

Impact of probation interventions on drug use outcomes for youths under probation supervision

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ABSTRACT

Use of drugs and alcohol by justice-involved youths is a longstanding concern for juvenile justice policy-makers and researchers. However, little explored in this research is how the tactics and strategies employed by probation officers with this population impacts drug use outcomes. This study explored the effects of four types of probation strategies (positive pressure, negative pressure, parental involvement, treatment referrals) on 12-month drug use trajectories in a sample of 144 youths under probation supervision. Multilevel negative binomial regression models found that positive pressures (incentives & rewards) reduced drug use when negative pressures (threats & confrontation) were minimized. More frequent parental involvement early in the course of probation was associated with reduced drug use for girls, and was associated with increased drug use for both boys and girls later during the probation period. Finally, early referral to drug treatment programs was associated with reduced drug use outcomes. These findings suggest practical program and policy strategies to reduce drug use among probation-involved youths.

1. Introduction

Drug use outcomes among adolescents involved in the juvenile justice system has been a long-standing concern among policy-makers, criminologists, and addictions researchers. It is well established that justice-involved adolescents are a high-risk group with respect to drug and alcohol use. Data from large-scale multi-site screening studies suggest that as many as 25–35% of justice-involved youths may have a diagnosable substance abuse disorder (Vincent, Grisso, Terry, & Banks, 2008; Wasserman, McReynolds, Schwalbe, Keating, & Jones, 2010). With the advent of evidence-based practices like contingency management, motivational interviewing, drug courts, and other interventions, concern has shifted to the accessibility (Taxman, Young, Wiersema, Rhodes, & Mitchell, 2007) and acceptability (Rudes et al., 2012) of evidence-based interventions to treat this population. The underlying assumption of this literature is that juvenile justice system actors, including the courts, probation, and parole, serve as a gateway to formal treatment services (Belenko et al., 2017). Little examined is the direct effect that agents of the juvenile justice system, especially probation officers, have in fostering positive drug-use outcomes among justice-involved youths. Considering that court orders to probation are given to over 60% of youths who are adjudicated delinquent (Sickmund & Puzanchera, 2014), the gap in the literature about how probation programs can impact youth drug use is striking. This study uses

longitudinal data of youths under probation supervision to identify the effect of probation tactics and strategies on drug use outcomes.

1.1. Models of probation practice

In the United States, probation interventions with substance abusing youths are most frequently considered from a casework perspective, where probation is conceptualized as a gateway to treatment, and where any treatment effect of probation activities are indirect. The Cascade model is prototypical of this perspective (Belenko et al., 2017). The Cascade model provides a framework to understand pathways from juvenile justice involvement to participation in substance abuse services. The model defines the cascade as a set of linked system activities beginning with the identification of substance abuse problems among youths via drug screening and assessment, effective referrals to evidence-based community interventions, and initiation, engagement, and retention of youths in treatment. Probation officers shoulder the burden of front-end cascade activities (i.e., screening and referral) whereas treatment programs take responsibility for back-end activities (i.e., treatment engagement and retention).

The Cascade provides a useful rubric to strengthen service access among justice-involved youths and to identify service system strengths and gaps. For instance, results of the National Criminal Justice Treatment Practices Survey (Taxman et al., 2007) illuminated

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widespread gaps in the availability of treatment services for justice-involved youths across the U.S. (Young, Dembo, & Henderson, 2007) and showed that the use of best practices for effective treatment were uneven across community corrections agencies (Henderson et al., 2007). More recent research with probation officers in adult community corrections illustrates the wide variation in officers who employ evidence-informed proactive referral practices (e.g., active linkages with treatment program, attend first appointment) in their work with justice-involved adults (Viglione, Blasko, & Taxman, 2018). But research in this area also points to the effectiveness of service linkages by probation officers when screening and referral are institutionalized as systematic activities (Hoeve, McReynolds, & Wasserman, 2014; Wasserman et al., 2010). The cascade is consistent with the widely accepted risk-need-responsivity model (RNR) for rehabilitation in justice settings (Bonta & Andrews, 2017). The RNR model guides justice agencies to allocate youths to more or less intensive interventions based on assessed risk for recidivism, and to match youths to evidence-based treatment programs based on assessed criminogenic need. As in the Cascade model, probation programs assume responsibility for screening, assessment, case planning, and referral.

