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A Therapeutic Workplace for the Long-Term Treatment of Drug Addiction and Unemployment: Eight-Year Outcomes of a Social Business Intervention

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Abstract

This study evaluated the long-term effects of a Therapeutic Workplace social business on drug abstinence and employment. Pregnant and postpartum women (N=40) enrolled in methadone treatment were randomly assigned to a Therapeutic Workplace or Usual Care Control group. Therapeutic Workplace participants could work weekdays in training and then as employees of a social business, but were required to provide drug-free urine samples to work and maintain maximum pay. Three-year outcomes were reported previously. This paper reports 4- to 8- year outcomes. During year 4 when the business was open, Therapeutic Workplace participants provided significantly more cocaine- and opiate-negative urine samples than controls; reported

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more days employed, higher employment income, and less money spent on drugs. During the 3 years after the business closed, Therapeutic Workplace participants only reported higher income than controls. A Therapeutic Workplace social business can maintain long-term abstinence and employment, but additional intervention may be required to sustain effects.

Keywords

contingency management; incentive; employment; social business; heroin; cocaine; methadone

1. Introduction

Drug addiction is often a chronic problem that can persist for many years and sometimes throughout a person's lifetime (Dennis & Scott, 2007; McLellan, Lewis, O'Brien, & Kleber, 2000). Treatments can promote drug abstinence in some patients, but relapse is common following discharge (Etter & Stapleton, 2006; Knapp, Soares, Farrel, & Lima, 2007; Lancaster, Hajek, Stead, West, & Jarvis, 2006; Sees et al., 2000; Tonstad et al., 2006; Veilleux, Colvin, Anderson, York, & Heinz, 2010) and sometimes after periods of drug abstinence that last a year or more (Galai et al., 2003; Shah, Galai, Celentano, Vlahov, & Strathdee, 2006). The development of enduring solutions to sustain abstinence over many years is perhaps the greatest challenge facing the substance abuse treatment and research communities.

The Therapeutic Workplace is a novel long-term, employment-based intervention designed to address the chronic nature of drug addiction by using a contingency management intervention that arranges abstinence-contingent access to paid employment to reinforce longterm drug abstinence (Silverman, 2004; Silverman, DeFulio, & Sigurdsson, 2012). Contingency management interventions are rooted in research that suggests drug addiction is operant behavior that is maintained and modifiable by its consequences and should be modifiable through the strategic use of alternative reinforcement (Bigelow & Silverman, 1999). Based on these principles, Higgins and colleagues developed voucher-based reinforcement intervention in which patients receive monetary vouchers exchangeable for goods and services for providing drug-free urine samples (Higgins et al., 1991). Voucher-based reinforcement can increase abstinence from a wide range of drugs (Lussier, Heil, Mongeon, Badger, & Higgins, 2006) and has been identified as a highly effective behavioral treatment for drug addiction (Castells et al., 2009; Dutra et al., 2008; Knapp et al., 2007; Pilling, Strang, Gerada, & NICE, 2007). Importantly, increasing the value of the vouchers can initiate sustained abstinence in refractory injection drug users (Dallery, Silverman, Chutuape, Bigelow, & Stitzer, 2001; Silverman, Chutuape, Bigelow, & Stitzer, 1999) and arranging long-term exposure to the voucher-based abstinence reinforcement can maintain long-term abstinence and prevent relapse (Kirby et al., 2013; Silverman, Robles, Mudric, Bigelow, & Stitzer, 2004).

The demonstrated benefit of high magnitude and long duration abstinence reinforcement raises an obvious practical problem: How could such interventions be financed? The Therapeutic Workplace is designed to provide a practical solution to this problem. The

essential features of the intervention are simple: Participants are hired and paid to work, as in typical employment. Unlike a typical employment site, however, participants in the Therapeutic Workplace must provide frequent objective evidence of drug abstinence to continue working and maintain maximum pay. The approach is useful because it does not require an independent source of funds to address abstinence, but instead harnesses the reinforcing effects of employment-based wages to reinforce abstinence. Since employment can be sustained for years, this approach also offers the potential advantage of maintaining employment-based abstinence reinforcement over long periods of time.

The Therapeutic Workplace was designed to treat low-income, chronically unemployed drug-dependent women. Since many of these women lacked job skills (Brewington, Arella, Deren, & Randell, 1987; Silverman, Chutuape, Svikis, Bigelow, & Stitzer, 1995), the intervention had two phases of treatment. During Phase 1, each patient's "job" was to participate in an intensive stipend-supported training program designed to establish job skills while abstinence was initiated. Once a participant initiated abstinence and acquired needed skills, she progressed to Phase 2 where she was hired as an employee in an on-going service business to perform data entry jobs (Silverman et al., 2005). Employment-based abstinence reinforcement was maintained throughout both phases. We previously reported that the Therapeutic Workplace could initiate (Silverman, Svikis, Robles, Stitzer, & Bigelow, 2001) and maintain (Silverman et al., 2002) heroin and cocaine abstinence for up to 3 years in a group of pregnant and recently postpartum methadone maintained women. During the initial three years of that study, participants were primarily enrolled in the Phase 1 training phase of the Therapeutic Workplace. The Phase 2 data entry business, Hopkins Data Services, was opened in April 2000, and Therapeutic Workplace participants who met the Phase 2 entrance requirements were hired as data entry operators in that business. Those participants were eligible to remain as employees in that data entry business until it was closed in October 2002. We followed all participants until 8 years after intake. Here we report on the effectiveness of the Therapeutic Workplace business in maintaining drug abstinence and employment during the fourth year after intake when the participants were eligible for employment in the data entry business. We also report on the post-intervention effects of long-term exposure of the Therapeutic Workplace by comparing the two groups during the years after the data entry business closed and the opportunity to participate in the Therapeutic Workplace ended for all participants.

