>n</i>)	131	73	46	25
Heroin use				
Self-reported days use M (SD)	7.0 (10.9)	6.0 (9.7)	12.1 (1.97)	13.8 (12.8)
% positive urinalysis ^b	69.6%	53.6%	71.4%	100%
Cocaine/crack use				
Self-reported days use M (SD)	2.3 (6.9)	1.5 (4.5)	7.0 (12.1)	3.4 (8.2)
% positive urinalysis	21.3%	22.6%	27.0%	15.8%

^aSee text for significant differences

^bData only from participants not in maintenance treatment at the time of the follow-up interview