Internationally, theory and research describe a more expansive role for probation officers that includes their direct involvement in the change process in addition to their assessment-referral function (Bourgon, Gutierrez, & Ashton, 2011). In Australia, Trotter's research (Trotter, 1996; Trotter, 2013; Trotter & Evans, 2012) demonstrates that three probation strategies reduce recidivism among justice-involved populations, including prosocial modeling and reinforcement, problem solving, and cognitive interventions like reframing and teaching ABCs (antecedents, behaviors, consequences). In Canada, Bonta developed and evaluated the Strategic Training Initiative in Community Supervision (STICS) program (Bonta et al., 2011). STICS is a probation supervision model based on the risk-need-responsivity paradigm that directs probation officers to employ cognitive behavioral techniques to address criminogenic needs. Eighty participating probation officers were randomly assigned to either a three-day STICS training ($n = 51$) or probation as usual ($n = 29$). Data showed that post-training recidivism rates favored trained officers over untrained officers (25% vs. 41%, respectively, $X^2 = 2.71, p = .10$).

Findings from this literature are not specific to the effect of probation on drug use outcomes among youthful offenders. Nevertheless, there are reasons to believe that probation interventions may have an effect on drug use outcomes. Data from Hoeve et al. (2014) demonstrated that probation referrals to drug treatment programs can reduce recidivism among court-involved youths. Moreover, research by Schwalbe and colleagues has identified a range of tactics and strategies probation officers employ to foster cooperation, compliance, and involvement of youths in the probation process (Schwalbe & Maschi, 2009). These tactics include counseling strategies, confrontational approaches, incentives and rewards, in addition to assessment and referral, all deployed within the context of a youth-PO relationship considered by many in the field to be a pre-requisite of successful probation practice (Trotter, 2013). Qualitative research with 31 probation officers illuminated their deep interpersonal involvement in the change process with probation-involved youths, including the balanced use of negative pressures, positive pressures, and counseling strategies (Schwalbe, 2012). Many of these strategies underlie evidence-based interventions for drug use and abuse like contingency management and motivational interviewing that, with some modification, can be implemented directly in the probation context (Rudes et al., 2012).

1.2. Current study

This study was conducted to identify probation tactics and approaches that are associated with longitudinal drug use outcomes among a sample of probation-involved youths. It explored the effect of four types of interventions that are commonly employed by probation

officers to effect behavior change in youth, including negative pressure (e.g. sanction threats), positive pressure (e.g., incentives, encouragement, rewards), parental engagement, and referral to specialized treatment. Further, the study explored interactions of these interventions with age, race, gender, risk, and time to identify conditions under which probation interventions were more or less effective. Results of this study are intended to inform the development of evidence-based probation interventions for probation-involved youths who are known to use drugs and alcohol.

2. Methods

2.1. Sample

The sample for this study was drawn from the Social Processes in Probation Study (SPPS). The SPPS recruited youths from an urban juvenile court system who were adjudicated delinquent and court ordered to a period of probation supervision. Juveniles were recruited to the study from the waiting rooms of the juvenile courts following a disposition that included a court order for probation ($n = 64, 41\%$), and from the waiting rooms of the juvenile probation department ($n = 92, 59\%$). Youths in two probation programs were eligible for inclusion in this study: general probation, where planned contacts ranged from one to four probation meetings per month, and enhanced supervision, where youths were required to meet with their probation officers multiple times per week. In total, 253 youths were approached to participate, 155 (61%) assented to participate in the study and received parental consent and permission, and 144 youths had sufficient data for inclusion in this study.

2.2. Procedures

Sample recruitment took place over one year, from May 2012 through May 2013. Study participants were invited to complete parent and youth baseline surveys immediately upon completion of the informed consent/assent procedures. Subsequent surveys were completed by youths in private spaces that were adjacent to the probation waiting room. Youths were tracked upon entry into the waiting room and invited to complete scheduled surveys and tests. Youth's ongoing participation was incentivized through the provision of gift cards for each survey completed. Survey data from youth and parent surveys completed immediately following recruitment were included in the current study.

