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Augmenting substance use treatment in the drug court: A pilot randomized trial of peer recovery support

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ABSTRACT

Introduction: Peer recovery specialist (PRS) support has been used to varying degrees in community substance use and mental health treatment for a number of years. Although there has been some evidence of positive PRS impacts on client outcomes, previous research has shown inconsistent findings and methodological shortcomings. Given the high prevalence of substance use disorders among people involved in the criminal justice system, and limited available treatment opportunities, PRS support could provide a cost-effective opportunity to promote positive client outcomes. Drug courts, with their focus on treatment and rehabilitation rather than punishment, are an ideal laboratory to test the impacts of PRS on substance use recurrence and recidivism.

Methods: The present study is, to our knowledge, the first experimental test of the PRS model in a justice system setting. We implemented a pilot experiment in the Philadelphia Treatment Court, randomizing 76 drug court participants to be linked to a PRS or to services as usual, and analyzed client outcomes over a nine-month follow-up period. Most participants' drug of choice was marijuana.

Results: The results showed a reduction in rearrests and improvement in drug court engagement, but no impact on substance use recurrence or treatment engagement.

Conclusions: The mixed findings suggest some promise for the PRS model in the drug court setting, but the need for further research with more diverse and higher-risk drug court populations.

1. Introduction

Drug courts emerged in 1989 as part of early efforts to address the treatment gap among arrested individuals with substance use disorders (SUD). These programs have become an important part of criminal justice reform, with more than 3000 drug courts across the U.S. (National Institute of Justice, 2018). Drug courts represent an important shift from punitive approaches to recovery and rehabilitation approaches for persons with SUD, with the goal of breaking the cycle of substance use and criminal behavior (Belenko, 2019; Goldkamp, 2003). Drug courts address substance use and associated criminal behavior among persons convicted of non-violent drug offenses through closely monitored community-based drug treatment and case management to facilitate access to ancillary services, while freeing resources for adjudicating violent offenses (Belenko, 2019; Huddleston et al., 2008). A substantial body of literature has shown significant reductions in recidivism among drug court participants as well as cost benefits (Belenko et al., 2005; Carey & Finigan, 2004; Goldkamp, Weiland, et al., 2001; Goldkamp, White, et al., 2001; Gottfredson et al., 2003; Mitchell et al., 2012; Wilson et al., 2006). More limited evidence exists of reduction in substance use, improved socioeconomic well-being, and family conflict-related outcomes (Brewster, 2001; Gottfredson et al., 2005; Green & Rempel, 2012; Harrell et al., 2001), or of the effects of drug courts on recurrence of substance use, treatment engagement and retention, and long-term outcomes after graduation (Belenko, 2001; Mitchell et al., 2012).

Drug courts have the potential to build recovery-oriented systems of care (ROSC) among participants (Belenko, 2019). ROSC build on strengths and resilience within individuals, families, and communities to help sustain long-term recovery (Sheedy & Whitter, 2009). Drug courts have made recent efforts to build ROSC for participants through connections with broader community supports, including peer recovery

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support (Taylor, 2014). Peer recovery specialists (PRS), sometimes referred to as certified peer specialists, peer support specialists, or recovery coaches, are individuals trained to utilize their lived experience of recovery from mental health disorder or SUD to help others succeed in their recovery (Bassuk et al., 2016; Philadelphia Dept. of Behavioral Health and Intellectual Disabilities Services and Achara Consulting Inc., 2017; SAMHSA, 2017). Peer recovery support and the use of PRS may hold significant promise for drug court participants in promoting and sustaining recovery as well as in expanding treatment capacity during and after drug court participation. PRS may also serve to increase drug court attendance and graduation rates. Although some drug courts have begun to incorporate peers in various roles, their additive impact on participant outcomes has not been determined.

1.1. Peer recovery specialists

Studies have associated peer recovery services with reductions in and recurrence of substance use while improving treatment engagement, retention, and participant satisfaction (Armitage et al., 2010; Bernstein et al., 2005; Boisvert et al., 2008; Boyd et al., 2005; Cos et al., 2020; Davidson et al., 2012; James et al., 2014; Kamon & Turner, 2013; Manning et al., 2012; O'Connell et al., 2020; Rowe et al., 2007; Scott et al., 2018; Smelson et al., 2013;Timko & Debenedetti, 2007; Timko et al., 2006; Timko et al., 2011; Tracy et al., 2011). Several studies observed reductions in emergency service utilization and hospitalization (Cos et al., 2020; Davidson et al., 2012; Kamon & Turner, 2013; Min et al., 2007; Smelson et al., 2013), although a study on prison-based PRS interventions saw this trend reverse significantly after 6 months post-release (Binswanger et al., 2015). There are also mixed results regarding the relationship between PRS and substance use-related health services utilization (Binswanger et al., 2015; Cos et al., 2020; Davidson et al., 2012; Kamon & Turner, 2013; Min et al., 2007; Smelson et al., 2013).

There is limited research on the integration and impacts of PRS on people with SUD in the criminal justice system, although evidence suggests the potential for PRS to improve outcomes for these individuals. For example, a comprehensive review of the effects of PRS on patients with mental health problems found significant support for their impact on a range of patient outcomes, including fewer psychiatric symptoms and hospitalizations, improvements in psychological and social adjustment, and increases in rates of employment and general well-being (SAMHSA, 2011). Reviews by Bassuk et al. (2016), Eddie et al. (2019), and Reif et al. (2014) found that programs that include PRS staff show evidence of positive substance use related outcomes, including reduced risk of recurrence of drug use, increased abstinence from heroin and cocaine, increased adherence to post-discharge behavioral health and medical health appointments, increased rates of completion of substance use treatment and past-month abstinence, and greater treatment satisfaction.

