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Behavior Analysts in the War on Poverty: Developing an Operant Anti-Poverty Program

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Abstract

Poverty is associated with poor health and affects many United States residents. The therapeutic workplace, an operant intervention designed to treat unemployed adults with histories of drug addiction, could form the basis for an effective anti-poverty program. Under the therapeutic workplace, participants receive pay for work. To promote drug abstinence or medication adherence, participants must provide drug-free urine samples or take scheduled doses of medication, respectively, to maintain maximum pay. Therapeutic workplace participants receive job skills training in Phase 1 and perform income-producing jobs in Phase 2. Many unemployed, drug-addicted adults lack skills they would need to obtain high-skilled and high-paying jobs. Many of these individuals will attend therapeutic workplace training reliably, but only when offered stipends for attendance. They also will work on training programs reliably, but only when they earn stipends for performance on training programs. A therapeutic workplace social business can promote employment, although special contingencies may be needed to ensure that participants are punctual and work complete work shifts, and social businesses do not reliably promote community employment. Therapeutic workplace participants will work with an employment specialist to seek community employment, but primarily when they earn financial incentives. Reducing poverty is more challenging than promoting employment, since it requires promoting employment in higher-paying, full-time and steady jobs. Although a daunting challenge, promoting the type of employment needed to reduce poverty is an important goal, both because of the obvious benefit in reducing poverty itself and in the potential secondary benefit of reducing poverty-related health disparities.

Keywords

poverty; operant conditioning; incentives; unemployment; drug addiction

Poverty is associated with poor health and affects a large number of United States residents. Poverty is associated with many adverse health conditions such as obesity (Drewnowski & Specter, 2004), cigarette smoking (Hiscock, Bauld, Amos, Fidler, & Munafò, 2012), human

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immunodeficiency virus (Oldenburg, Perez-Brumer, & Reisner, 2014), heart failure (Hawkins, Jhund, McMurray, & Capewell, 2012), stroke (Addo et al., 2012), cancer (Ward et al., 2004), death (Muennig, Fiscella, Tancredi, & Franks, 2010), and a shortened lifespan (Chetty et al., 2016). In 2016, 40.6 million people in the United States lived in poverty, representing about 12.7 percent of the United States population (Semega, Fontenot, & Kollar, 2017). We do not know whether poverty causes poor health, whether poor health causes poverty, or whether some third factor causes both; but the pervasive associations between poverty and health should make poverty a prime target for intervention. Despite the prevalence of poverty in the United States and the potential adverse effects of poverty on health and longevity, researchers have made limited progress in developing effective anti-poverty programs.

The United States “waged war” on poverty in the 1960s, but the large-scale anti-poverty programs that were instituted had only minor effects (Bitler & Karoly, 2015). In the 1990s, a number of anti-poverty programs employed financial incentives intended to promote education and employment and to reduce poverty (Holtyn, Jarvis, & Silverman, 2017). Governments and other organizations in the United States applied these incentive-based programs on a large scale. Like the initial anti-poverty programs in the 1960s, these welfare-reform programs also had very small effects. Despite a lack of substantial or meaningful effects, governments did demonstrate their willingness to implement incentive programs to address poverty and they demonstrated that they had the structural capabilities to do so (Holtyn et al., 2017).

Although governments and organizations have implemented anti-poverty incentive programs, those programs have been administered without any systematic development. Therefore, it is not surprising that they have had limited effects (Holtyn et al., 2017; Silverman, Holtyn, & Jarvis, 2016). A program of research on the development of an operant treatment for poor unemployed adults with a history of drug addiction called the therapeutic workplace could form the basis for an effective anti-poverty intervention (Holtyn et al., 2017; Silverman et al., 2016). In contrast to the large-scale antipoverty programs, the therapeutic workplace has been evaluated through systematic and rigorous research. This article reviews aspects of research on the therapeutic workplace focused on the development of employment related behaviors and employment in low-income adults who have long histories of drug addiction.

The Therapeutic Workplace: Developing an Operant Anti-Poverty Program

Drug addiction, like other health problems, is associated with poverty. Injection drug use has been concentrated in people who live in poverty (Armstrong, 2007), and unemployment and drug addiction have been closely associated (Henkel, 2011). Interventions for unemployed adults with histories of drug addiction have had very limited effects (Azrin, Sisson, Meyers, & Godley, 1982; Higgins et al., 2003; Magura, Staines, Blankertz, & Madison, 2004; Saal, Forschner, Kemmann, Zlatosch, & Kallert, 2016; Svikis et al., 2012). The therapeutic workplace could serve as the foundation for an effective anti-poverty program.

Overview of Therapeutic Workplace

The therapeutic workplace is a behavioral treatment that uses operant conditioning to promote drug abstinence, medication adherence, job skill development and employment in low-income adults who have long histories of drug addiction (Silverman, 2004; Silverman, DeFulio, & Sigurdsson, 2012). Under the therapeutic workplace, participants receive pay (stipends or wages) for work. To promote drug abstinence or medication adherence, the therapeutic workplace arranges employment-based reinforcement in which participants must provide routine drug-free urine samples or take scheduled doses of medication, respectively, to work and maintain maximum pay (typically about \$10 per hour). Because we treat low-income adults who have limited academic and job skills, the therapeutic workplace has two phases through which participants can progress sequentially. During the initial phase (Phase 1), participants receive job skills training to prepare them for employment. During the second phase (Phase 2), participants perform income-producing jobs. Throughout both phases, participants can earn a base pay hourly wage and productivity pay based on performance on training programs (Phase 1) or work (Phase 2).