At the close of the recruitment window, the probation department provided the study with investigation reports that are completed by probation officers for the courts following adjudication. In this district, investigation reports include a record of youths' legal history, circumstances surrounding the presenting offense, and a narrative psychosocial history, including family and living circumstances, school information, drug use, peer relationships, and health and mental health information, among other topics. Investigation reports were available for 134 study participants. Research assistants utilized a standardized coding system to extract information from the reports about youth offending histories, living situations, and risk and need profiles. 22% of the cases were double coded to assure reliability. Reliability estimates for variables used in this analysis ranged from 0.64 to 0.86.

In September 2014, the probation department provided the study with all probation case notes for participating youths. By departmental policy, probation officers are required to report all contacts that they have with any aspect of the youths on their caseloads. Thus, case notes include records of direct meetings with youths, their parents and caregivers, and a range of collateral contacts including schools and services providers. Case notes also include records of supervision, and notations of system actions including intermediate steps toward VOP filings and court actions. In total, 11,088 case notes for 144 youths were available for the study. Two teams of research assistants utilized a

standard coding system to extract information contained within the case notes, including contact characteristics, psychosocial information recorded by probation officers, intervention tactics reported, and program participation.

2.3. Measures

2.3.1. Monthly drug use

The outcome for this study was coded from probation case notes. Two types of notes were taken as indicators of confirmed drug use in a youth's case notes: indicators of failed drug tests, or the verbal report of youths, parents, or collateral contacts alleging youth drug use. Reliability for monthly drug use was in the acceptable range ($\kappa = 0.72$). Of 257 notes coded with confirmed drug use, 48 (19%) were based on failed drug tests and 209 (81%) were based on youth, parent, or other reports. These were summed by month for each youth in the study for a total count of drug use notes per month.

2.3.2. Monthly probation interventions

Two types of probation tactics were coded from probation case notes: events and interpersonal strategies. Events included *parent contact* ($\alpha = 0.90$), which was coded whenever a case note indicated that a parent was a participant in an in-person or telephone meeting with the probation officer, and *drug abuse program*, which was coded whenever an external program providing inpatient or outpatient substance abuse treatment was mentioned in case notes. Interpersonal strategies included *negative pressure* ($\alpha = 0.70$), coded whenever a case note included a reprimand for non-compliance, or a reminder about potential negative consequences for non-compliance, and *positive pressure* ($\alpha = 0.80$), coded whenever a case note included an incentive or reward for positive behavior, praise, affirmation, or encouragement. Each of these four codes (parent contacts, drug abuse program, negative pressure, positive pressure) were summed to derive monthly rates, along with a code for *total monthly contacts*, which is the sum of all probation contacts per month with youths, parents, and collaterals. The type of data recorded in case notes precluded more specific or detailed descriptions about interpersonal strategies, including especially the severity and style with which probation officers employed these tactics. Limitations in the interpretation of study findings related to the measurement of probation tactics is taken up more fully in the discussion section below.

2.3.3. Youth characteristics

Youth demographic characteristics (race, gender, age) were reported by youth at study intake. A cumulative *Risk Score* was derived by summing seven risk indicators coded from youth predisposition reports, including behavioral problems at home ($\alpha = 0.64$), failing school subjects ($\alpha = 0.72$), history of drug use ($\alpha = 0.86$), angers easily ($\alpha = 0.68$), negative peer relations,¹ first offense before age 14, and number of prior offenses more than two. Probation attitudes included overall scores on the *working alliance inventory (WAI), short version* (Tatman & Love, 2010, $\alpha = 0.91$), the *perceptions of fairness scale* (Henderson, Wells, Maguire, & Gray, 2010, $\alpha = 0.83$), and a six-item *deterrence scale* ($\alpha = 0.87$) developed for this study measured on a scale from zero to 100% (e.g., "How likely are you to get caught if you use marijuana"). The study also includes scores on a single question measuring attitudes toward probation requirements: "Following probation conditions is a good idea," measured on a seven point scale ranging from completely disagree to completely agree.

¹ The initial coding had low reliability because of misunderstanding among coders of the coding rules for this item ($\alpha = 0.37$). Thus, the first author recoded all disposition reports, compared the new codes with the original codes, then made a final coding decision where there had been disagreement.