Other studies of PRS within the criminal justice system have found mixed results for criminal justice outcomes (Bauldry et al., 2009; Cos et al., 2020; Lynch et al., 2018; Rowe et al., 2007). Bauldry et al. (2009) found that formerly incarcerated individuals who received PRS were 35% less likely to be reincarcerated for a new offense one year post-release compared to individuals who had not received PRS. Young adults on probation enrolled in a mentoring program which included PRS experienced 57% fewer felony reconvictions after two years than a comparison group (Lynch et al., 2018), although there were no significant differences in rearrests after controlling for risk differences between treatment and comparison groups. An evaluation of a program which provided PRS linkage to health center patients with a history of criminal justice involvement observed a significant decrease from intake to six month follow up in the number of self-reported crimes (including illegal substance use) in the past 30 days (Cos et al., 2020). In contrast, Rowe et al. (2007) did not find a significant difference in recidivism between individuals receiving and not receiving PRS for co-occurring mental health and SUD.

There is little published empirical research examining the impact of peers on drug court outcomes. One of the few studies examining drug court clients with PRS was a quasi-experimental evaluation of the Texas Department of State's Health Services Access to Recovery (ATR) project (Mangrum, 2008), comparing outcomes for ATR clients who were referred from drug courts, non-drug court probation, or non-criminal justice clients referred from Child Protective Services. Clients received PRS in individual and group settings. During the month prior to discharge from treatment, clients who received PRS were significantly more likely to abstain from drug use than were criminal justice system-involved clients and non-criminal justice clients without a PRS during the same time period. Drug court and probation clients in the PRS treatment condition also showed greater improvement in treatment completion compared with non-criminal justice ATR program completers who received PRS. The findings suggest that court and community supervision may further bolster the benefits of PRS services; however, the study did not separate the effects of the peer component from the effects of the other recovery support components of the ATR program, nor was exposure to PRS uniform across program participants.

A more recent pilot study reported the preliminary outcomes of the Maintaining Independence and Sobriety through Systems Integration, Outreach and Networking-Criminal Justice (MISSION-CJ) intervention in two Massachusetts drug courts (Smelson et al., 2019). The judge referred the clients to the MISSION-CJ program if they had a co-occurring psychiatric disorder and a current substance use treatment need, were eighteen years or older, and were enrolled in one of the two drug court programs. Using a pre-test/post-test design, Smelson et al. (2019) found that the average number of nights spent in jail in the previous six months significantly decreased from 61.18 nights at baseline to 33.94 nights at six-month follow-up. There were also significant reductions after six months in the percentage of clients who reported drug use (51.5% prior vs. 19.7% after) and alcohol use (36.4% prior vs. 10.6% after), compared with the six months before enrollment in the MISSION-CJ program. Additionally, there was a significant decrease in the percentage of patients reporting hospitalizations related to substance use. As with Mangrum (2008), the Smelson et al. (2019) findings are promising, but without a comparison or control group, causal inference is limited.

Overall, most prior studies of peer-based addiction recovery support lack methodological rigor, with the interventions and outcome measures varying greatly and lacking detail about what peer services entailed, peer roles and responsibilities, and the types and nature of the relationships between peers and other staff (Bassuk et al., 2016; Eddie et al., 2019; Reif et al., 2014). These inconsistent findings suggest a need for further research on the impact of PRS services on criminal justice and treatment outcomes for people with SUD involved in the justice system. In addition, there has been little research to date on the types and amount of services that peers provide, and how these services might relate to treatment outcomes.

Nonetheless, these findings suggest that integration of PRS into the drug court setting may hold promise for promoting and sustaining recovery among drug court participants (Belenko, 2019). Given the popularity of drug courts as a treatment-focused criminal justice model, and recent interest in implementing peer models in drug courts and other criminal justice settings, more rigorous research is needed on the additive impact of PRS on public safety and public health outcomes in drug court settings.

1.2. The current study

To address the significant gaps in the research related to peer recovery support in drug court settings, we conducted a mixed methods study of the effects on client outcomes of integrating trained PRS into the Philadelphia Treatment Court (PTC), a drug court for adults with non-violent drug offenses in Philadelphia, PA. We report here the results

from a pilot randomized controlled trial (RCT) of the preliminary impacts of adding PRS to the drug court team on client recurrence of substance use, treatment engagement, rearrests, and drug court participation. The current paper represents a preliminary rigorous empirical test of the PRS model in a drug court setting. We hypothesized that drug court participants receiving a PRS would have fewer rearrests, lower rates of substance use recurrence, greater treatment engagement, and more successful drug court participation.

