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Does Readiness to Change Predict Reduced Crack Use in HIV Prevention?

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Abstract

This study examines crack cocaine (crack) use, readiness to change, and gender in a sample of 923 men and women randomized to standard HIV education (SI) or peer-delivered intervention (EI). Four levels of crack use characterized frequency of use in the past 30 days; readiness was assessed on three levels (Precontemplation, Contemplation, Preparation/Action). Differences between intervention groups on crack use and readiness by gender were examined from baseline to 3-month follow-up. Overall, participants reduced their crack use from baseline, with those in the EI showing greater improvement than those in the SI. A small proportion of participants improved readiness; those who improved were more likely to improve their crack use. No significant gender differences were found. These findings suggest that the readiness construct does not fully capture the dynamics of change among out-of-treatment crack users. Further research is needed to fully comprehend the dynamics of change among this group.

1. Introduction

In 25 years of the acquired immunodeficiency syndrome (AIDS) epidemic in the United States, trends have changed significantly. While concern was initially focused solely on men who have sex with men and intravenous drug users, women have become increasingly at-risk for HIV transmission through heterosexual contact. Since the early 1990s, women have comprised an increasing proportion of those living with AIDS. In 1992, women accounted for 14% of adults and adolescents living with AIDS; by 2004, it was 23% (CDC, 2006). HIV/AIDS has differentially impacted African American women. In 2002, HIV infection was the leading cause of death for African American women aged 25–34 years (CDC, 2006). Women are most likely to become infected with HIV through heterosexual contact; in 2004, 78% of African American women diagnosed with HIV/AIDS became infected through heterosexual contact (CDC, 2006).

African American women who use crack cocaine (crack) are especially vulnerable to HIV related to their exposure to violence, crime, and high rates of victimization (Freeman, Collier, & Parillo, 2002; Wechsberg, Lam, Zule, & Bobashev, 2004; Zierler & Krieger, 1997). The emergence of African American substance abusing women as a new HIV risk group has led

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to efforts exploring HIV risk factors in this population. A tripartite of risk factors has been identified whereby drug use, depression, and exposure to violence intersect to increase HIV-risk among African American women (Johnson, Cunningham-Williams, & Cottler, 2003). Additionally, research indicates that smoking crack increases high-risk sexual activities associated with HIV infection, such as high frequency of sex, multiple partners, low condom use, and trading sex for drugs (Chiasson, et al., 1991; DeHovitz et al., 1994; Hoffman, Klein, Eber, & Crosby, 2000; Hser, Chou, Hoffman, & Anglin, 1999). Crack use associated with trading sex for drugs is particularly problematic, as Siegal, Falck, Wang, and Carlson (1995) found that among women who use crack those who traded sex for drugs were less likely to use condoms than women who traded sex for money. High-risk sexual activities, such as low levels of condom use when trading sex for drugs, place female crack users at a heightened risk for HIV and other sexually transmitted diseases (STDs).

The effectiveness of interventions aimed at reducing crack use among women who are out-of-treatment users is particularly important to examine since crack use plays a critical role in the spread of HIV and other STDs (Edlin et al., 1994; Ross, Hwang, Leonard, Teng, & Duncan, 1999). As prevention interventions targeting HIV-risk behaviors become a primary strategy in the face of the evolving AIDS epidemic, intervention efforts must be designed to address the complex contextual and psychological factors impacting the lives of African American women who use crack. The Transtheoretical Model (TTM) has been widely applied to addictions treatment (DiClemente & Prochaska, 1998; Willoughby & Edens, 1996; Prochaska et al., 1994; Siegal, Li, Rapp, & Saha, 2001; Abellanas & McLellan, 1993) and may provide a useful framework to guide prevention efforts tailored to the needs of HIV-risk groups such as African American women who use crack.