2.4. Analysis

The principle outcome of the study – case note mentions of drug use per month – was a count variable. Because the distribution of the outcome variable was overdispersed (i.e., the standard deviation was larger than the mean), multilevel negative binomial regression was used to test the longitudinal relations of probation tactics and youth drug use (Hilbe, 2014). Multilevel negative binomial regression models the log of the count of case note mentions of drug use per month with $\exp(B)$ describing the incident rate ratio (IRR) – the likelihood of an increase/decrease in monthly drug use conditioned on a one-unit increase in the magnitude of the predictor variable. The analysis began with the estimation of an unconditional growth curve and a base model of control variables. The unconditional growth curve models included estimates for month, with non-linear change over time tested with the inclusion of a square term for month. Because the opportunity to detect drug use depended on the frequency of probation supervision, all models controlled for the total number of probation contacts with youth each month. The parameter estimates of interest in this analysis were the longitudinal relations between probation tactics (lagged one and two months) and confirmed drug use. Because confirmed drug use is likely to evoke many of the probation tactics of interest in this study (e.g., confirmation of drug use may lead to negative pressures, involvement of parents, referral for treatment, and/or an offer of incentives for reduced drug use), the principle threat to the study's internal validity is the cross-sectional association of probation tactics and drug use. To isolate the longitudinal effects of probation tactics and confirmed drug use, three control variables were included in all models, including (a) prior month confirmed drug use, to control for the stability of drug use over time, (b) current month probation tactics to control for the cross-sectional associations of probation tactics and confirmed drug use, and (c) an interaction of prior month drug use and prior month probation tactics to isolate the general effect of probation tactics from prior-month cross-sectional associations of tactics and confirmed drug use.

2.5. Missing data

Because the study design depended upon interviews with youths when they appeared at the probation department for regularly scheduled meetings with their probation officers, attrition from the study was expected. In the end, 101 youths completed all surveys that are included in this analysis, investigation reports were available for 134 youths, and probation case notes were available for 144 youths. Attrition of youths from the self-report surveys can be attributed to several sources, including random processes such as ending their period of probation supervision prior to completion of surveys ($n = 8$), moving ($n = 6$), and censoring at the end of the study window ($n = 3$), and non-random processes such as arrest and placement in detention ($n = 6$), absconding ($n = 13$), and refusing to complete surveys when offered ($n = 7$).

Multiple imputation was selected to impute missing data using chained equations (Allison, 2002; Azur, Stuart, Frangakis, & Leaf, 2011; Schafer & Graham, 2002). Ordinarily, the quality of the MI imputations depends on random patterns of missing data, with biased imputations occurring when missingness mechanisms depart from random processes as they do in this study (usually designated as missing at random, or MAR). However, MI is robust to modest departures from the MAR assumption, and in any case result in less biased estimates than list wise deletion which depends on highly restrictive missing completely at random (MCAR) assumptions (Schafer & Graham, 2002). Moreover, experience shows that imputations are unbiased when non-random missingness mechanisms are statistically controlled in the imputation models through the use of auxiliary variables (Collins, Schafer, & Kam, 2001; Newman, 2014).

The development of our implementation models was guided by

several decisions. First, the decision was made to restrict the analysis to youths for whom complete case notes were available ($n = 144$). All youths missing case notes were also missing investigation reports, leaving too few data-points to estimate missing variables for these youths. Second, the decision was made to include data for the first twelve months of probation. As youths moved off of probation supervision, monthly outcome data was no longer available, reducing the sample size considerably. Third, imputation models included indicators for rearrest and the non-random missingness mechanisms (placement/absconding/discontinue decision), an indicator for probation failure extracted from the probation case notes, and an indicator for point of study recruitment which serves as a proxy for youths who entered the study at the beginning of their probation term (i.e., recruited immediately following court disposition) or at some point in the middle of their probation term (i.e., recruited from the waiting rooms of the probation office). Final imputation models included all analysis variables and the indicators of missingness mechanisms described above. Five imputations were estimated for each youth in each month that they remained in the study, yielding 1673 youth-month imputed observations.