Models of Phase 2 Employment

We developed three models of implementing the second phase of the therapeutic workplace: the social business model, the cooperative employer model, and the wage supplement model (Silverman, Holtyn, & Morrison, 2016). Under all models, individuals enroll in Phase 1 of the therapeutic workplace to initiate abstinence and establish skills. Below are brief descriptions of each model; our experiences with the social business and wage supplement models are described in more detail later in the paper.

The Social Business Model—Under the Social Business model, Phase 1 graduates are hired as employees in a social business. A social business, a concept that won Muhammad Yunus the Nobel Prize, is a business that exists to address the needs of a low-income population (Weber & Yunus, 2010; Yunus & Weber, 2007). The therapeutic workplace social business maintains employment and employment-based abstinence reinforcement. We established a therapeutic workplace social business, Hopkins Data Services, which provided data entry services to customers (Aklin et al., 2014; Silverman et al., 2005).

The Cooperative Employer Model—Under the Cooperative Employer model, a community employer hires graduates of Phase 1. The Cooperative Employer requires that employees undergo random drug testing and remain abstinent to maintain employment. We have not yet evaluated this model.

The Wage Supplement Model—Under the Wage Supplement Model, we offer graduates of Phase 1 abstinence-contingent wage supplements if they maintain competitive employment. Governments in Minnesota, Connecticut, Milwaukee, New York, and Canada have used wage supplements to increase employment in welfare recipients (Berlin, 2007; Michalopoulos, 2005; Riccio et al., 2010). Our model harnesses the power of wage supplements to promote employment, while simultaneously using the wage supplements to reinforce drug abstinence. We are in the process of evaluating the Wage Supplement Model (R01DA037314).

The Therapeutic Workplace in the Treatment of Drug Addiction

Research on the therapeutic workplace has focused primarily on its potential to treat drug addiction. The therapeutic workplace can promote (Silverman, Svikis, Robles, Stitzer, & Bigelow, 2001) and maintain (Aklin et al., 2014; Silverman et al., 2002) abstinence from opiates and cocaine in unemployed pregnant and postpartum women. It can promote (Donlin, Knealing, Needham, Wong, & Silverman, 2008) and maintain (DeFulio, Donlin, Wong, & Silverman, 2009) abstinence from cocaine in unemployed welfare recipients enrolled in methadone treatment. It can promote abstinence from opiates and cocaine in unemployed out-of-treatment injection drug users (Holtyn, Koffarnus, DeFulio et al., 2014; Holtyn, Koffarnus, Defulio et al., 2014). It can promote abstinence from alcohol in unemployed homeless alcohol-dependent adults (Koffarnus et al., 2011). Finally, it can promote adherence to oral (Dunn et al., 2013) and extended-release (Defulio et al., 2012; Everly et al., 2011) naltrexone in unemployed opioid-dependent adults. We have seen that contingencies for drug abstinence are required to promote drug abstinence (e.g., DeFulio et al., 2009; Silverman et al., 2007) and contingencies for medication adherence are needed to promote medication adherence (e.g., DeFulio et al., 2012; Dunn et al., 2013; Everly et al., 2011); employment in the therapeutic workplace alone is not sufficient to promote drug abstinence or medication adherence. We do not know how the other elements of the therapeutic workplace intervention contribute to the outcomes that we have observed. Although not a primary focus of the therapeutic workplace research, we have learned a fair amount about promoting key behaviors that have led to or may lead to employment. The remainder of this article reviews that aspect of the therapeutic workplace research. The studies reviewed in this manuscript were approved by the Western Institutional Review Board (20021498, The Therapeutic Workplace Initiation Study; 20021204, Therapeutic Workplace Maintenance Study) or the Johns Hopkins Medicine Institutional Review Board (NA_00039249, A Therapeutic Workplace for Drug Abusers; NA_00044349, A Therapeutic Workplace for the Treatment of Alcohol Dependence Version 1.2; NA_00039284, Employment-Based Addiction Pharmacotherapy; NA_00000928, Employment-Based Depot Naltrexone Clinical Trial; NA_00011835, A Bridge to Treatment: The Therapeutic Workplace and Methadone Treatment; IRB00037123, Secondary Analyses of Therapeutic Workplace Studies; IRB00046990, The Long-Term Treatment of Drug Addiction and Unemployment).

Education-Focused Interventions

Employment interventions for low-income and other unemployed populations follow two broad approaches: education-focused or quick-entry interventions (Silverman, Chutuape, Svikis, Bigelow, & Stitzer, 1995). Education-focused interventions, sometimes called human capital development approaches, seek to develop skills that participants need to obtain gainful employment, particularly to obtain jobs that pay higher wages. Quick-entry approaches seek to promote employment immediately without the delay required to provide intensive training.