The TTM of intentional behavior change integrates psychoanalytic, cognitive, and behavioral theories (DiClemente & Prochaska, 1998) and centers on the stages of change construct, which conceptualize change as a temporal process consisting of five stages (precontemplation, contemplation, preparation, action, and maintenance) that organize motivational aspects of the process of change over time. "Readiness" is a slightly more general concept related to the stage construct, representing a pragmatic view of motivation as preparedness for behavior change (DiClemente, Schundt, Gemmel, 2004). According to the TTM, delivering interventions that do not address specific stage-based needs, a "mismatched stage effect," can be detrimental for a number of reasons (DiClemente & Prochaska, 1998): they may alienate the client, resulting in a reluctance to participate and high dropout rates; they may be a barrier to sustained behavior change; and they drain valuable time and resources that could be better used to support more effective efforts.

While the readiness concept has been applied extensively to addiction treatment, there is a lack of research examining the relationship between gender, readiness, and actual behavior change among out-of-treatment crack users. Research has yielded mixed results in applying readiness to crack use. In a study of in-treatment crack users, Siegal et al. (2001) could not replicate previous findings and assumptions about readiness to change; they found no significant changes on any of the four stages of change between admission to treatment and treatment completion and level of functioning did not relate to readiness at admission or six months post-treatment. The authors concluded that the stages of change construct might not capture the dynamics of change in all populations and in some cases readiness to change and successful behavior change might be independent of one another (p. 696).

Evidence suggests that African American women who smoke crack are more likely to be at early stages of change for condom use (Corby & Wolitski, 1996). If this is also true for their crack use, there is a need to tailor interventions targeting crack use and associated high-risk sexual behaviors to the needs of women at these early stages. Peer-delivered interventions

could be effective at reducing the mismatched stage effect. Peer-delivered interventions have been used to address a variety of health behaviors with diverse populations (Broadhead et al., 1998; Kobetz et al., 2005; Nyamathi, Flaskerud, Leake, Dixon, & Lu, 2001; Smith & DiClemente, 2000; Sung et al., 1997). For example, Corby & Wolitski (1996), in working with female sex workers and intravenous drug users, found significant behavioral stage gains for condom use with non-main partners associated with an intervention incorporating peer role-models. Peers may have the innate ability to connect with individuals in such a way as to meet stage-specific needs, even when interventions are not specifically tailored to the stages of change.

Overall, there is a scarcity of research examining the underlying structure of behavioral change by gender, readiness level, and intervention type among out-of-treatment crack users. An understanding of these factors and their relationship to positive behavior change could facilitate the development of more effective and efficient interventions targeting African American women who use crack. Using data collected from EachOneTeachOne (EOTO), an HIV prevention study targeting HIV risk behaviors among out-of-treatment drug abusers, the present analysis examines readiness to change cocaine use and actual change in crack use by intervention type and gender, comparing men and women in the National Institute on Drug Abuse (NIDA) standard HIV education intervention to those in a peer-delivered intervention from baseline to a 3-month follow-up.

2. Materials and methods

2.1 Outreach and recruitment

EOTO was a NIDA-funded randomized intervention study conducted through the St. Louis Cooperative Agreement site from 1993 to 1999. The study examined rates of HIV infection and high-risk behaviors among out-of treatment crack and injection drug users (IDUs). As detailed elsewhere (Cottler et al., 1998), two areas of St. Louis City confirmed to have high rates of drug abuse, crime, and prostitution (documented by police arrest data) as well as high rates of tuberculosis, hepatitis B, syphilis, and AIDS (according to the St. Louis City Department of Health) were targeted for street outreach recruitment. Recruitment was conducted by Community Health Outreach Workers (CHOWs) at two satellite St. Louis City Department of Health offices (“HealthStreet” centers).