2. Methods

2.1. Study site

The PTC, established in 1997, was the first drug court in Pennsylvania. Treatment and judicial supervision are integrated, and the judge has the central authority to place participants in community-based treatment as well as to terminate and/or readmit clients into treatment. PTC staff determine client eligibility by an assessment for substance use, a felony possession with intent to deliver drug charge, no convictions or open cases involving violent crimes, and no more than two prior nonviolent convictions, juvenile adjudications, or diversion dispositions. The PTC is a post-adjudication program requiring the participants to tender a no contest plea that the court holds in abeyance pending program completion. Drug court completion requires a minimum of 12 months of successful program participation and compliance with all requirements. Participants move through four phases (each with gradually less intensive supervision requirements), as they successfully fulfill the requirements of each phase, prior to graduation. At the time of the current study, PTC had a staff of 8-10 case managers through Public Health Management Corporation's (PHMC) Criminal Justice Initiatives, and PTC provided case management services to approximately 700 adults a year (PHMC case management records, FY16-FY17). Case managers maintain caseloads of up to 50 participants each. PHMC staff also includes evaluators with degrees in behavioral health psychology or related disciplines and training in American Society of Addiction Medicine assessment. PHMC evaluators conduct initial SUD assessments for the PTC and enter the diagnoses into the PHMC client database. Individual treatment providers subsequently conduct full biopsychosocial assessments of each client.

PTC assigns a case manager to all participants when they enter the program. Case managers have both client-facing and court-facing responsibilities. For PTC participants, case managers are responsible for facilitating access to social, behavioral, and legal services; meeting monthly or more if clinically necessary; and regularly meeting in treatment facilities and recovery houses. For the court, case managers are responsible for preparing accurate and timely progress reports and presenting them to the judge; completing discharge summaries; maintaining participant records for billing as well as drug court and PHMC administrative database compliance and accountability requirements; conducting urine drug screens; and following up on court ordered sanctions or requests.

PHMC hired and trained three PRS for this study. They were required to have graduated from the PTC and to have been in recovery and have abstained from substance use for at least one year. Their responsibilities were primarily client-centered. Like case managers, they were responsible for meeting with their clients regularly, identifying community linkages to support client recovery efforts, conducting outreach to their clients at treatment facilities in the community, attending client recovery plan meetings, and meeting clients at their appointments. In contrast to case managers, however, their role also entailed using their lived experience of PTC participation and recovery to inform services, including sharing their personal story; providing additional support to clients who found court and/or treatment compliance challenging; and assisting clients with self-esteem enhancement, conflict resolution, assertiveness and other recovery skills. They were also responsible for alerting the case management unit to any of their clients' current or potential behavioral or health related problems. PRS had a mean of 11.5 phone or in-person contacts (range 1–25) with their PTC clients and provided a mean of 5.1 different types of services (range 0–9).

2.2. Sample recruitment and randomization

Temple University research assistants conducted recruitment primarily at the initial court hearing at which individuals pled into the PTC; the research assistants recruited and consented a few participants at their first formal PTC status hearing, typically about one month after the plea hearing. Recruitment began on January 31, 2017 and ended on January 31, 2018. At the end of each two-week recruitment period, a research assistant randomized (using SPSS software) all newly consented participants equally into the experimental (PRS) or control (treatment-as-usual [TAU]) conditions. To help ensure that randomization was balanced at the end of each two-week block and cumulatively over the course of the project, at each randomization they checked to see that the number of experimental and control participants did not differ by more than one. If it did, they adjusted the probability of assignment as needed to increase the likelihood that the groups would be balanced. Following random assignment, the research assistant informed the PHMC Case Management Supervisor of which newly enrolled PTC participants needed to be assigned to a PRS. Based on the intervention protocol, the PRS attempted initial contact with their new client within 48 h (two business days) of assignment. The protocol required PRS to have their first face-to-face contact with their client within five business days of the initial contact, followed by a minimum of three face-to-face meetings and one phone contact each month.

Overall, the research assistants approached 157 individuals about the study during their initial PTC hearing, where they were expected to accept admission into the PTC. Of the 81 (51.6%) who consented to participate in the study, five ended up not opting into the PTC. Of the remaining 76 newly enrolled drug court participants who consented to take part in the study, 39 were assigned to the PRS group and 37 to the TAU group. Of the 39 participants assigned to the PRS condition, three were not linked to a PRS but were included in the intent-to-treat analyses.[1] As Table 1 shows, randomization was successful in that there were no statistically significant differences at baseline between the experimental and control groups on standard demographic criteria or on SUD-related variables.

2.3. Research question and hypotheses

The primary research question the pilot RCT sought to answer was, “Do Peer Recovery Specialists improve drug treatment court participant outcomes?” We tested four primary hypotheses, following participants for nine months after drug court enrollment. We hypothesized that, compared with PTC participants without a PRS, those who are assigned a PRS will:

1. Experience less frequent recurrence of substance use, as measured by a smaller percentage of positive and missed urine drug screens.
2. Have better treatment engagement, as measured by a smaller percentage of missed treatment sessions.

[1] One Spanish-speaking participant was randomly assigned to the experimental group but could not be assigned a PRS because there was no Spanish-speaking PRS on staff at the time. We later decided to include him in the sample as intent-to-treat because he had consented and was technically eligible, increasing the experimental group to 39 participants. Two other individuals were randomized into the experimental group but due to administrative error were never actually assigned a PRS. We compared intent-to-treat analyses using the full sample with similar analyses using the subset of 36 participants assigned to the experimental condition who were linked to a PRS and found similar results.

Table 1
Sample characteristics at enrollment (% with the exception of age).