2. Materials and Methods

Participants in this study were enrolled in a randomized controlled clinical trial between October 30, 1996 and January 21, 1998. At the time of enrollment, participants were receiving treatment at the Center for Addiction and Pregnancy (Jansson et al., 1996; Svikis et al., 1997), a comprehensive specialty treatment program designed for pregnant and postpartum substance dependent women located at the Johns Hopkins Bayview Medical Center in Baltimore, Maryland. Interested individuals who met the eligibility criteria (see below) were randomly assigned to a Therapeutic Workplace or Usual Care Control group. Both groups were initially enrolled in the study for 6 months and then were repeatedly re-enrolled in the study in 6-month blocks for 8 years. The main methods and results of the trial were reported previously (Silverman et al., 2001, 2002) as was a description of the data

entry business (Silverman et al., 2005). Methods for the training and employment phases will be reviewed briefly with only methods specific to the period between the fourth and eighth year after intake described here in detail.

2.1 Recruitment and Enrollment

Center for Addiction and Pregnancy patients were eligible for this study if they were between the ages of 18 and 50 years, unemployed, currently receiving methadone maintenance treatment, and provided at least one urine sample positive for opiates or cocaine during the 6 weeks prior to screening for study enrollment. Patients were excluded if they were considered at risk for suicide or had a psychiatric disorder that might disrupt their workplace functioning or limit their ability to provide informed consent (e.g., schizophrenia). Participants provided informed consent and the study was approved by The Johns Hopkins University School of Medicine Institutional Review Board.

2.2 Experimental Design and Groups

Forty women who provided informed consent were randomly assigned to a Therapeutic Workplace ($n = 20$) or a Usual Care Control ($n = 20$) group. There were no significant baseline differences between the two groups on any intake measures (Silverman et al., 2001). During the initial months of the study, Therapeutic Workplace participants were invited to participate in an intensive training program to learn basic academic skills and to become data entry operators (Phase 1). When we opened the Phase 2 data entry business, Hopkins Data Services, in April 2000, Therapeutic Workplace participants who met the Phase 2 entrance requirements (described below; $N = 9$) were hired as data entry operators in that business while those who did not meet the Phase 2 entrance criteria by the forty-eighth month in the study were no longer eligible for employment in the Phase 2 data entry business. Eligible participants were allowed to continue their employment until Hopkins Data Services closed in October 2002 due to financial considerations. Since participants were enrolled in the study at different times, they started and ended employment in the Phase 2 data entry business at different points in their study participation. Figure 1 shows the amount of time spent by each participant in the two study phases. Both groups received standard treatment at the Center for Addiction and Pregnancy, including referrals to services after treatment at the Center for Addiction and Pregnancy ended. Usual Care Control participants only received the Center for Addiction and Pregnancy treatment and referrals.

2.3 Outcome Assessments

The long-term outcome measures for this study were derived from assessments conducted once every 30 days for all participants in both groups from 18 to 48 months after treatment entry, and more extensive assessments collected every 6 months from 18 to 96 months after treatment entry. At each assessment a urine sample was collected, and interviews and questionnaires were administered. Results from the assessments conducted from 18 to 36 months after intake were reported previously (Silverman et al., 2002). This report will focus on data collected from 37 to 96 months after intake. Participants were contacted via phone, mail, or in person by outreach staff and were given cab transportation to and from the research unit. In addition, they were paid \$30 in vouchers for each 30-day assessment and \$50 in vouchers for every 6-month assessment.

Urine collection and toxicology—The primary outcome measures for this study were derived from urine samples collected at each follow-up assessment under procedures designed to ensure their validity (Silverman et al., 2002) and tested for metabolites of cocaine (benzoylecgonine) and opiates (morphine) using OnTrak Abuscreen (Roche Diagnostic Systems; Montclair, NJ) or using the Abbott AxSym (Abbott Laboratories, Abbott Park, IL). The samples were considered positive for cocaine and opiates if metabolite concentrations were at or above 300 ng/mL. Samples collected every 6 months were tested by an outside laboratory for cocaine, opiates, and a wider range of other drugs.

Questionnaires and interviews—At each 30-day assessment, we administered the employment, alcohol/drug, and legal sections of the Addiction Severity Index (ASI) follow-up (McLellan et al., 1985), an AIDS Risk Questionnaire (Silverman et al., 2002); and a 30-day employment history. The AIDS risk questionnaire asked 9 questions (yes-no) related to HIV risk in the past 30 days, including “shot up drugs,” “shared needles,” and “taken money for sexual activities.” In addition, at 6 month follow up assessments, participants completed the full ASI; a battery of computer-based questionnaires that focused on drug use, employment, and other activities; a questionnaire asking about their children; and a questionnaire about concomitant medication.

2.4 Therapeutic Workplace Intervention

The Therapeutic Workplace intervention was divided into training (Phase 1) and employment (Phase 2) phases as described previously (Silverman et al., 2001, 2002; 2005). Throughout Phase 1 participants could attend the workplace three hours per day, Monday through Friday. Upon arrival, a urine sample was collected. If the sample tested negative for opiates and cocaine, working for pay was allowed that day. During Phase 1, basic skills education (math, reading, spelling, writing) and job skills (typing, keypad and data entry) training was provided throughout each 3-hour work shift. Pay in the form of vouchers exchangeable for goods and services was earned based on attendance, performance and professional demeanor during work shifts. Under the escalating reinforcement schedule, base pay vouchers for sustained abstinence and workplace attendance started at \$7.00 per day and increased by \$.50 for each consecutive successful day, to a maximum of \$27.00 per day. Participants also could earn up to \$7.00 per day for maintaining appropriate professional demeanor and up to about \$3.00 per day for performance on training programs.