2.2 Sample

Men and women were eligible to participate in EOTO if they were at least 18 years of age, current injection or crack user or heroin smoker, and received no drug or alcohol treatment within the past 30 days. A total of 1220 men and women participated in EOTO with 991 completing baseline and follow-up interviews. For the present analyses, data collected from 923 EOTO participants who reported a lifetime history of crack use and who completed baseline and 3-month follow-up interviews were examined; 383 individuals (153 women and 230 men) were randomized to the Standard Intervention (SI) and 540 individuals (238 women and 302 men) were randomized to the peer-delivered Enhanced Intervention (EI).

2.3 Intervention

Standard Intervention—The SI protocol developed by the NIDA Cooperative Agreement Final Cohort sites (Wechsberg et al., 1997) focused on educational information on the risk of transmission of HIV and STDs associated with cocaine use, correct cleaning of drug injection equipment, correct use of condoms, and the benefits of drug treatment in two sessions. The first session was a pre-HIV test counseling session followed by an HIV-test blood draw. The second session (occurring approximately two weeks after the first) consisted of post-HIV test counseling, review of educational information delivered in the first session, delivery of test

results, appropriate referrals, and random assignment to one of two intervention groups. Approximately 40% of the sample was randomized to the SI and 60% to the EI. Those randomized to the SI received no further intervention.

Enhanced Intervention—The EI (referred to as “Group B” to respondents) included the SI plus four additional two-hour sessions. Two sessions focused on drug abuse and high-risk sexual behaviors and were led by peer counselors; two sessions focused on stress management and AIDS and were led by St. Louis City Department of Health staff. All four sessions began with a 10-minute HIV education booster session and concluded with a peer-led didactic discussion. In order to minimize barriers to participation, meals, transportation, and childcare services were provided.

2.4 Data collection and measures

A Washington University School of Medicine staff member administered informed consent and conducted interviews at baseline and 3-month follow-up at one of two HealthStreet centers. Respondents received remuneration of \$35 for completing the baseline interview and \$30 for completing the follow-up interview; those in the EI were compensated \$10 for each additional session they attended.

The interview assessed risk behaviors, stage of change, psychiatric disorders, social network characteristics, and health service utilization. Measures of focus in the present paper are the NIDA Risk Behavior Assessment (RBA) and the Change Assessment Questionnaire (CAQ).

The RBA focuses on HIV drug and sexual risk behaviors in the last 30 days, including exchanging sex for money or drugs and frequency of drug use, including marijuana, crack, heroin, and other drug use. The reliability and validity of the RBA has been tested with favorable results (Needle et al., 1995; Weatherby, Needle, Cesari, & Booth, 1994), yielding levels of test-retest reliability of 0.7 or greater and concurrence as evidenced by urine tests (Weatherby et al., 1994). Data from the RBA presented here include sexual risk variables and frequency of crack cocaine use.

The CAQ is a modified version of the University of Rhode Island Change Assessment Scale (URICA) assessing attitudes, intentions, and behaviors associated with current cocaine use. The CAQ measures endorsements on 4 stage of change subscales (Precontemplation, Contemplation, Action, and Maintenance); respondents endorse items on a 5-point Likert scale from ‘Strongly Agree’ to ‘Strongly Disagree’ (McConaughy, Prochaska, & Velicer, 1983).

2.5 Statistical Analyses

Frequency of crack use and readiness to change cocaine use were assessed from baseline to 3-month follow-up. Sixteen behavioral categories of crack use were created based on four levels of use in the 30 days prior to each assessment period: none (0 days), low (1–5 days), moderate (6–14 days), and high (15–30 days). Levels of use were judged by the authors to be appropriate behavior level categories for frequency of crack use within a 30 day period. As in previous analyses of EOTO data (Cottler et al., 1998), the 16 crack use categories were dichotomized (improved or worsened) based on the participant’s level of use at baseline and follow-up. Individuals who remained at a low use category or moved from a higher use category to a lower use category from baseline to follow-up were labeled “improved.” Those who maintained a high level of use or moved from a low use category to a high use category from baseline to follow-up were labeled “worsened.”