We do not know whether education-focused or quick-entry approaches would better alleviate poverty in unemployed adults with histories of drug addiction, but many unemployed drug users lack the educational credentials and skills needed to obtain higher paying jobs. One

option would be to tailor the employment intervention to skill level and occupational goals (Silverman et al., 1995). Highly skilled individuals can most likely benefit from the quick-entry approach; however, the type of intervention required for low-skilled individuals is more complicated. For low-skilled individuals who are interested in jobs that do not require special skills, the quick-entry approach may be most appropriate. In contrast, low-skilled individuals who are interested in higher paying jobs that require specialized academic or job skills may prefer education-focused interventions. These participants can receive intensive education and training during Phase 1 of the therapeutic workplace intervention.

Occupational interests and academic and job skills—Our research has shown that many unemployed, drug-addicted adults lack skills that they would need to obtain high skilled and high paying jobs. We first studied the occupational interests and academic skills in a group of pregnant and postpartum women who were enrolled in a substance abuse treatment program (N=50). These women were typically unemployed (90%) and most were interested in obtaining a variety of office jobs for which many lacked the academic and job skills needed to function effectively in those jobs (Silverman et al., 1995). Less than half of the participants (46%) completed 12th grade, and participants had low reading, math and spelling skills based on the Wide Range Achievement Test. For example, these women read at the average (25%), low average (27%), borderline (25%), or deficient (23%) levels; no women read at the high average, superior, or very superior levels.

These educational and skill levels are consistent with other populations who have participated in therapeutic workplace research (Holtyn, DeFulio, & Silverman, 2015). Figure 1 shows that a little over half of the participants (N=559) in 6 different studies conducted between 2001 and 2009 completed 12 or more years of education and about one third of participants completed between 9 and 11 years of education. Figure 2 shows that reading levels of participants varied widely, but many participants had very limited reading skills. Almost all participants had average reading levels (34.3%) or below (25.8% had low average, 19.5% had borderline, and 19.1% had deficient). Participants in these studies also had limited spelling and math skills (Holtyn et al., 2015). In a separate analysis, we found that many of our participants were deficient in computer skills (Sigurdsson, Ring, O'Reilly, & Silverman, 2012).

Attendance and progress in training—Many participants attend paid therapeutic workplace training (Phase 1) at remarkably high rates. Figure 3 shows attendance of participants (N=169) who could work and earn maximum pay (typically about \$10 per hour) independent of urinalysis or medication adherence. Data were obtained from participants in six different therapeutic workplace studies over periods lasting 18 (Everly et al., 2011), 24 (DeFulio et al., 2012), or 26 (Dunn et al., 2013; Holtyn et al., 2014; Koffarnus et al., 2011; Silverman et al., 2007) weeks. These data may overestimate attendance, since all but one study (Koffarnus et al., 2011) included an induction period that participants were required to complete to move on to the main study. Figure 3 excludes participants who did not complete the induction period. Nevertheless, these attendance data suggest that many individuals who could benefit from academic or job skills training (i.e., an education-focused intervention)

will attend the therapeutic workplace training program at high rates. Across all studies, half of the participants attended 69% or more of the days.

In the therapeutic workplace, we initially taught a range of academic skills during Phase 1, including math, reading, spelling, writing, typing, and data entry (Silverman et al., 2001). We provided math, reading, spelling and writing training through conventional teacher-led instruction, which was staff-intensive. To reduce the costs of conducting therapeutic workplace studies, we restricted training in subsequent studies to keyboarding and math skills that we could teach through computer-based training. Generally, during Phase 1, participants can earn about \$8 per hour in base pay and about \$2 per hour for performance on training programs. One early analysis showed that our computer-based typing training program could teach chronically unemployed drug users fluent typing skills in an average of less than 52 hours over less than 18 weeks (Dillon, Wong, Sylvest, Crone-Todd, & Silverman, 2004).

The requirement for training stipends—All of the participants shown in Figure 3 were offered incentives for attending the therapeutic workplace and for performance on the training programs. Those data show that participants will attend the therapeutic workplace when offered incentives. However, they do not show whether the incentives are needed to promote attendance. We have conducted research which shows that stipends for training are essential to promote attendance and progress in training. In our initial study (Silverman, Chutuape, Bigelow, & Stitzer, 1996), a within-subject reversal design showed that a small group of participants (N=5) reliably attended the job skills training program when participants received high pay (averaging \$10.50 per hour) for attending the training program, but most participants (4 of 5 participants) stopped attending the program when the magnitude of voucher pay was reduced to between \$3 and \$4.50 per hour.

We conducted a larger randomized controlled clinical trial in homeless alcohol-dependent adults that evaluated the contribution of training stipends (Koffarnus et al., 2013). In that study, we randomly assigned participants to one of three conditions: no reinforcement (n=39), training reinforcement (n=42), or abstinence and training reinforcement (n=43). The no reinforcement and training reinforcement groups are most relevant to the current issue. We invited participants in the no reinforcement group to attend the therapeutic workplace program, but they did not earn incentives for attending or for performance on the training programs. We invited participants in the training reinforcement group to attend the therapeutic workplace program, and they earned incentives for attending (base pay) and for performance on the training programs (productivity pay). Figure 4 shows that training reinforcement participants attended significantly more hours in the therapeutic workplace (bottom panel) and completed significantly more training steps (top panel) than no reinforcement participants. That study showed clearly that training stipends dramatically increased attendance in training and progress on training programs.