	Exp (n = 39)	Control (n = 37)	Total (N = 76)
Gender			
Male	76.9	83.8	80.3
Female	23.1	16.2	19.7
Age (mean)	28.2	26.7	27.5
Race/ethnicity			
Black	51.3	54.1	52.6
White	41.0	43.2	42.1
Other	7.3	2.7	5.3
Hispanic	25.6	37.8	31.6
Primary language			
English	94.9	91.9	93.4
Spanish	5.1	8.1	6.6
Employment			
Full time	20.5	24.3	22.4
Part time	12.8	16.2	14.5
Unemployed	51.3	54.1	52.6
Student/disabled	15.4	5.4	10.5
Education			
Less than HS	51.3	32.4	42.1
GED/HS	25.6	37.8	31.5
Other	23.1	29.8	26.4
Housing status			
Dependent	66.7	67.6	67.1
Independent	30.8	32.4	31.6
Homeless	2.6	0.0	1.3
Has dependent children	28.2	18.9	23.7
Primary diagnosis			
Cannabis disorder	82.0	83.8	82.9
Opioid disorder	15.4	8.1	11.8
Cocaine disorder	2.6	5.4	3.9
Sedative/hypnotic disorder	0.0	2.7	1.3
Prior sud treatment	10.3	10.8	10.5
Approved level of care			
Intensive OP	79.0	86.5	82.7
OP	5.3	10.8	8.0
Other	15.7	2.7	10.3
Mental health problem	48.7	40.5	44.7
Prior MH treatment (Self-reported)	33.3	29.7	31.6

Note: All between-group differences are nonsignificant.

3. Have lower recidivism, as measured by fewer rearrests and longer time to first rearrest.
4. Have better engagement in the drug court process, as measured by fewer sanctions, more incentives, and advancement to a higher drug court phase.

2.4. Data sources

We collected data from two administrative databases: the PHMC Client Registry System (CRS) and the Pennsylvania State Courts' Problem-Solving Adult and Juvenile Courts Information System (PAJCIS). PAJCIS is a statewide data management system maintained by the Unified Judicial System of Pennsylvania and managed by the Administrative Office of Pennsylvania Courts (AOPC) to capture case processing and performance data on county drug courts and other problem-solving court programs. PAJCIS was a source for the following participant-level data: demographic information, case processing information, court attendance and outcomes (including sanctions and incentives), case management and PRS contacts and outcomes, treatment engagement, drug test results, jail days, suspensions, and program milestones. We complemented the incomplete rearrest and warrant information in PAJCIS through manual search of an online, public access data system maintained by the Pennsylvania courts, searchable by name and State Identifier (SID).

The CRS, maintained by PHMC primarily as a billing system for reimbursable services, provided participant-level data on primary substance use diagnosis, indicators of mental health issues, prior mental health and substance use treatment, and recommended and approved levels of care. The CRS also provided risk assessment scores related to housing, childcare, education, employment, basic needs, transportation, drug use, legal issues, mental health, and physical health. However, because these risk data were missing for 18.4% of the participants, and there was limited variation in the risk ratings, we did not include these scores in our analyses.

Temple University researchers obtained access to these databases with permission from the AOPC, the First Judicial District of Pennsylvania, and the City of Philadelphia. The Institutional Review Boards of PHMC, the Philadelphia Department of Health, and Temple University reviewed and approved all study procedures.

2.4.1. Key measures

Demographic characteristics of the sample included gender; age at entry into the PTC program; race (Black, White, and other); ethnicity (Hispanic/non-Hispanic); and primary language (English or Spanish). Other baseline demographic factors included employment status (full-time, part-time, unemployed, or student/disabled); housing status (dependent, independent, or homeless); highest level of education achieved (high school/GED vs. less than high school), and having any dependent children.

Baseline substance use and mental health status, based on the PTC intake evaluation, included primary substance use diagnosis (cannabis, opioid, cocaine, or sedative/hypnotic drug disorder); any prior substance use treatment; any mental health problem; any prior mental health treatment; and approved level of care (intensive outpatient, outpatient, and other).

Outcome measures included recurrence of substance use, treatment engagement, recidivism (rearrests and bench warrants issued), and drug court engagement during the nine-month follow-up period (number of court hearings attended). Measures of recurrence, based on drug screen results reported in PAJCIS, included the mean percentage of any positive drug screens; the mean percentage of non-marijuana drug screens; and the mean percentage of missed drug screens. Measures of treatment engagement included the number and percentage of treatment sessions attended (as reported in PAJCIS by each provider), and the mean number of different treatment programs attended. Measures of recidivism were the percentage of participants rearrested during the follow-up period, and the percentage of study participants receiving bench warrants. We measured drug court engagement by the mean number of sanctions, the mean number of incentives each group earned, and the highest phase of the drug court program (1 to 4) participants achieved during the nine-month follow-up period. Because drug court is at minimum a one-year program, most graduations fell outside of the follow-up period. However, since it is a key outcome, we captured data on successful graduations observed as of the end of data collection on January 10, 2019.

2.5. Analysis plan

Preliminary descriptive analyses (*t*-tests, Pearson correlations, and Fisher exact chi square) described the study sample and determined the variables to be used to test our hypotheses. We also compared groups to verify that random assignment yielded equivalency on sociodemographic variables and substance use history, and to identify any significant baseline differences for which we needed to control in analyses. We conducted initial descriptive bivariate analyses to examine differences in outcomes between the experimental and control conditions. We used chi-square for categorical variables (e.g., rearrest), and *t*-tests for continuous measures (e.g. percentage of positive drug screens, number of sanctions, percentage of missed treatment sessions).

Because we used administrative records for the main analyses, no cases were lost to follow-up. PAJCIS and the CRS are used for participant monitoring and program operations. We examined distributions of key dependent variables and covariates to assure adequate distribution and

made log transformations where distributions were skewed.