Readiness to change from baseline to follow-up was assessed using a continuous readiness score proposed by DiClemente et al. (2004) and calculated using the following CAQ subscale

algorithm: [Contemplation subscale mean + Action subscale mean + Maintenance subscale mean – Precontemplation subscale mean]. Possible resultant scores range between (–2) and (+14). The following cutoff points, assigned by DiClemente et al. (2004) and modified by Callaghan et al. (2005), were used: scores below 8 were categorized as Precontemplation, scores from 8 to 12 were categorized as Contemplation, and scores above 12 were categorized as Preparation/Action.

Nine readiness categories were created based on readiness level at baseline and follow-up and dichotomized in a method similar to the categorization of crack use levels. Those who moved from a higher readiness level at baseline to a lower level at follow-up were considered worsened. Those who moved from a lower readiness level at baseline to a higher level at follow-up were considered improved. Individuals who remained in Precontemplation or Contemplation from baseline to follow-up were considered worsened because they did not show positive change in their readiness level. Those who remained at the Preparation/Action level from baseline to follow-up were considered improved, as they maintained the highest level of readiness.

The chi-square statistic was used to make comparisons between intervention groups, genders, and by gender within intervention group on improved or worsened frequency of crack use and readiness level. Sociodemographic characteristics that were significantly different by gender within intervention groups at baseline were entered into a logistic regression model, assessing the predictive significance of sociodemographic characteristics, intervention group assignment, and change in readiness on the dependent variable, improved crack use status at follow-up. The predictive significance of the interaction of intervention type and gender as well as the interaction of readiness level and gender were tested; because these interaction terms were not found to be statistically significant they were not included in the logistic regression model. Overall model fit was assessed using the Hosmer-Lemeshow goodness of fit statistic (Hosmer, Hosmer, Cessie, & Lemeshow, 1997). Analyses were performed using SAS version 9.1.

Because these are intent to treat analyses, participants were considered part of the EI group if they were randomized to that group, regardless of the number of sessions they attended.

3. Results

3.1 Sociodemographic characteristics

The sample of 923 crack users was 56% male, 94% African American, and 38.16 (7.2) years old on average. Nearly two-thirds (66%) reported at least a high school education, 18% were currently employed, 13% were living with someone as married, and 13% considered themselves homeless. A lifetime history of arrests was reported by 68%.

Table 1 presents sociodemographic characteristics by gender within intervention group at baseline. Of those randomized to the SI, men were more likely than women to have a lifetime history of arrests (81% vs. 57%, $p<.0001$), were slightly more likely than women to be currently employed (23% vs. 15%, $p=.0542$), and were significantly older than women (39.5 vs. 36.2, $p<.0001$). Of those assigned to the EI, men were more likely than women to have at least a high school education (69% vs. 60%, $p<.05$), be currently employed (20% vs. 12%, $p<.01$), have a lifetime history of arrests (83% vs. 55%, $p<.0001$), and were significantly older than women (39.8 vs. 36.1, $p<.0001$). No other sociodemographic characteristics were significant by gender within intervention group.

Of those assigned to the EI, 16% attended 1–2 of the peer-delivered sessions, 9% attended three, and 43% attended all four sessions for a total of 68% attending one or more EI sessions.

3.2 Sexual risk behaviors

Although not shown in a table, 81% of women and 83% of men reported that they were sexually active in the 30 days prior to baseline. Over half of the sample (53% of women and 55% of men) who reported sexual activity in the past 30 days reported never using a condom during that time period. Women were more likely than men to have a history of giving sex for drugs (39% vs. 7%, $p < .0001$) and money (53% vs. 11%, $p < .0001$).