The Therapeutic Workplace data entry business opened and began employing successful Phase 1 participants in April 2000. Participants were hired as data entry operators in the Phase 2 business if they had completed the typing, keypad, and data entry programs; and maintained at least 2 consecutive weeks of abstinence, consistent attendance (no unexcused incomplete work shifts), punctuality (no unexcused late arrivals at work), and professional behavior (no professional demeanor violations requiring an administrative break). For some participants, Phase 1 participation had extended beyond that needed to reach training criteria due to delays in the business opening. Details of the business operation are reported in Silverman et al. (2005).

On Monday, Wednesday and Friday of each week upon reporting to the workplace, each operator was required to provide a urine sample under observation. If the sample tested negative for opiates and cocaine, the operator was allowed to work that day. If the sample was positive for opiates or for cocaine, the operator was not allowed to work that day or on any subsequent day until a new drug-free urine sample was provided. Data entry operators earned base pay for the hours worked and productivity bonuses based on the amount and accuracy of their data entry work. The wage system was designed to adhere to minimum wage laws, to make maximum possible earnings contingent on productivity and accuracy, and to differentially reinforce sustained drug abstinence. Operators were paid through standard payroll check every 2 weeks.

Participants were invited to work for 6 hours per day, 5 days per week and were paid slightly over minimum wage at the time (\$5.25 per hour) for all hours worked, with 1-hour unpaid lunch and 5 minutes of paid break for every 55 minutes worked. In addition, participants earned \$5.00 per batch of data entered minus \$0.08 for every character entered incorrectly in the batch. Batches of data were designed so that an operator working at a moderate pace could enter a batch in about 1 hour. Further, values of the productivity bonuses were linked to shift attendance and sustained abstinence. If an operator provided a drug-positive urine sample or failed to provide a scheduled sample, the value of the operator's batch completion bonus would be reset to \$1.00 per batch (minus \$0.02 per error). After the reset, the operator's batch completion bonus increased again by \$0.10 per batch for every consecutive day of sustained abstinence and workplace attendance; after 9 consecutive days of sustained abstinence and attendance, the batch completion bonus was returned to \$5.00 per batch. The same reset could be instated if the participant reported late or failed to complete a work shift, although operators could use earned personal days and personal time to avoid those resets. Operators received continuous feedback on the current value of their earnings and pay.

Early in the fourth year, one participant, S18, obtained and maintained employment in the community. This precluded her attendance in the Therapeutic Workplace. To maintain abstinence, she continued to provide urine samples every Monday, Wednesday and Friday and she continued to earn base pay vouchers if she continued to work 3 hours per day or 15 hours per week in her community job (with documentation) and continued to provide urine samples negative for opiates and cocaine.

Because many participants in the Therapeutic Workplace were welfare recipients, Hopkins Data Services was integrated in Baltimore City's Grant Diversion welfare-to-work program (also called Wage Subsidy). As with any employment, welfare recipients could lose part or all of their cash assistance when they became employees of Hopkins Data Services. Under the Grant Diversion program, Baltimore City's Department of Social Services subsidized the wages of any welfare recipient who was employed by Hopkins Data Services (up to \$300 per month for 6 months for each welfare recipient). The Department of Social Services maintained all medical benefits for each recipient for 1 year after the start of employment, and both medical and childcare benefits for their children were maintained for longer periods of time.

2.5 Data Analysis

The analyses were designed to examine the effects of the therapeutic workplace intervention on primary and secondary outcome measures during both the time participants could work in the data entry business (Business Open), and following closure of Hopkins Data Services when participants no longer had the opportunity to work in the business (Business Closed). To achieve these goals, data collected while the data entry business was opened were analyzed separately from data collected when the business was closed. The business opened in April 2000 and closed in October 2002. Since participants started the study at different times, the number of months in the study while the business was opened and the number of months in the study while the business was closed varied across participants. To examine the effects of the therapeutic workplace intervention while the business was opened (Business Open), we analyzed data from the monthly assessments completed during the fourth year after intake (between months 37–48 after treatment entry). Some participants (S2, S3, S4, S6, S7, S8, S10, S11, S12, S13, S14, S15, S17, S20) were in Phase 1 during the initial month(s) of their fourth year. For those participants, the monthly assessment data collected while they were in Phase 1 were not included in the Business Open analyses. To examine the effects of the therapeutic workplace intervention after the business was closed (Business Closed), we analyzed data collected in the 6- month assessments conducted between months 60–96. For some participants, the business was closed at the time of the 60th month assessment. In those cases, the 60th month data were not included in the Business Closed analyses. Therapeutic Workplace and Usual Care Control groups were compared on dichotomous measures were compared using Generalized Estimating Equation (GEE) tests and on continuous variables using SAS Proc Mixed analysis. Statistical tests were two-tailed and considered significant at $p < .05$.