We estimated multivariate models depending on the distribution of the dependent variables. Categorical outcomes (e.g. rearrest) were tested using logistic regression. For variables whose distributions approached normality, we analyzed continuous outcome measures (e.g., attendance, percentage of positive urine screens) using ordinary least squares regression models. The main analyses were based on intent-to-treat, including all 76 cases.[2] As this was a pilot study, we did not anticipate having sufficient power to test some contrasts with alpha set at 0.05. We therefore present the actual p values in the tables, and also include Cohen's d effect sizes with 95% confidence intervals (based on *t*-test p-value with unequal sample sizes or chi-square p-value). Given the exploratory nature of this study, it is reasonable to relax the alpha to 0.10 (Nosek & Lakens, 2014); effect sizes provide guidance for estimating necessary sample sizes for future fully powered trials. Similarly, we did not adjust alpha (e.g., with a Bonferroni correction) for multiple comparisons given the limited power and risk of Type II error (Nakagawa, 2004; Perneger, 1998).

For each hypothesis, we screened potential covariates for relevance by significant Pearson correlation with the dependent variables or theoretical relevance. Given the relatively modest sample size, we limited the number of covariates in each model. The small sample size also precluded examination of potential moderators and mediators of participant outcomes.

3. Results

3.1. Sample description

Table 1 summarizes the characteristics of the full sample; there were no statistically significant differences between the experimental and control groups. Most of the sample were male (80.3%) and the average age at enrollment was 27.5 years. A little more than half self-identified as Black (52.6%) and almost one third (31.6%) as Hispanic/Latinx. A majority of the sample was unemployed (52.6%), with only 22.4% working full-time and 14.5% part-time. In common with other criminal justice populations, the participants had poor educational attainment, with 42.1% lacking a high school diploma or GED. About two-thirds were dependent on someone else for housing, while 31.6% were independently housed. Finally, 23.7% of the sample had dependent children.

PHMC's Clinical Evaluation Unit classified most participants (82.9%) as having a primary diagnosis of cannabis use disorder, with 11.8% having a primary diagnosis of an opioid use disorder. Only 10.5% of the sample had been in treatment prior to entering the PTC. Consistent with PTC policy, most of the participants (82.7%) received recommendation and approval for intensive outpatient (IOP) substance use treatment during their initial phase in the PTC.

There was a relatively high prevalence of mental health problems in the sample. Although typically individuals with serious mental illness would be screened out of the PTC and referred to the Philadelphia Mental Health Court, many individuals involved in the justice system have mental health disorders (James & Glaze, 2006). Nearly half (44.7%) of the sample had an indication of a mental health problem, and nearly a third (31.6%) reported that they had previously received some type of mental health treatment.

3.2. Impact on recurrence of substance use (hypothesis 1)

Table 2 summarizes the descriptive outcomes. We found no significant experimental effects on any of the indicators of substance use recurrence. The presence of a PRS did not reduce the mean percentage of positive drug screens (marijuana or others), or percentage of missed drug screens.

Table 2
Descriptive outcomes.

	Exp (n = 39)	Control (n = 37)	P value	Effect size (95% CI)
Recurrence				
Mean percentage positive drug screens	25.7	28.9	.552	0.14 (−0.31–0.59)
Mean percentage non-marijuana positive drug screens	4.1	3.2	.677	0.10 (−0.35–0.55)
Mean percentage missed drug screens	22.5	23.9	.830	0.05 (−0.40–0.50)
Treatment engagement				
Mean # treatment sessions attended	48.5	46.5	.769	0.07 (−0.38–0.52)
Mean percentage of treatment sessions missed	0.28	0.30	.682	0.09 (−0.36–0.54)
Mean total # of treatment programs attended	1.6	1.4	.337	0.22 (−0.23–0.67)
Recidivism				
% Rearrested	17.9	35.1	.089	0.40 (−0.06–0.86)
% Had Bench Warrant Issued	25.6	35.1	.368	0.21 (−0.24–0.66)
Mean time to first arrest (days)	178.4	124.5	.139	0.34 (−0.11–0.80)
Drug court engagement				
Mean phase achieved (out of 4 phases)	2.2	1.9	.128	0.35
% Graduated	25.6	21.6	.680	0.10
Mean number of sanctions	2.0	2.0	.921	N/A
Mean number of incentives	2.2	0.8	.021	0.54
% Suspended from program	12.8	21.6	.308	0.24

Table 3 summarizes the multivariate analyses of the effects of having a PRS on the mean percentage of positive drug screens and mean percentage of missed drug screens, controlling for other factors. Having a PRS was not significantly related to positive or missed drug screens. A greater number of case manager contacts was associated with a higher percentage of positive drug screens (p = .076) but fewer missed screens (p = .002).

3.3. Impact on treatment engagement (hypothesis 2)

The results showed no significant experimental differences for any of the measures of treatment engagement (Table 2). Table 4 summarizes the results of multivariate analyses of the PRS effect on total number of treatment sessions attended across all programs, and percentage of treatment sessions missed, controlling for other factors. In the model for percentage of missed treatment sessions, we also included age as a covariate (log transformed because of skewness in the distribution).

Having a PRS was not significantly related to either treatment engagement outcome. None of the covariates was related to the total number of treatment sessions attended. Age was significantly related to the percentage of missed treatment sessions (p = .028), where older participants were less likely to miss treatment sessions.