3.3 Levels of crack use

Based on our criteria for improved or worsened level of crack use, 66% of the overall sample improved by stopping use, maintaining a low level of use, or reducing their self-reported crack use at follow-up. A majority of the overall sample was categorized at a moderate or high level use at baseline (71%, $n = 652$); almost half of these users eliminated or reduced their level of use to low at follow-up (49%, $n = 320$). Approximately half (51%, $n = 332$) of the moderate or high level users at baseline remained at those levels at follow-up. Of the total sample, 11% ($n = 105$) moved from the high use level at baseline to no use at follow-up and only 5% ($n = 46$) moved from no or low use at baseline to moderate or high use at follow-up.

Table 2 presents levels of crack use at baseline and 3-month follow-up by intervention status. A majority of participants in both the SI and EI were high level users at baseline (53% vs. 54% respectively). Over time, participants in the EI were more likely than those in the SI to improve their crack use status (70% vs. 61% improved, $p = .004$). There were no statistically significant differences between genders in improvement in crack use regardless of intervention status; over half of men (62%) and women (59%) in the SI and nearly three-fourths of men (71%) and women (69%) in the EI improved their crack use status from baseline to 3-month follow-up.

3.4 Levels of readiness to change

Overall the Contemplation level of readiness was the most common at baseline (89%) and follow-up (88%); 81% ($n = 745$) of the sample remained in Contemplation from baseline to follow-up despite the large percentage who improved their crack use status. A similar pattern was found in both intervention groups, with most in Contemplation at baseline (88% of the SI; 89% of the EI) and follow-up (88% of the EI; 89% of the SI), and remaining in Contemplation from baseline to follow-up (80% of the SI; 81% of the EI).

No statistically significant differences were found by gender, intervention group, or between intervention groups by gender in improved readiness level; however, there was an overall trend toward improved readiness level in women compared to men (11% vs. 8%, $p = 0.07$). Of those randomized to SI, women were slightly more likely than men to improve in readiness level (11% vs. 6%, $p = 0.05$). Improvement in readiness between women (11% improved) and men (9% improved) in the EI was not statistically significant.

3.5 Logistic regression model

Older participants compared to younger were more likely to improve crack use status from baseline to follow-up. For each year increase in age, the odds of improving crack use status increased 1.024 (95% Confidence Interval [CI] = 1.004, 1.045). As shown in Table 3, odds of improving crack use status was computed for ages 38 and 50 using 18 years of age as the referent category. Those 50 years of age had the greatest odds of improving crack use status (Odds Ratio [OR] = 2.155; 95% CI = 2.112, 2.200). Assignment to the EI was also a significant predictor of improved crack use status, with those assigned to the EI 1.508 times more likely to improve crack use status (95% CI = 1.141, 1.993) than those assigned to the SI. Additionally, those who improved their level of readiness from baseline to follow-up were more likely to improve regarding their crack use ([OR] = 1.737; 95% CI = 1.025, 2.941).

4. Discussion and conclusions

Overall, this sample of out-of-treatment crack users improved regarding their high-risk cocaine use with 66% of the overall sample improving in crack use status by stopping use, maintaining a low level of use, or reducing use from baseline to follow-up. Both men and women randomized to the EI were significantly more likely to reduce their crack use than those in the SI (70% vs. 61% improved) and those assigned to the EI were 1.508 times more likely to improve their crack use status compared to those in the SI. Our findings suggest that the peer-delivered EI is a valuable intervention for both men and women in addressing crack use among out-of-treatment users.

Despite this change in crack use, a considerably smaller proportion improved readiness level. A large majority of those assigned to both the SI and the EI were in the Contemplation level at baseline and 3-month follow-up. No statistically significant gender differences were found in readiness level, though with a larger sample differences may have reached significance (women versus men overall, 11% vs. 8%, $p=0.07$; women versus men in the SI, 11% vs. 6%, $p=.050$). Although a small proportion of participants improved readiness level, those who did were more likely to improve in crack use status.