The primary outcomes were dichotomous measures of cocaine and opiate use and employment while the business was open (Business Open). Participants were categorized at each assessment separately as abstinent from cocaine, from opiates, and from both opiates and cocaine. In the primary analysis of urinalysis results, all missing urine samples were considered positive (“missing positive”). Additional analyses were conducted using a missing as missing method (“missing missing”) and an interpolation method in which missing samples were considered positive for a given drug only if a sample provided immediately before or after the missing sample (or missing group of samples) was positive for that drug (“missing interpolated”); other missing samples were considered negative. Similar analyses were conducted for the self-reported drug use on the ASI. For the measures of self-reported drug use, a participant was considered positive for a given drug (opiate or cocaine) at an assessment if the participant reported using that drug in the past 30 days. Similar rules were used for “missing positive,” “missing interpolated,” and “missing missing” analyses. Similar analyses were conducted for the assessments collected during the Business Closed period. Tables 1 and 2 show that over 80% of assessments were collected for both groups during the Business Open and Business Closed periods and there were no significant differences between groups in the rates of assessment collection. Thus, the rates of missing data were low and similar for the two groups in both the Business Open and Business Closed periods.

Participants were also categorized at each assessment as employed full time, employed part-time, or unemployed based on self-report data from the ASI. Full time was defined as working on 15 days in the past 30 days; unemployed was defined as 0 days of work; part-time was coded for intermediate numbers of days employed. Two analyses were conducted to assess the potential effects of missing data. In the primary analysis, participants were considered unemployed for missing assessments. In the other analysis, missing assessments were not replaced with any value.

Secondary measures of HIV risk behaviors, employment, income, and drug treatment were also analyzed. Secondary dichotomous measures were analyzed without replacing values for missing data (missing missing). Secondary continuous measures were analyzed both using the “missing missing” and the “missing interpolated” approaches for handling missing data. The specific measures that were analyzed are shown in Tables 1–4.

3. Results

3.1 Attendance in the Therapeutic Workplace

Figure 1 shows patterns of workplace attendance across 6 years of the study in consecutive weekdays for each of the 20 Therapeutic Workplace participants. The figure shows that nine of the 20 Therapeutic Workplace participants were hired into the business at some point in time, four (S15, 16, 20, 27) were still participating when the business closed, four (S44, S33, S45, S35) left the workplace for outside employment, and only one (S12) dropped out of the workplace for unknown reasons.

3.2 Cocaine and Opiate Abstinence

During the fourth year after intake while the data entry business was open (Business Open), Therapeutic Workplace participants provided significantly higher rates of urine samples negative for cocaine, for opiates, and for both opiates and cocaine than participants in the Usual Care Control group on the 30-day assessments (Table 1 and Figure 2). The differences between groups were evident independent of whether all missing samples were considered positive (missing positive) or whether the missing values were interpolated (missing interpolated) or not replaced (missing missing). Self-reported abstinence of cocaine, opiates, and both drugs, including data were virtually identical to the biochemically-confirmed urinalysis results. Taken together, the urinalysis and self-report data suggest that over fifty percent of participants in the Therapeutic Workplace group were abstinent from cocaine and from opiates, which is about twice the rate of abstinence among participants in the Usual Care Control group.

The primary analyses of urine samples (missing positive) collected every 6 months during years 5–8 after the business had closed (Business Closed) showed no significant differences between the two groups in the percentage of urine samples negative for cocaine, opiates, or both cocaine and opiates (Table 2 and Figure 2). There were no significant differences between the two groups on any of the measures of self-reported drug use during years 5 through 8 while the business was closed (Table 2).

3.3 Employment and Income

Analyses of monthly assessments between months 37–48, while the data entry business was in operation, showed that Therapeutic Workplace participants reported a significantly greater percentage of months being employed full-time (Business Open; Table 1 and left panel of Figure 3) and a significantly lower percentage of months being unemployed (Table 1) than Usual Care Control participants. The data in Figure 3 (left panel) show that about 40 percent (8 of 20 participants) of Therapeutic Workplace participants were employed full-time for most of the fourth year after intake, whereas none of the Usual Care Control participants reported being employed full time for most of the year.

After the data entry business closed during the fifth to eighth year after intake (Business Closed; Table 2, right panel of Figure 3), the difference in the percentage of months that Therapeutic Workplace and Usual Care Control participants reported being employed full time was no longer significant.

Tables 3 and 4 show the continuous measures of employment and income based on 30-day assessments while the Hopkins Data Services data entry business was in operation (Business Open, Table 3) and after the business closed (Business Closed, Table 4). Compared to the Usual Care Control group, while the Business was open the Therapeutic Workplace group reported more days employed per month, higher monthly employment income, higher total monthly income, and less money spent on drugs (Table 3). After the data entry business closed, there was only a significant difference between the Usual Care Control group and Therapeutic Workplace group on total income earned (Table 4).

3.4 HIV Risk Behaviors and Illegal Activities

There were no significant effects of the Therapeutic Workplace intervention on HIV risk behaviors or illegal activities, either while the business was open (Table 1) or after it closed (Table 2). The self-reported rates of most of the behaviors for both groups were low (below 10%) during both periods.