3.4. Impact on recidivism (hypothesis 3)

Recidivism was measured by the percentage of rearrested participants, whether a bench warrant was issued, and time to first rearrest (Table 2). PTC participants assigned to a PRS had a lower percentage

[2] We conducted additional analyses excluding the three experimental cases who never received a PRS. The findings were very similar to the intent-to-treat analyses, and are available from the first author on request.

Table 3
OLS regression models of recurrence of substance use outcomes.

Model	Unstandardized coefficients		Standardized coefficients	T	P value
	B	S.E.	β		
a. Percentage of positive drug screens					
Gender	0.878	3.988	0.033	0.220	.826
Hispanic	3.767	3.074	0.165	1.226	.225
Highest level of education	−0.386	0.672	−0.073	−0.574	.568
Experimental group	−2.513	2.684	−0.118	−0.937	.352
Mental health problem	−1.041	2.800	−0.049	−0.372	.711
Total CM contacts Log10	7.779	4.314	0.225	1.803	.076
Has dependent children	−1.430	3.170	−0.058	−0.451	.653
Constant	0.931	8.500		0.110	.913
b. Percentage of missed drug screens					
Gender	11.871	8.817	0.188	1.346	.183
Hispanic	6.947	6.796	0.126	1.022	.310
Highest level of education	−1.329	1.486	−0.104	−0.895	.374
Experimental group	2.516	5.933	0.049	0.424	.673
Mental health problem	−9.315	6.191	−0.182	−1.505	.137
Total CM contacts Log10	−30.056	9.539	−0.362	−3.151	.002
Has dependent children	−11.887	7.008	−0.201	−1.696	.095
Constant	28.773	18.793		1.531	.131

Table 4
OLS Regression models of treatment engagement.

Model	Unstandardized coefficients		Standardized coefficients	T	P value
	B	Std. error	β		
a. Total number of treatment sessions attended					
Gender	8.578	11.317	0.118	0.758	.451
Hispanic	9.555	8.744	0.150	1.093	.279
Highest level of education	0.699	1.946	0.047	0.359	.720
Experimental group	−3.336	7.838	−0.056	−0.426	.672
Mental health problem	−1.890	8.077	−0.032	−0.234	.816
Total CM contacts Log10	13.130	12.886	0.132	1.019	.312
Has dependent children	7.365	9.041	0.108	0.815	.418
Constant	8.806	24.316		0.362	.718
b. Percentage of missed treatment sessions					
Total CM contacts Log10	−10.431	10.044	−0.127	−1.038	.303
Has dependent children	−6.944	7.090	−0.123	−0.979	.331
Age Log10	−58.738	26.036	−0.271	−2.256	.028
Experimental group	−1.169	6.094	−0.024	−0.192	.848
Hispanic	9.184	6.835	0.175	1.344	.184
Gender	2.890	8.311	0.048	0.348	.729
Highest level of education	−1.119	1.523	−0.091	−0.735	.465
Constant	107.179	40.378		2.654	.010

rearrested over the nine-month follow-up period (17.9% vs. 35.1%, p = .089), which translated into a medium effect size of d = 0.40. They also had a somewhat lower, but nonsignificant, percentage having a bench warrant issued (25.6 vs. 35.1%), an effect size of d = 0.21.

We estimated logistic regression models for rearrest. Age was included as an additional covariate (log transformed due to skewness in the distribution). The results are shown in Table 5. After controlling for age, having a PRS only approached marginal significance related to rearrest (p = .12); as expected, age was also significantly related to rearrest (p = .01), with being older reducing the odds of rearrest.

The time between PTC admission and first rearrest, for those rearrested, was longer for participants with PRS (178 days) compared with the control participants (124 days), although the result was not significant due to the small number of rearrests. No additional analyses were possible with this small sample, but the findings suggest that being assigned a PRS may delay the onset of rearrest as well as reduce the probability of rearrest.

As shown in Table 2, experimental group participants were less likely to receive a bench warrant during the nine-month observation period. A logistic regression analysis (Table 6) found that this effect was not significant once we controlled for other covariates. Similar to the multivariate analysis of rearrest, age was associated with receiving a bench warrant (p = .065), with being older reducing the odds of receiving a warrant.

3.5. Impact on drug court process and engagement outcomes (hypothesis 4)

Hypothesis 4 anticipated that clients assigned a PRS would have better engagement in the drug court program as measured by sanctions and incentives, as well as the phase of drug court achieved. We summarize these findings in Table 2. Participants with a PRS received a significantly higher number of incentives compared to the control group (2.2 vs. 0.8, p = .021). Other indicators of court engagement did not yield significant differences. We estimated logistic and OLS regression models on two of the outcomes: whether the participant received an incentive, and the phase achieved at the end of follow-up, respectively. We included as covariates several demographic characteristics (age log transformed because of skewness in the distribution, gender, Hispanic, and highest education attained), whether they had dependent children, whether they had a current mental health problem (OLS regression model only), and the total number of contacts with a case manager (log transformed due to skewness in the variable). We present the results in Tables 7 and 8.

Although significant at the bivariate level, after controlling for other covariates, having a PRS was not significantly related to either receiving an incentive or the phase level achieved. In contrast, total case manager contacts was significantly positively related to both incentives and drug court phase. Having any dependent children was related to achieving a higher drug court phase.

By the end of the study, four of the 76 participants were terminated from the drug court by the end of data collection, one was deceased due to non-SUD cause, and 18 had graduated, leaving 53 active clients.