The overall negligible improvement in readiness level from baseline to follow-up highlights several important intervention and research issues. The TTM has been widely used to guide interventions throughout the substance abuse field; however, there is little consistent evidence of how readiness to change relates to crack use among out-of-treatment users (Bridle, C., Riemsma, R.P., Pattenden, J., Sowden, A.J., Mather, L., Watt, I.S., Walker, A., 2005). These analyses indicate that assignment to the EI has a greater impact on crack use than improvement in readiness level. Additionally, those who improved their crack use status in both the SI and EI did not show similar improvement in readiness level over a 3 month time period. Given these findings, it is possible that the readiness to change construct does not fully capture the dynamics of change in this population. Our findings are consistent with previous findings showing little evidence of the connection between reduction in crack use and readiness to change (Siegal et al., 2001).

Intervention research conducted over longer periods of time is needed in order to fully understand the enduring effects of time-limited HIV-risk reduction interventions. In the present study the follow-up period was only 3 months, which may not be an adequate time period in which to capture change in readiness for cocaine use among out-of-treatment users. Additional longitudinal data collection focused on capturing the endurance of the behavior change and trends in readiness to change over time is warranted. Unfortunately, our study had only two time points 3 months apart and therefore does not allow us to investigate this possibility.

In addition to the need for added measurement points, our results must be understood within the restrictions of other limitations. Recruitment for the EOTO study was conducted through street outreach methods and does not represent a random probability sample. Further, data from the RBA and CAQ used in the present analyses are self-report, and reviewers suggest the possibility of bias. While the RBA has demonstrated favorable reliability and validity, there are several psychometric weaknesses of the CAQ. The CAQ used here was based on the 28-item version of the URICA and modified to be specific to cocaine use. Using continuous readiness summary scores, the CAQ yielded a large majority of respondents in Contemplation in both the SI and EI at baseline and follow-up. The 'stage' concept of the TTM has been criticized for drawing arbitrary lines differentiating stages, therefore making false categorizations (West, 2005). Our findings that a majority of respondents improved in crack use status yet remained in Contemplation from baseline to follow-up suggests the need to

further explore the ability of this measure and scoring method to place individuals into meaningful categories of readiness among out-of-treatment crack users.

Our analytic approach is more restrictive than others due to our definitions of improved or worsened crack use and readiness status as well as the use of intent to treat analysis. In terms of crack use, a forced dichotomy was chosen to eliminate the possibility of those who reported no change by maintaining a low or high level of use from baseline to follow-up being placed in the same category (Cottler et al., 1998). Similarly, levels of readiness were dichotomized in order to avoid placing those who remained in Precontemplation or Contemplation with those who maintained the highest level, Preparation/Action, from baseline to follow-up. Additionally, our assigned levels of crack use and readiness at baseline and follow-up are based on somewhat arbitrary definitions. Our use of intent-to-treat analyses may also limit our results. An alternative to the intent-to-treat analysis would be an effectiveness analysis exploring the dose-response effect with actual participation. Future analyses could incorporate this alternative analytic technique to examine the threshold number of EI sessions required to influence both behavior change and readiness level.

In considering this research, we must locate drug use and attitudes towards change within the context of the social environment. Our sample of out-of-treatment users showed low levels of employment and were likely to have a history of arrests. Many women in our sample had a history of exchanging sex for drugs (39%) or money (53%). These situational factors influence attitudes towards drug use captured in the readiness concept, likely having a profound impact on behavior change. Within these stressful circumstances, one may not be able to sustain positive behavior changes. The Contemplation level of readiness is particularly important to examine with context in mind. A large majority of our sample fell into this category. According to the TTM, during Contemplation people tend to focus on the pros and cons of behavior change. As the costs and benefits of change are weighed, individuals often remain ambivalent and stagnate in Contemplation for long periods of time (Velicer, Prochaska, Fava, Norman, & Redding, 1998). Those in Contemplation attempting behavior change may be more likely to remain ambivalent about positive change within a context characterized by poverty, violence, and victimization in which many crack users live. The TTM has been criticized for its focus on conscious decision-making and planning processes while drawing attention away from critical influences on human motivation such as situational determinants of behavior (West, 2005). To fully comprehend behavior change and intervene effectively, the multiple, complex influences on motivation must be understood and integrated into models of behavior change used to guide interventions.