The study by Koffarnus, Wong et al. (2013) showed that incentives for attendance and performance increase both attendance and progress on the training programs. However, that study did not determine whether the incentives simply increased attendance, which may have increased participation in training and progress on the training programs. We conducted

two studies to determine if we need to arrange incentives for performance on training programs to ensure progress on training programs. In one study (Subramaniam, Everly, & Silverman, 2017), we used a within-subject reversal design to compare productivity pay and base pay conditions. In the productivity pay condition, participants earned \$8 per hour for attending the therapeutic workplace and bonuses for performance on the typing and keypad training programs. In the base pay condition, participants only earned an hourly pay for attendance, although we increased the amount of base pay to equal the total pay in the productivity pay condition. Participants spent about the same amount of time on the therapeutic workplace in the two conditions, but they typed more characters per hour in the productivity pay condition.

A second study (Koffarnus, DeFulio, Sigurdsson, & Silverman, 2013) compared similar productivity and base pay conditions in 42 out-of-treatment adults who injected drugs and participated in the therapeutic workplace. All participants worked on typing (QWERTY keyboard) and keypad (number pad) training programs. In both of the programs, participants practiced the skills being taught on program steps in short timings that lasted 1 min each. Half of the participants earned base and productivity pay while working on the typing program and base pay only while working on the keypad program (Group A); the other half of participants earned base and productivity pay while working on the keypad program and base pay only while working on the typing program (Group B). We randomly assigned participants to Groups A and B. Participants worked on one of the programs each weekday for 2 hours every afternoon for 30 weeks. Participants in Groups A and B earned about the same amount in total wages (a little over \$10 per hour) and they worked about the same number of hours. However, Figure 5 shows that participants completed more timings per hour (bottom panel) and completed more training program steps (top panel) when they earned productivity and base pay (filled circles) than when they only earned base pay (open circles).

Taken together, these studies show that therapeutic workplace participants will attend training reliably when offered stipends for attending training; and they will attend training and work on training programs reliably when they earn stipends for attendance and performance on training programs. Without stipends for attendance, some participants will not attend training. Without stipends for performance on training programs, some participants will not work on training programs reliably even if they attend the training program consistently.

Promoting Employment

Whether we use a quick-entry or an education-focused approach to promote employment and alleviate poverty, we need some method to promote employment. Below we describe some experience we have had promoting employment with the social business model and the wage supplement model.

Social business model—Starting in October 1996, we enrolled pregnant and postpartum women from the Center for Addiction and Pregnancy in a randomized controlled trial. The women were unemployed and enrolled in methadone treatment but continued to use opiates

or cocaine during treatment. We randomly assigned those participants to a Therapeutic Workplace or Usual Care Control group. We invited Therapeutic Workplace participants to attend the therapeutic workplace for over 4 years and monitored both groups for up to 8 years after random assignment.

In April of 2000, we opened a therapeutic workplace social business, Hopkins Data Services (Silverman et al., 2005). Hopkins Data Services sold data entry services to paying customers and hired therapeutic workplace participants as data entry operators. Many of the therapeutic workplace participants served as successful and skilled data entry operators (Silverman et al., 2005). About 40% of therapeutic workplace participants attended the workplace for much of the time (over 5 years) that the therapeutic workplace operated and they became employees of Hopkins Data Services. Figure 6 (left panel) shows that the therapeutic workplace business was effective in promoting employment in therapeutic workplace participants (Aklin et al., 2014). During the fourth year after random assignment when Hopkins Data Services was open, therapeutic workplace participants reported full-time employment on significantly more months than Usual Care Control participants did.

Although Hopkins Data Services maintained employment in many therapeutic workplace participants, some special circumstances require notice. First, half of participants employed by Hopkins Data Services left Hopkins Data Services for outside employment before Hopkins Data Services closed. Although the therapeutic workplace maintained abstinence from heroin and cocaine, we have some evidence that some participants relapsed to drug use after Hopkins Data Services closed (Aklin et al., 2014). Although we cannot know from this study, leaving employment at Hopkins Data Services for outside employment may lead to relapse since outside employers probably do not maintain employment-based abstinence contingencies. Second, some Hopkins Data Services employees (therapeutic workplace participants) did not reliably arrive at work on time or work complete work shifts, behaviors that were critical to the successful functioning of our data entry business. We were able to promote punctuality and working complete work shifts, but special contingencies were required for some participants (Wong, Dillon, Sylvest, & Silverman, 2004a; Wong, Dillon, Sylvest, & Silverman, 2004b).

The wage supplement model—Social businesses can promote employment, but may have limited capacity. That is, to provide employment opportunities, social businesses must be developed and they must be self-sustaining. Promoting employment in community jobs could increase capacity because of the widespread availability of community jobs. However, promoting employment in community jobs may be difficult. Our social business, Hopkins Data Services, employed therapeutic workplace participants at relatively high rates (Aklin et al., 2014), but Hopkins Data Services employees did not reliably get employed in community jobs when the business closed. During the years after Hopkins Data Services closed, Therapeutic Workplace and Usual Care Control participants did not differ significantly in their reports of full-time employment (Figure 6, right panel).