4. Discussion

Addressing some of the extant limitations in the literature on PRS, the current study implemented a pilot RCT in a drug court setting to provide preliminary data on the efficacy of the PRS model on client outcomes. We found positive trends related to recidivism and engagement of participants in the PTC program. Compared with the control condition over the nine-month study period, participants assigned a PRS

Table 5
Logistic regression results: rearrest.

	B	S.E.	Exp(B)	Wald	df	P value
Experimental group	−0.895	0.574	0.409	2.432	1	.119
Age Log10	−8.810	3.418	0.000	6.645	1	.010
Constant	11.678	4.731	117,924.250	6.094	1	.014

Table 6
Logistic regression: bench warrant received.

	B	S.E.	Exp(B)	Wald	df	P value
Experimental group	−0.260	0.565	0.771	0.211	1	.646
Age Log10	−5.212	2.821	0.005	3.414	1	.065
Hispanic	0.259	0.629	1.295	0.169	1	.681
Total CM contacts Log1	−1.146	0.937	0.318	1.497	1	.221
Has dependent children	−0.335	0.676	0.716	0.245	1	.621
Highest level of education	−0.090	0.145	0.914	0.379	1	.538
Constant	7.319	4.252	1509.358	2.963	1	.085

Table 7
Logistic regression model: receiving any incentive.

	B	S.E.	Exp(B)	Wald	df	P value
Experimental group	0.237	0.564	1.268	0.177	1	.674
Age Log10	2.470	2.345	11.825	1.110	1	.292
Hispanic	−1.100	0.675	0.333	2.654	1	.103
Total CM contacts Log10	3.297	1.154	27.021	8.165	1	.004
Has dependent children	0.223	0.666	1.250	0.112	1	.738
Highest level of education	0.244	0.151	1.277	2.615	1	.106
Gender	−0.306	0.796	0.736	0.148	1	.700
Constant	−5.094	3.809	0.006	1.788	1	.181

Table 8
OLS regression model: drug court phase achieved at end of follow-up.

Model	Unstandardized coefficients		Standardized coefficients	t	P value
	B	Std. error	β		
Gender	−0.063	0.331	−0.026	−0.190	.850
Hispanic	−0.371	0.255	−0.179	−1.455	.151
Highest level of education	0.038	0.056	0.078	0.679	.500
Experimental group	0.210	0.223	0.108	0.941	.350
Mental health problem	−0.020	0.232	−0.010	−0.086	.932
Total gCM Contacts Log10	0.822	0.358	0.262	2.296	.025
Has dependent children	0.671	0.263	0.300	2.550	.013
Constant	1.763	0.706		2.500	.015

had a smaller rearrest percentage (17.9% vs. 35.1%, p = .089), a greater mean number of case manager contacts (7.6 vs. 5.0, p = .018), and a higher mean number of incentives earned (8 vs. 2.2, p = .021). Somewhat surprisingly, having a greater number of case manager contacts was associated with a higher percentage of positive drug screens but fewer missed screens. These results make sense if we consider that the case managers were administering the drug screens; fewer missed meetings meant fewer missed screens.

While PRS helped reduce recidivism, one surprising finding that contradicted our hypotheses was that the PRS did not significantly reduce substance use recurrence, as measured by percentage of positive drug screens, nor did the PRS increase treatment engagement. However, there was a higher number of case management contacts in the PRS group, and case management contact significantly predicted phase completion and incentive receipt as well as percentage of missed and positive drug screens. Having a PRS might therefore have had an indirect effect on these outcomes; perhaps the PRS were encouraging their clients to comply with their required case manager contacts.

Alternatively, it is possible that the support offered by the PRS was insufficient to counteract the influence of SUD on drug court clients' behavior. Because most of the study participants had a primary diagnosis of cannabis use disorder,[3] it may be that they were able to make other positive changes in their lives, but did not view their cannabis use as interfering with their life in general or their desistance from criminal behavior in particular. The recent trends toward legalizing or decriminalizing marijuana might have contributed to this view. The extensive use of intensive outpatient treatment in the PTC, although perhaps driven by considerations other than the SUD diagnosis, may have affected treatment engagement among those with low SUD severity. Finally, PRS might have prioritized avoiding recurrence to more serious drug use (such as heroin) rather than marijuana. Future research should further explore qualitatively the nature of the connection and discussions between the PRS and their clients to better understand the messaging that is conveyed between them.

It is worthwhile to note in this context that when recruiting participants for the study, we had assumed (1) that new treatment court participants would perceive that they are in need of drug treatment; and (2) that they would view the potential of being assigned to a PRS as an incentive and not as a burden. Instead, we found during our recruitment that many new PTC participants denied that they had a drug problem and thus did not see the need for any extra recovery support, or viewed the prospect of talking and interacting with a PRS as an additional burden on top of their many mandated treatment and case management appointments and court dates. This lack of interest in having a PRS may be a consequence of the higher than anticipated percentage of participants with cannabis use disorder in the drug court sample. These factors might explain why having a PRS did not reduce recurrence or improve treatment engagement; neither the PRS nor the client may have viewed cannabis use as a recurrence or treatment concern. Such challenges suggest that future studies should assess the best ways to link PRS to PTC participants based on need. The experiences of this pilot RCT and limitations described below provide valuable information for future PRS studies as well as for replications of the PRS model in drug court settings.