4.0 Discussion

This study demonstrates that a Therapeutic Workplace business can maintain heroin and cocaine abstinence and promote employment for an extended period of time, in this case for as long as four years, in a group of poor and chronically unemployed women. The study also provides an extended view of the nature and persistence of drug addiction and unemployment in this population. Participants in this study were originally identified and selected because they were unemployed and failed to stop their use of cocaine and heroin during their participation in a comprehensive treatment for pregnant and postpartum women. Usual Care Control participants continued high rates of cocaine and opiate use and unemployment throughout the study. During the monthly assessments conducted throughout the fourth year after intake (see Table 1), only 23 and 30 percent of urine samples provided by Usual Care Control participants were negative for cocaine and opiates, respectively. Only two of the 20 control participants (10%) provided evidence of continuous abstinence from cocaine and opiates (Figure 2). In marked contrast, during the fourth year after intake when

the data entry business was in operation, Therapeutic Workplace participants maintained more than twice the rate of cocaine negative and opiate-negative urine samples relative to control participants (Table 1 and Figure 2). Seven Therapeutic Workplace participants (35%) maintained continuous abstinence from cocaine and opiates during the fourth year after intake. It is noteworthy that despite being paid regular paychecks as employees in the Therapeutic Workplace business, cash did not appear to lead to relapse. These data suggest that the Therapeutic Workplace business can be effective in maintaining abstinence from cocaine and opiates over an extended period of time.

In addition to persistent use of cocaine and opiates in this population, the women who participated in this study were chronically unemployed and had little financial means to support their families. Many of the participants had been engaged with the Department of Social Services as welfare recipients with all the attendant services and pressures to obtain employment and leave the welfare system. Yet unemployment remained a severe and chronic problem for most Usual Care Control participants. None of the participants were employed full time at study intake. The monthly assessments conducted during the fourth year after intake showed that Usual Care Control participants maintained very high rates of unemployment and low rates of full-time employment (Table 1, Figure 3). Usual Care Control participants only reported being employed full time on 7% of the monthly assessments during the fourth year after intake. Therapeutic Workplace participants reported being employed fulltime at significantly and substantially higher rates than Usual Care Controls during the fourth year after intake. Therapeutic Workplace participants reported being employed full-time on 42% of the monthly assessments conducted during the fourth year after intake. While the Therapeutic Workplace was in operation the Therapeutic Workplace participants reported significantly more days worked per month, more employment income, more total income, and less money spent on drugs (Table 3). Although much of the employment reported by Therapeutic Workplace participants was employment in the Therapeutic Workplace data entry business, these data show that this population rarely becomes employed in community jobs (Usual Care Control participants), but they will work fairly consistently when given an employment opportunity (Therapeutic Workplace participants) and when common barriers to employment (Svikis et al. 2012) are minimized.

Employment has been extremely difficult to promote in low-income adults with long histories of drug addiction (Magura, Staines, Blankertz, & Madison, 2004; Sviki et al. 2012). One fairly large and well-conducted study evaluated the long-term effectiveness of an intensive case management intervention in 302 substance-dependent women receiving Temporary Assistance for Needy Families (Morgenstern et al., 2009). The case management services provided in that study were very intensive and were provided throughout the 24 months of the study. Despite the intensity and long duration of the case management services provided in this study, the intervention had no effect on employment at the 22-month or 23-month assessment time points, and appeared to have only a small effect at the 24-month time point (22% of the Intensive Case Management participants reported being employed full time compared to 9% of the Usual Care Control Participants). In this context, the effect of the therapeutic workplace business on employment during the 4th year after intake (Therapeutic Workplace participants reported being employed full time on 42% of the

months during the 4th year after intake compared to 7% for Usual Care Control participants) was substantial.

Most of the statistically significant beneficial effects of the Therapeutic Workplace did not persist after the Therapeutic business closed. Six-month assessments conducted in the three years after the Therapeutic Workplace business closed showed that the two study groups provided statistically similar rates of urine samples negative for cocaine and opiates and statistically comparable rates of employment (Table 2), although the Therapeutic Workplace reported significantly higher total income than Usual Care Control participants during the post-intervention follow-up period (Table 4). Part of the failure to sustain significant differences between the two groups during the post-intervention follow-up period resulted from improvements in Usual Care Control group, particularly in their rates of opiate negative urine samples. Although the rates of opiate negative urines samples provided by Therapeutic Workplace participants across the Business Open and Business Closed periods were almost unchanged, some Therapeutic Workplace participants who maintained cocaine abstinence during Year 4 when the business was opened relapsed to cocaine use during the follow-up period when the business was closed. Whether the intervention can have sustained effects on drug use if the contingencies are maintained for some limited period of time (e.g., five years) is unknown. Long-term studies to investigate whether some extended duration of exposure to abstinence reinforcement contingencies produces irreversible effects are needed, although they would be very difficult to conduct. The failure to sustain effects on drug abstinence in the years after exposure to the Therapeutic Workplace intervention suggests that it may be necessary to maintain the abstinence reinforcement contingencies for extended periods and possibly indefinitely for some people.

Rates of employment in Therapeutic Workplace participants decreased substantially during the post-intervention follow-up period. It is clear that employment in the therapeutic workplace data entry business was not sufficient to ensure that participants will seek and maintain long-term employment in community jobs. Additional interventions to promote long-term employment in community jobs are still needed for this population.

Several participants left the business for community employment before the business closed (Figure 1; S44, S33, S45, S35). If it is necessary to maintain abstinence contingencies over extended periods of time, the propensity of participants to seek and obtain community employment that does not require that employees maintain objectively verified abstinence can compromise the ability of the Therapeutic Workplace to maintain long-term abstinence. Two approaches might be used to address this limitation. First, the Therapeutic Workplace could offer more competitive hours, wages and benefits to encourage participants to maintain their employment in the Therapeutic Workplace business. Second, employment-based abstinence reinforcement contingencies could be integrated into community workplaces to maintain long-term abstinence in participants. A combination of these approaches might be optimal.