Our finding that 66% of the overall sample improved in crack use status despite only 9% having improved in readiness level suggests that while peer-delivered interventions are successful in reducing crack use among a sample of both male and female out-of-treatment users, the stage construct of the TTM does not fully explain the dynamics of change among this population. The TTM is limited in explaining the full range of influences on behavior change and there is a need for a more complete model. This point is particularly relevant to African American women who use crack, as it is well established that these women tend to be exposed to social contexts characterized by violence, crime, and victimization (Freeman et al. 2002; Wechsberg et al., 2004; Zierler & Krieger, 1997). As patterns of HIV transmission change with African American women becoming increasingly at risk through heterosexual contact, interventions targeting high-risk drug use and sexual behaviors tailored to the needs of African American women who use crack are becoming increasingly important. Future research should move toward a more comprehensive understanding of influences on behavior change and motivation in order to facilitate the development of interventions tailored to the needs of high-risk populations such as the one targeted by EOTO.

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Table 1
Sociodemographics of the St. Louis EOTO effective sample (N=923)

Characteristics	Standard Intervention (n=383)				Enhanced Intervention (n=540)			
	Men (n=230)		Women (n=153)		Men (n=302)		Women (n=238)	
	n	%	n	%	n	%	n	%
African American	208	90	135	88	284	94	223	94
High school or more education	156	68	101	66	209*	69	143	60
Currently employed	53	23	23	15	61**	20	28	12
Consider themselves homeless	28	12	19	12	44	15	26	11
Lifetime history of arrests	187***	81	87	57	249***	83	130	55
Married/Living with partner	31	13	20	13	36	12	29	12
Mean Age (SD)	39.5*** (7.4)		36.2(6.0)		39.8*** (7.6)		36.1(6.5)	

* p<.05

** p<.01

*** p<.0001

Table 2
Levels of crack cocaine use (number of days used in past 30 days) at baseline and 3-month follow-up - Standard Intervention group (n = 383) and Enhanced Intervention group (n = 540)

Level	3-month follow-up					Total (at baseline)			
	None (0 days)	Low (1–5 days)	Moderate (6–14 days)	High (15–30 days)					
Baseline									
None (0 days)	SI	27	7%	4	1%	0	0%	31	8%
Low (1–5 days)	EI	25	5%	6	1%	1	0%	33	6%
Moderate (6–14 days)	SI	23	6%	38	10%	10	3%	81	22%
High (15–30 days)	EI	44	8%	58	11%	8	2%	126	24%
Total	SI	12	3%	15	4%	17	4%	68	17%
(at follow-up)	EI	20	4%	42	8%	12	2%	88	16%
	SI	44	11%	46	12%	29	8%	203	53%
	EI	61	11%	80	15%	49	9%	293	54%
	SI	106	28%	103	27%	56	14%	383	100%
	EI	150	28%	186	34%	70	13%	540	100%

Table 3

Model for predicting improvement in crack cocaine use at 3-month follow-up (N=923)

Variable	Odds Ratio	95% Confidence Limits	
Male	1.025	0.759	1.385
Age*			
18	1.000	-	-
38	1.616	1.584	1.650
50	2.155	2.112	2.200
High school degree+	0.866	0.641	1.170
Employed	1.422	0.969	2.087
Lifetime history of arrests	1.122	0.819	1.536
EI assignment	1.508	1.141	1.993
Improved readiness level	1.737	1.025	2.941

Log Likelihood= 1156.524

Adjusted R-Square= 0.0322

c= 0.590

* 18 used as referent age