4.1. Limitations

We should note several limitations in this study. First, although we had access to two administrative databases, these data had some limitations. There was inconsistent documentation of client contacts and activities in the PAJCIS system. In administrative databases, it can be difficult or impossible to distinguish between events that did not happen and those that simply may not have been recorded. Although agency supervisors routinely monitor data for accuracy and completeness, as with any official records, there were gaps and inconsistencies, and agency staff addressed them where possible. Aside from those limitations, with the exception of treatment sessions attended and missed treatment attendance records in PAJCIS for seven cases, missing data were generally not a problem.

In addition, tracking phases is complex because progression through the drug court is often a non-linear process. Participants frequently restart a prior phase as a sanction for noncompliance. Dates on which participants entered and left drug court phases were inconsistently documented. Case managers were also inconsistent in the codes they used to track client contacts. They reported many contacts in text-based court reports or case notes, and did not always report other details of contacts, such as whether a phone call was successful or not. We relied primarily on case notes to count both case manager and PRS contacts, but the notes did not always clearly specify the types and quantity of these contacts. The records may have undercounted drug court sanctions and overcounted incentives. For example, the records did not record phase restarts as sanctions, although they are a frequent court response to new drug use. Additionally, the PTC staff may recognize a single event

[3] Although as a precondition to enter PTC all participants had to be charged with possession with intent to deliver, and not simply a possession charge.

such as a phase completion with applause, accolades, certificates, and gift bags, each of which the case manager might record as an incentive. It is likely they all occurred but were not always all noted for each event. Additionally, data on participant substance use did not include a measure of severity. Finally, available data on mental health problems did not indicate the type of problem, and so were of limited utility. Increased collaboration between drug courts and researchers may facilitate future improvements in electronic client data. Case managers should be made aware of the importance of accurately recording client data, and more frequent fidelity monitoring would lead to more timely and accurate data entry.

The second major limitation is the relatively small sample size, which limited our power to detect main treatment effects, and potential issues of sample generalizability (the consent rate of 51.6% was less than expected). However, this study was intended to be exploratory in nature and to inform potential revisions to the intervention as well as to provide preliminary estimates of the intervention's effect size to guide power calculations for a future fully powered RCT. Similarly, while the nine-month follow-up period does not align with the full drug court program (a minimum of 12 months if there is perfect compliance with drug court requirements), the study time frame captured a sufficient portion of drug court engagement to address the main study hypotheses. We surmise that the relatively low consent rate reflected two issues that were expressed by some of the non-consenting individuals: (1) participants were already overwhelmed by the requirements they were facing as participants in the PTC, and perceived the study requirements as an additional burden, and (2) some were in denial that they had a drug problem and needed treatment.

Third, this study was conducted in one large urban drug court, in which the client case mix included a large percentage of individuals with cannabis use disorder. Accordingly, caution is warranted in generalizing the findings to drug courts in other settings, or with a higher percentage of clients with non-cannabis substance use disorders.

4.2. Conclusions

This study contributes to the empirical literature on PRS in criminal justice settings. Our findings indicate that PRS can be successfully integrated into the drug court setting and have some positive impacts, although several hypotheses were not confirmed. We need more research on the integration of PRS into drug court settings to further our understanding of how PRS affects client outcomes. Many questions remain about how to successfully integrate peers into drug court and maximize their impacts, what the ideal peer support model should look like, and how professional staff and drug court participants should interact with peer staff. As drug court graduates themselves, PRS can provide personalized one-to-one support and role modeling that case managers are not able to provide. However, challenges of integrating peers into the workforce may include negative attitudes toward recovery by some justice system staff, role conflict and confusion (e.g. seeing peers as clients and not as coworkers), conflict between maintaining confidentiality and trust and needing to share information with court staff and case managers, job structure, and social support (Gates & Akabas, 2007). We plan to address some of these issues in a future paper.

Future research should assess the timeline and method for linking PRS to participants to maximize the benefits of PRS support. For example, need-based matching of PRS may reduce perceptions of PRS support as burdensome to lower-risk participants and target resources most appropriately and effectively. Future studies might consider targeting only high-risk, high-need participants for randomization to the PRS condition, as a purer test of the impacts of PRS. Outcomes in the present study may have been attenuated if low-risk drug court clients were assigned to a PRS. Relatedly, studies should consider conducting study recruitment after the initial plea into the drug court process, as we found that some participants were overwhelmed and oversaturated with information at the time of their plea. Additional research is also needed on the appropriate caseload size for PRS.

Interest continues to grow in integrating PRS into primary care, community substance use and mental health treatment, and criminal justice settings. Although there is some evidence of positive outcomes related to peer recovery support in community-based treatment, many prior studies had low methodological rigor and provided insufficient information about the specific roles and responsibilities of PRS. The current study suggests positive potential for integrating PRS into a court-based treatment program and indicates the need for additional research on the impacts of PRS in drug courts and other criminal justice settings.

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CRediT authorship contribution statement

Steven Belenko was responsible for the design of the study, drafted main sections of the article, and oversaw the data analyses and development of the results section. Archana Bodas LaPollo drafted sections of the introduction, methods, and discussion, and edited the paper. Nili Gesser assisted with client recruitment and data collection, drafted sections of the discussion section, and edited the paper. Doris Weiland assisted with data collection, drafted sections of the methods and discussion sections, and edited the paper. Lauren Perron conducted the literature review on peer recovery support and drafted that section of the introduction. Ingrid D. Johnson assisted with client recruitment and data collection, and edited the paper.

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