While we cannot know why our participants do not become employed in community jobs, they do appear interested in paid work. We have seen evidence of this from the study by Aklin and colleagues (2014) and from one study which showed that therapeutic workplace

trainees participate in stipend-supported training at significantly higher rates than they work in community jobs both before and after therapeutic workplace participation (Sigurdsson, DeFulio, Long, & Silverman, 2011).

The wage supplement model may be an effective approach to promote community employment. We are in the process of evaluating the effectiveness of the wage supplement model in promoting employment and drug abstinence (R01DA037314). Participants in this study are opioid-dependent adults who are unemployed at study intake. In this study, we refer participants to methadone treatment if needed and invite them to attend Phase 1 of the therapeutic workplace for about 3 months. We invite participants who continue attending the workplace at the end of the 3-month period to work with an employment specialist for one year to seek employment in a community job. The employment specialist implements a variation of Individual Placement and Support (IPS), which is a supported employment program for adults with severe mental illness (Bond, Drake, & Becker, 2012). At the beginning of that year, we randomly assign participants to an IPS Only group or IPS plus Abstinence-Contingent Wage Supplement group. Participants in the IPS plus Abstinence-Contingent Wage Supplement group can earn abstinence-contingent stipends for working with the employment specialist. When employed, those participants earn abstinence-contingent wage supplements for all verified (by pay stubs) hours that they work in a job.

This study is still ongoing, so we only have preliminary data on IPS participation. Figure 7 shows the percentage of days that participants in the two groups attended IPS and worked with the employment specialist during the first 6 months. Most IPS Only participants stopped attending IPS and working with the employment specialist immediately. IPS plus Abstinence-Contingent Wage Supplement participants attended IPS and worked with the employment specialist consistently and significantly more than IPS Only participants. Our preliminary data shows that participants will work with an employment specialist to seek community employment, but only when offered stipends for doing so.

Discussion

Promoting employment in unemployed drug users can be difficult. Interventions for unemployed adults with histories of drug addiction have had limited effects (Magura et al., 2004; Saal et al., 2016; Svikis et al., 2012). As described in this article, we have begun to learn about the elements we may need to successfully promote employment in this population.

Many unemployed drug users who have participated in the therapeutic workplace research lack academic and job skills that they may need to obtain high-paying jobs (see Figures 1 and 2). Supplying these individuals with the skills they need to succeed is not simple. One large-scale study compared a quick entry employment intervention to an education-focused intervention in welfare recipients (Bos, Scrivener, Snipes, & Hamilton, 2002), but failed to show a benefit of the education-focused approach. Unfortunately, participants did not attend the education and training program reliably, so the education-focused intervention could not be fully evaluated. Some large-scale antipoverty programs have attempted to promote engagement in educational programs by offering incentives to low-income adults for

completing Community College courses with a passing grade or for acquiring a General Education Development (GED) certificate. These programs have had limited effects, possibly because of the very large response requirements for reinforcement (e.g., participants had to complete an entire course with a passing grade to earn an incentive) and the relatively small reinforcement magnitude (Holtyn et al., 2017).

We can promote attendance and participation in education and job skills training programs and skill acquisition through the strategic use of reinforcement contingencies. Specifically, participants' attendance and performance in our training depended critically on precise arrangement of financial incentives. Therapeutic workplace participants attended training reliably, but primarily when offered stipends for therapeutic workplace attendance (see Figures 3 and 4). Therapeutic workplace participants worked consistently on training programs, but primarily when some incentives were arranged contingent on performance on training programs (see Figure 5). Although we do not know the importance of many features of the therapeutic workplace training programs, the programs were divided into small steps through which participants could progress sequentially, participants earned incentives very frequently (in some cases every minute) throughout each day, and participants received continual feedback on the speed and accuracy of the performance on the training programs and on their earnings on the training programs.

The general principles used in our training programs, particularly the use of incentives for attendance and performance on training programs, could be employed to teach a wider range of skills (e.g., GED preparation, Word Processor or Spreadsheet skills, or advanced information technology skills). To administer training programs efficiently, we created a computer-based training authoring and course presentation system called ATTAIN. We have used ATTAIN to teach people at high risk for human immunodeficiency virus (HIV) about HIV risk behaviors and medication (pre-exposure prophylaxis) that can prevent acquisition of HIV (Getty et al., in press), but it could be used to teach skills that might be important for employment.

Our experience with Hopkins Data Services provides strong evidence that we can promote employment with a social business (see Figure 6). Social businesses may be attractive because they bypass the need for a job search, job interviews and for participants to meet the requirements of community employers. Our data show that therapeutic workplace participants can be productive employees of a social business, although special contingencies may be needed to maintain punctuality and completion of full work shifts.

We know much less about our ability to promote employment by community employers. In an ongoing study, we are evaluating our wage supplement model to promote and maintain drug abstinence and employment in community jobs. Although we do not know yet whether the wage supplement model will be effective in promoting community employment, we have already seen that simply offering therapeutic workplace participants employment services by an employment specialist is not sufficient to ensure that they engage with the employment specialist; therapeutic workplace participants will work with an employment specialist to seek employment, but primarily when they earn financial incentives for working with the employment specialist (see Figure 7).