The data on the Usual Care Control group show that despite extended prior involvement in the drug abuse treatment system, including exposure to a state-of-the-art drug abuse treatment for pregnant and postpartum women, these treatment efforts did not curtail drug

use. Furthermore, despite the fact that 90 percent of the Usual Control participants had received some form of public assistance (data not shown) and many were eligible for employment services available in the welfare system, only one Usual Care Control participant (5%) reported consistent full-time employment during the eight years that they were followed in this study. These data show that this population is in desperate need of more effective treatment approaches to address the drug addiction, chronic unemployment and poverty than is currently being provided in their community. These data leave little question that the available approaches to promote drug abstinence and employment in these individuals have been grossly inadequate.

There were no significant effects of the Therapeutic Workplace intervention on HIV risk behaviors or illegal activities, either while the business was open (Table 1) or after it closed (Table 2). The failure to detect effects on these behaviors may have been due, at least in part, to the fact that the self-reported rates of most of the behaviors for both groups were low (below 10%) during both periods, and it was not possible to decrease those behaviors further.

This report describes the long-term outcomes of a Stage 1 Behavior Therapy Development project (Rounsaville, Carroll, & Onken, 2001) that sought to develop and evaluate the Therapeutic Workplace, a novel behavioral treatment for drug addiction. As a Stage 1 Behavior Therapy Development project, the study yielded some very positive results, but it also has clear limitations. First, participants remained in the training phase of the intervention (Phase 1) for about 3 years because the data entry business Hopkins Data Services was not opened until 2000, about 3 years after the participants enrolled in the study. Such a long training phase was probably not necessary, although we cannot know from this study how little time would be needed to prepare participants to serve as employees in a business like Hopkins Data Services. Based on our experience to date (Silverman et al., 2012), we expect that participants could be trained and prepared for employment in much less time. Second, because this was a Stage 1 Behavior Therapy Development project, a priority was placed on the development of this novel intervention, and less emphasis was placed on maintaining the most elegant experimental design. As a result, participants began working in the therapeutic workplace data entry business when that business was established and spent different lengths of time in the training, business (Business Open) and post-intervention (Business Closed) phases of the study, which complicated the analyses. Finally, the study employed a small sample size. While this sample size was sufficient to demonstrate that the Therapeutic Workplace business was an effective maintenance intervention that could maintain abstinence and employment for as long as 4 years after intake, the sample size may not have provided sufficient power to evaluate any smaller lasting effects after the intervention was discontinued. For example, during the follow-up period after the business closed Therapeutic Workplace participants reported more than twice the rate of full time and employment income as Usual Care Control participants, but those differences were not statistically significant. We cannot know from this study whether a larger sample size would have been sufficient to detect post-intervention effects of the intervention.

Businesses like Hopkins Data Services that exist to address a social problem have been referred to as Social Businesses (Weber and Yunus, 2010; Yunus, 2006; Yunus and Weber, 2007) or Social Firms (Gilbert et al., 2013; Warner and Mandiberg, 2006). A “social business is outside the profit-seeking world. Its goal is to solve a social problem by using business methods, including the creation and sale of products and services (Weber and Yunus, 2010; p. 1).” In a similar vein, “social firms” have been used throughout the world to provide employment opportunities to people with mental illness (Gilbert et al., 2013; Warner and Mandiberg, 2006). Distinguished from sheltered workshops, employees in social businesses and social firms earn standard market wages. Hopkins Data Services provided data entry services to customers and hired Therapeutic Workplace participants as data entry operators (Silverman et al., 2005). Its sole purpose was to serve the needs of a group of low-income women who have long histories of poverty and drug addiction and employees earned at or above the state and federal minimum wage. A variety of social businesses have been used primarily in low-income countries to address poverty with some success (Weber and Yunus, 2010). Social firms have been used throughout the world, including in Italy, Germany, the United Kingdom, New Zealand, Japan, Korea, Canada and the United States (Gilbert et al., 2013; Warner and Mandiberg, 2006). This study shows that a social business also can be used to promote drug abstinence and employment in a population of chronically unemployed women who have long histories of addiction to heroin and cocaine.

Neither social businesses nor social firms have undergone rigorous scientific evaluations. Many questions remain about the value and role of social businesses or social firms in addressing social problems, and similar questions exist for Therapeutic Workplace social businesses. This study showed that a Therapeutic Workplace social business can maintain drug abstinence and employment in the participants, but we do not know if the intervention’s costs can be justified. That a Therapeutic Workplace social business can increase drug abstinence as well as employment might improve its value and its financial advantage. However, formal cost effectiveness and cost-benefit analyses of Therapeutic Workplace social businesses will need to be conducted to address this issue.

Further research could also be conducted to identify how Therapeutic Workplace social businesses could be used. If the use of Therapeutic Workplace social businesses can be financially justified, they could be used as long-term maintenance interventions. Alternatively, they could be used to provide temporary, short-term employment opportunities and employment-based abstinence reinforcement, while participants seek longer-term solutions to address their employment and/or substance abuse problems. Even the most effective employment interventions for substance abusers (Magura, Staines, Blankertz, & Madison, 2004; Morgenstern et al., 2009) or other populations (Bond, Drake, & Becker, 2012) do not promote employment in all participants and they typically promote employment in many participants only after considerable delay. Thus, complementary or alternative employment interventions could be valuable. The Therapeutic Workplace social business could provide such a complementary or alternative approach for chronically unemployed drug addicted individuals.