We do not know why stipends are required to promote regular training participation or consistent job search behaviors. Some people obviously participate in job skills training and seek employment without explicit additional stipends. Indeed, many people pay substantial tuition to get job skills training (e.g., at community colleges, four-year colleges, or trade schools) and will seek employment with no additional incentives. Our data and the data from employment programs for low-income adults (Holtyn et al., 2017) show that many adults with limited employment histories will not engage in jobs skills training reliably or seek employment in community jobs without explicit incentives. At the same time, our data are encouraging because they show that our participants will work when given the opportunity (see Figures 3 and 6). These data show that wages can serve as effective reinforcers for work in this population. Interestingly, we have been successful at promoting employment in our social business, Hopkins Data Services. As we have noted, social businesses may be attractive because they bypass the need for a job search, job interviews and for participants to meet the requirements of community employers. We suspect that the employment problems of our participants are not simply a problem of motivation; the problem must lie elsewhere. We can only speculate about why our participants fail to seek and obtain community employment, given that our wages can maintain a considerable amount of work behaviors. Perhaps they have experienced limited success with community employers, which has resulted in extinction of employment-related behaviors (e.g., job search behaviors). Perhaps their criminal history serves as a substantial barrier to employment. Whatever the case, our data suggest that we may be able to promote gainful employment in our participants through the strategic use of operant reinforcement.

We have not completed the development of effective employment interventions for unemployed adults with histories of drug addiction, but we have learned some key lessons about promoting attendance in training, building skills needed for employment, and promoting employment. Through continued systematic research of the type described in this article, we hope to continue the development of effective employment interventions for a population that has been difficult to move into gainful employment. In all likelihood, if we are successful in developing effective employment interventions for adults who have long histories of drug addiction, those interventions will be useful for a wide range of low-income unemployed adults.

Developing effective employment interventions is a critical first step in reducing poverty. However, reducing poverty is considerably more challenging than promoting employment, since it requires promoting employment in higher-paying, full-time and steady jobs. Although a daunting challenge, promoting the type of employment needed to reduce poverty is an important goal, both because of the obvious benefit in reducing poverty itself and in the potential secondary benefit of reducing poverty-related health disparities. Given the success of applying operant principles in the therapeutic workplace, behavior analysts should be uniquely suited to addressing this difficult challenge.

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Public Significance Statement

Poverty is associated with poor health and affects many United States residents. The therapeutic workplace, an operant intervention designed to treat unemployed adults with histories of drug addiction, could form the basis for an effective anti-poverty program. Although a daunting challenge, promoting the type of employment needed to reduce poverty is an important goal, both because of the obvious benefit in reducing poverty itself and in the potential secondary benefit of reducing poverty-related health disparities.

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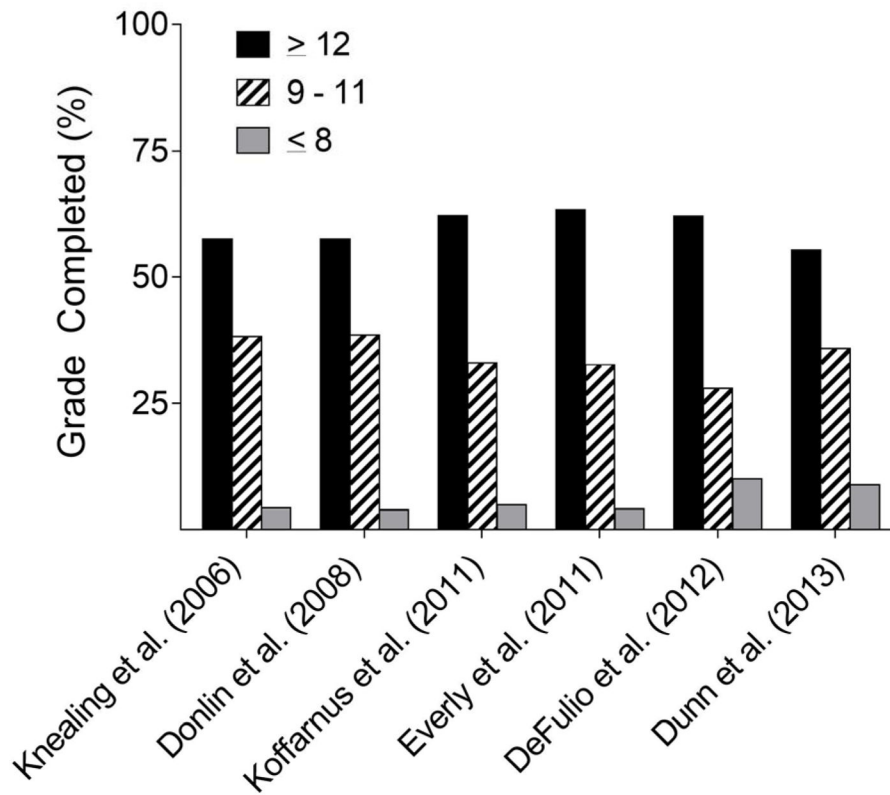


Figure 1.

The percentage of participants who completed 12 or more years of education (black bars), 9 to 11 years of education (striped bars), or 8 or less years of education (grey bars) across six different studies conducted at the Center for Learning and Health in Baltimore, MD. From Holtyn et al. (2015, p. 71; copyright by IOS Press and the authors, reprinted with permission).