4.1 Conclusion

The Therapeutic Workplace can serve as a maintenance intervention to sustain long-term abstinence and employment in poor and unemployed substance abusers; however, questions remain about the extent to which Therapeutic Workplace procedures can be applied and maintained in a cost-effective and practical manner. Given that the Therapeutic Workplace Social Business had to close because it had not become financially self-sustaining, more ingenuity is needed to develop effective business models for this approach. Successful Social Business models do exist (Weber and Yunus, 2010) and might be adapted to treat drug addiction and chronic unemployment using key Therapeutic Workplace contingencies. Some public funds for interventions like the Therapeutic Workplace intervention may be required to support such efforts. Considerable public funds currently support welfare-to-work initiatives and substance abuse treatment programs for those who are poor and chronically unemployed. However, the long-term outcomes of Usual Care Control participants in this study underscore how inadequate those public programs can be for these women. Given the severity and persistence of the problems of addiction, unemployment, and poverty in the population of mothers in the study, and lasting effects produced by the Therapeutic Workplace, investigations into the future financing and further development and evaluation of this intervention are clearly warranted.

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HIGHLIGHTS

- A Therapeutic Workplace social business was evaluated in drug-dependent women.
- A Therapeutic Workplace social business maintained long-term cocaine abstinence.
- A Therapeutic Workplace social business maintained long-term opiate abstinence.
- A Therapeutic Workplace social business promoted employment.
- Most Therapeutic Workplace social business effects did not last after it closed.

Figure 1.

Days in attendance in the Therapeutic Workplace across consecutive weekdays for the Therapeutic Workplace group. Each horizontal line represents the attendance results for a different individual across consecutive weekdays during the study. The numerals on the ordinates represent participant numbers. The solid portions of lines indicate that the participant attended the workplace on that day. Thin and thick portions of each line represent attendance in the training (Phase 1) and data entry business (Phase 2) portions of the intervention, respectively. Participants are arranged from those with the most attendance on the top of the figure to patients with the least attendance on the bottom. Since patients were required to provide drug-free urine samples to maintain access to the workplace, continuous solid lines also show consecutive days of abstinence. Four participants (S44, S33, S45 and S35) had offsite employment included in this figure. The open squares indicate when four of the participants left the therapeutic workplace business for competitive employment in a community workplace. Solid circles indicate when the business closed.

Figure 2.

Percentage of negative urine samples for cocaine (top panels) and opiates (bottom panels) during the period while the data entry business, Hopkins Data Services, was opened (Business Open; left panels) and after the business closed (Business Closed; right panel). Data from the Business Open period were based on 30-day urine samples collected when Hopkins Data Services was opened and between months 37–48 after treatment entry. Business Closed data were based on 6-month assessments collected between months 60–96 and after Hopkins Data Services had closed. Dots represent data for individual participants and bars represent group means. Missing samples were considered positive. Because the business opened and closed on a fixed dates and participants were enrolled in the study at different dates, participants had different number of 30-day assessments during Year 4 that the business was open and different number of 6-month assessments during Years 5–8 that the business was closed.

Figure 3.

Percentage of months that participants reported being employed full time during the period when the data entry business was open (Business Open; left panel) and after the business had closed (Business Closed; right panel). Business Open data were based on 30-day assessment samples collected between months 37–48 after treatment entry (Year 4), while Business Closed data were based on 6-month assessments collected between months 60–96 (Years 5–8). Dots represent data for individual participants and bars represent group means. Participants were considered unemployed if the participant did not complete an assessment (i.e., if the data were missing). Because the business opened and closed on a fixed dates and participants were enrolled in the study at different dates, participants had different number of 30-day assessments during Year 4 that the business was open and different number of 6-month assessments during Years 5–8 that the business was closed

Table 1

Dichotomous outcome measures based on 30-day assessments while Hopkins Data Services was in operation (Year 4 post-intake; Business Open)

	Control (n=20)	Therapeutic Workplace (n=20)	<i>P</i>	Odds Ratio (95% CI)
Percentage				
Urinalysis Results (Negative) ^a				
Cocaine	23	57	.016	3.79 (1.28–11.26)
Opiates	30	63	.016	3.64 (1.29–10.25)
Both Cocaine and Opiates	17	49	.015	4.57 (1.28–16.34)
Self-reported Abstinence ^a				
Cocaine	27	63	.011	4.03 (1.38–11.74)
Opiates	33	71	.007	4.73 (1.55–14.48)
Both Cocaine and Opiates	18	55	.006	5.49 (1.57–19.16)
Employment ^b				
Employed full time	7	42	.004	8.23 (2.48–27.37)
Employed part time	6	5	.657	0.78 (0.26–2.31)
Unemployed	87	53	.012	4.83 (1.57–14.84)
Received public assistance	62	58	.890	1.08 (0.37–3.17)
HIV Risk Behaviors ^b				
Injected drugs	43	33	.504	0.67 (0.21–2.18)
Smoked crack	44	56	.527	1.42 (0.48–4.17)
Shared needles or works	4	6	.876	1.22 (0.11–13.35)
Sex for drugs or money	8	1	.289	0.20 (0.03–1.68)
Illegal Activities ^b				
Engaged in illegal activities	2	2	.880	0.86 (0.12–6.30)
Detained or incarcerated	3	4	.561	1.49 (0.39–5.66)
Assessments Collected	82	89	.627	1.49 (0.35–5.66)

Note. Data were based on the measures collected at the 30-day assessments during the fourth year after intake and while Hopkins Data Services was open. Data were based a maximum of twelve 30-day assessments for each participant; some participants had fewer assessments because Hopkins Data Services had not opened during their initial month(s) of their fourth year. The percentages in the table reflect the percentage of assessments that participants provided (in the case of urinalysis results) or reported the listed outcomes. Groups were compared using GEE tests. CI = confidence interval.

^aData are based on the “missing positive” analyses in which missing samples or missing ASI self-reports of drug use were considered positive. The “missing interpolated” and “missing-missing” analyses yielded similar results, so they are not shown.

^bData are based on the “missing=missing” analyses in which missing values are not included or replaced in the analysis.

^cTotal of Employed full time, Employed part time and unemployed for the Therapeutic Workplace group equals more than 100 percent because of rounding.

Table 2

Dichotomous outcome measures based on 6-month assessments after Hopkins Data Services had closed (Years 5–8 post-intake; Business Closed)

	Control (n=20)	Therapeutic Workplace (n=20)	<i>P</i>	Odds Ratio (95% CI)
Percentage				
<i>Urinalysis Results (Negative)^a</i>				
Cocaine	36	46	.374	1.54 (0.60–4.00)
Opiates	54	66	.272	1.72 (0.66–4.50)
Both Cocaine and Opiates	32	46	.273	1.75 (0.65–4.77)
<i>Self-Reported Abstinence^a</i>				
Cocaine	39	52	.269	1.74 (0.65–4.62)
Opiates	56	63	.606	1.30 (0.48–3.51)
Both Cocaine and Opiates	33	48	.233	1.91 (0.66–5.53)
<i>Employment^b</i>				
Employed full time	11	27	.111	2.81 (0.78–10.10)
Employed part time	5	5	.962	1.03 (0.34–3.13)
Unemployed	84	68	.121	2.30 (0.80–6.63)
Received public assistance	62	55	.909	0.94 (0.32–2.76)
<i>HIV Risk Behaviors^b</i>				
Injected drugs	44	38	.684	0.78 (0.24–2.58)
Smoked crack	47	70	.102	2.48 (0.84–7.32)
Shared needles or works	0	4	--	--
Sex for drugs or money	9	2	.211	0.23 (0.02–2.23)
<i>Illegal Activities^b</i>				
Engaged in illegal activities	6	2	.271	0.31 (0.03–2.86)
Detained or incarcerated	9	4	.304	0.46 (0.13–1.68)
Assessments Collected	86	82	.696	0.76 (0.19–3.03)

Note. Data were based on the measures collected at the 6-month assessments for each participant from month 60 through month 96 after Hopkins Data Services had closed (Business Closed). Data were based a maximum of seven 6-month assessments (months 60, 66, 72, 78, 84, 90, and 96) for each participant; some participants had fewer assessments because Hopkins Data Services had closed at the time of the 60th month assessment. In those cases, the 60th month data were not included in the Business Closed analyses. The percentages in the table reflect the percentage of assessments that participants provided (in the case of urinalysis results) or reported the listed outcomes. Groups were compared using GEE tests. CI = confidence interval.

^aData are based on the “missing positive” analyses in which missing samples or missing ASI self-reports of drug use were considered positive. The “missing interpolated” and “missingmissing” analyses yielded similar results, so they are not shown.

^bData are based on the “missing=missing” analyses in which missing values are not included or replaced in the analysis.

Table 3

Continuous outcome measures based on 30-day assessments while Hopkins Data Services was in operation (Business Open) ^a

	Control <i>M</i> (<i>SD</i>)	Therapeutic Workplace <i>M</i> (<i>SD</i>)	<i>F</i>(1,36)	<i>P</i>
Days employed per month	2.22 (0.44)	9.64 (0.74)	16.90	<.001
Employment income	\$60 (13)	\$478 (44)	15.09	<.001
Public assistance income	\$284 (22)	\$310 (23)	0.08	.772
Illegal income	\$82 (23)	\$87 (23)	0.01	.951
Total income	\$539 (38)	\$852 (49)	6.52	.015
Amount of money spent on drugs	\$318 (39)	\$127 (16)	5.14	.029
Days in outpatient treatment	2.34 (0.48)	2.15 (0.49)	0.04	.848
Days of methadone use	16.52 (1.00)	18.47 (0.97)	0.20	.658

Note. All measures were collected from the Addiction Severity Index Lite (ASI Lite). Data were analyzed with multilevel analyses with group and time as factors using SAS Proc Mixed analysis.

^aData are based on the “missing interpolated” analyses in which missing samples were interpolated based on the values before and after the missing values. The “missing-missing” analyses yield similar results, so they are not shown.

Table 4

Continuous outcome measures based on 6-month assessments after Hopkins Data Services had closed (Business Closed)^a

	Control <i>M</i> (<i>SD</i>)	Therapeutic Workplace <i>M</i> (<i>SD</i>)	<i>F</i>(1,36)	<i>P</i>
Days employed per month	4.00 (0.85)	7.03 (1.01)	1.79	.119
Employment income	\$148 (33)	\$349 (55)	3.76	.061
Public assistance income	\$276 (30)	\$306 (34)	0.11	.747
Illegal income	\$43 (17)	\$55 (38)	0.06	.813
Total income	\$622 (42)	\$1086 (75)	13.13	.001
Amount of money spent on drugs	\$240 (59)	\$204 (85)	0.07	.796
Days in outpatient treatment	1.63 (0.49)	2.35 (0.71)	0.20	.660
Days of methadone use	18.05 (1.34)	21.79 (1.30)	1.23	.275

Note. All measures are reported as missing interpolated and were collected from the Addiction Severity Index Lite (ASI Lite). Data were analyzed with multilevel analyses with group and time as factors using SAS Proc Mixed analysis.

^aData are based on the “missing interpolated” analyses in which missing samples were interpolated based on the values before and after the missing values. The “missing-missing” analyses yield similar results, so they are not shown.