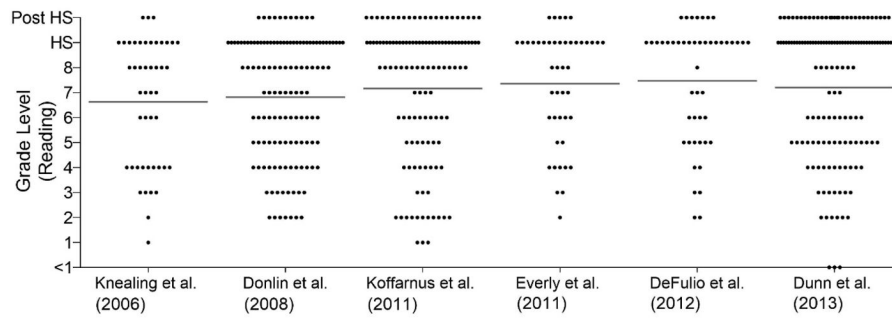


Figure 2. Wide Range Achievement Test (WRAT) reading levels across six different studies conducted at the Center for Learning and Health in Baltimore, MD. The filled circles show grade level for individual participants and the grey horizontal lines show group means. From Holtyn et al. (2015, p. 72; copyright by IOS Press and the authors, reprinted with permission).

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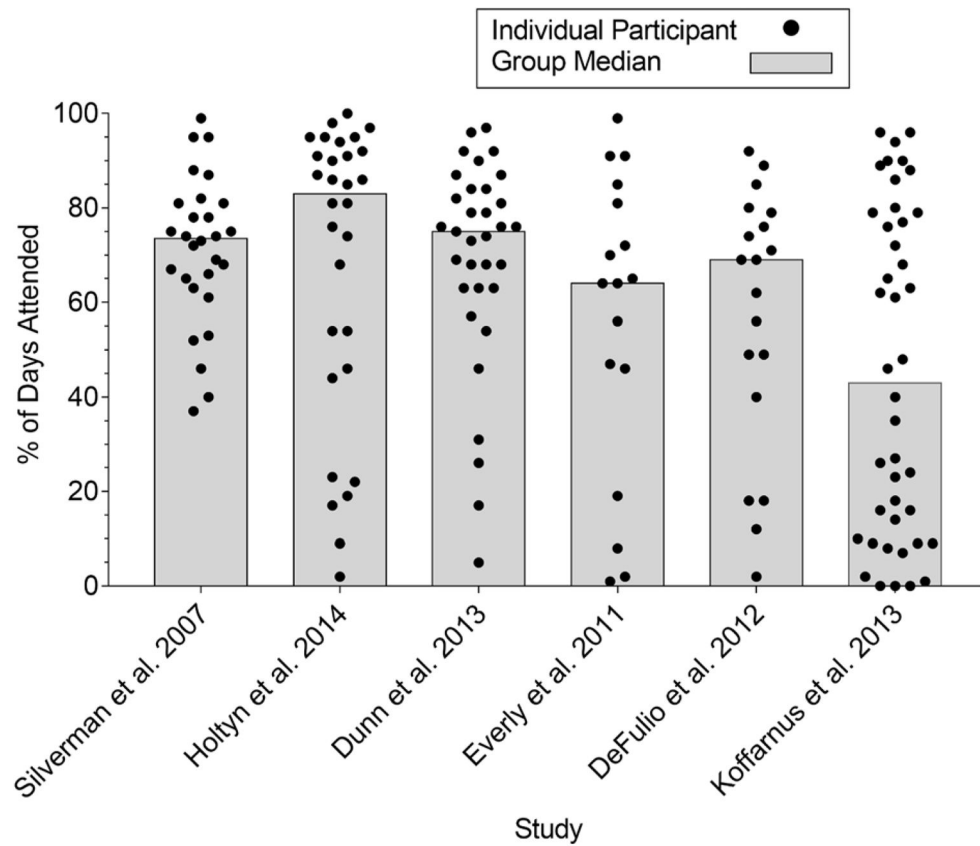


Figure 3.

The percentage of days that participants attended the training at the therapeutic workplace when, through random assignment, participants could work and earn stipends independent of urinalysis results or medication adherence. The filled circles show data for individual participants and the grey bars show group medians. The data come from previously published studies; the citation for each study appears below each bar. Participants from all studies except the study by Koffarnus et al. 2013 completed an induction period prior to random assignment and enrolling in the period shown in the figure.

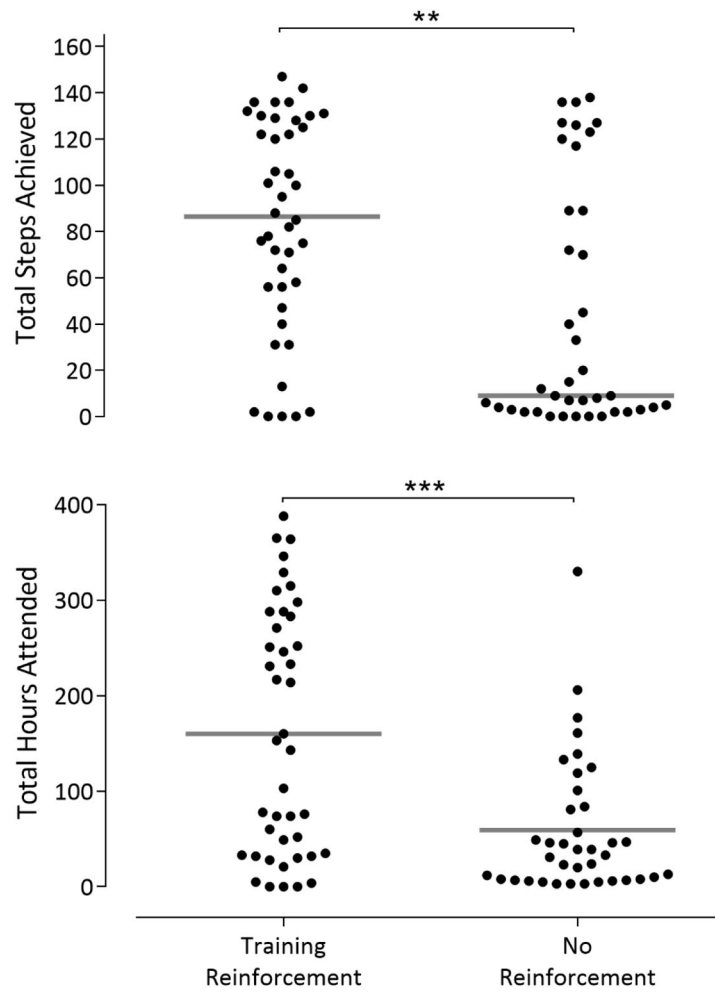


Figure 4. Total steps achieved (top panel) and total hours attended (bottom panel) are shown for each of two groups. Individual points represent individual participants, and horizontal bars indicate the median values for the group. Asterisks indicate significant differences between groups with Dunn's *post hoc* tests (** $p < .01$, *** $p < .001$). Adapted from Koffarnus, Wong et al. (2013, p. 7; reprinted with permission).

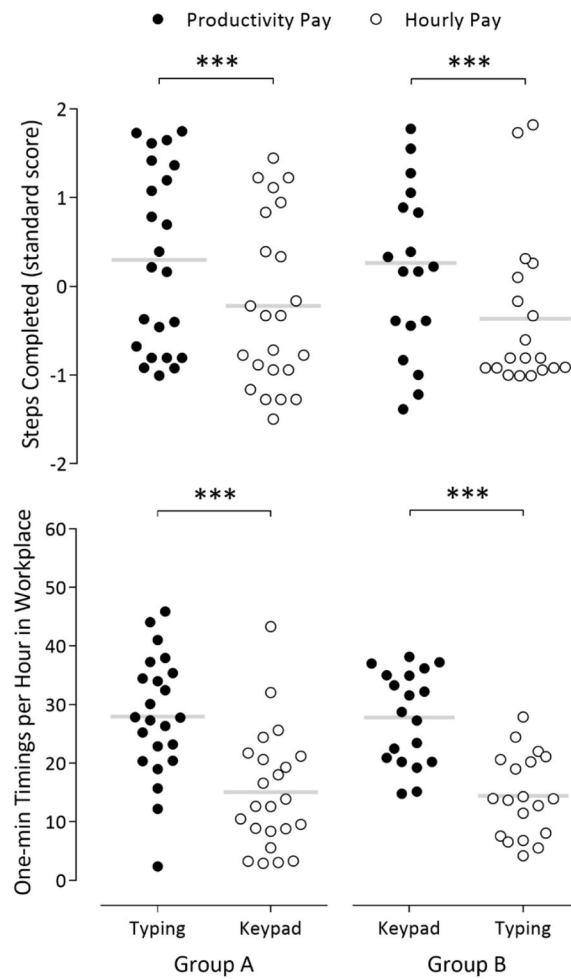


Figure 5. Steps completed (top) represented as a standard score, and timings initiated per hour (bottom) as a function of group and payment condition. Each point represents an individual participant, and the horizontal lines represent the group means. Asterisks indicate a significant effect of planned comparisons between payment conditions for each group (***) $p < .001$). From Koffamus, DeFulio et al. (2013, p. 402; reprinted with permission).

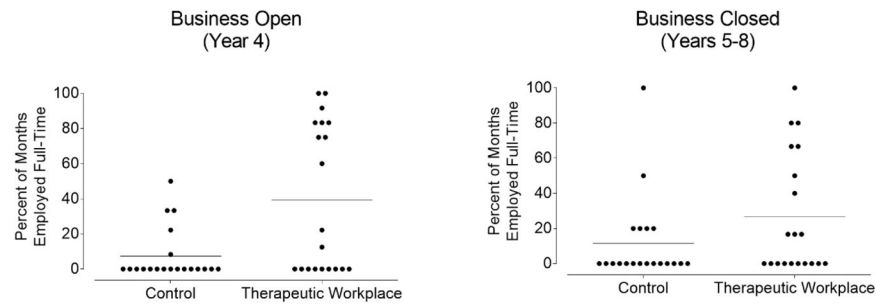


Figure 6.

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. From Aklin et al. (2014, p. 335; reprinted with permission).