3. Results

Table 1 present youth sample characteristics and compares these between youths with no confirmed drug use during their period of probation ($n = 72$) and youths who had at least one confirmed episode of drug use reported in probation case notes ($n = 72$). The sample was predominantly Black (80.5%) and male (77%) and in their middle teen years (15.1, $sd = 1.17$). In terms of risk profile, the average youth had 2.7 indicators of risk at intake. Nearly two-thirds of youths failed at least 1 school subject during the past year (63%), 67% of youths had negative peers, 45% had behavior problems at home, and 43% were assessed to have anger control problems. Prior arrests were common, with the average youth reporting at least 1 arrest prior to the index arrest. The most frequent offense types were misdemeanor level person offenses (60%) and felony level theft-related offenses (37%). 63% of youths were court ordered to “general probation” ($n = 91$), where reporting requirements ranged from once per month to once per week, whereas the remaining youths ($n = 53$; 37%) were court ordered to “ESP” supervision, where youths were required to report to their probation officer at least three times per week. Of youth and probation

characteristics, only risk score was associated with confirmed drug use during probation ($t = 4.26, p < .001$).

Drug use prior to and during the course of probation was common in this sample. Nearly 60% of youths were assessed to have used illicit drugs during the twelve months preceding their adjudicated offense ($n = 77$). During the twelve-month period of observation in this study, 72 youths (50%) had at least one case-file indication of confirmed drug use, with 38 youths having three or more. Of 1673 youth-months recorded in the data, 89% ($k = 1491$) had zero confirmed drug use, 7% ($k = 117$) had one case-file indication of confirmed drug use, and the remainder (3%, $k = 65$) had two or more. As expected, drug use in the year prior to the current probation period was associated with confirmed drug use during the course of probation ($\chi^2 = 13.95, p < .001$).

In any given month, probation officers had a median of six probation contacts of any type (range: 0–60), including two in-person contacts with youth (range: 0–14), one contact with parents (range: 0–14), and one collateral contact (range: 0–19). Table 1 shows that negative pressures per month recorded in case notes ranged from zero to six (mean = 0.40 per month; median = 0), positive pressures per month ranged from zero to three (mean = 0.15 per month; median = 0), and substance abuse treatment program mentions per month ranged from zero to 17 (mean = 0.26 per month; median = 0). Results of bivariate analyses presented in Table 1 indicate that youths with confirmed drug use were more likely to receive negative pressures, to have parents directly involved in probation meetings, and more likely to have substance abuse treatment programs mentioned in their case notes, as well as to have fewer positive pressures.

Table 2 presents multivariate growth curve models predicting the number of times drug use was affirmed in youth case notes on a monthly basis. Model 1 established the growth curve and control variables which served as a baseline for all further hypothesis testing. A non-significant parameter estimate for month indicated that rates of confirmed drug use were consistent over the course of probation. As expected, number of total probation contacts in the month was highly significant, confirming that more frequent probation contacts were associated with a higher likelihood of detecting youth drug use ($\beta = 0.09, IRR = 1.09, p < .001$). Among time invariant youth characteristics (gender, age, race) and youth survey data (attitude toward probation, working alliance inventory, perceptions of fairness scale, deterrence scale), only the risk scale at probation intake predicted drug use and

Table 1
Sample characteristics.

	Total		No drug use ($n = 72$)		Confirmed drug use ($n = 72$)		
	Frequency	Mean (s.d.)	Frequency	Mean (s.d.)	Frequency	Mean (s.d.)	
Youth characteristics							
Black	116 (80.5%)		57 (49%)		59 (82%)		
Female	33 (23%)		19 (58%)		14 (42%)		
Age		15.1 (1.17)		15.04 (1.35)		15.2 (0.96)	
Risk score (0–6)		2.5 (1.50)		2.0 (1.5)		3.01 (1.35)	$t = 4.26^{***}$
Felony							
Enhanced probation	53 (37%)		51 (56%)		40 (44%)		$\chi^2 = 3.61^+$
Youth drug use							
Prior drug use (past year)	77 (58%)		27 (35%)		50 (58%)		$\chi^2 = 13.95^{***}$
Drug use per month		0.17 (0.59)		–		0.34 (0.79)	
Probation interventions							
Negative pressures per month		0.40 (0.84)		0.26 (0.63)		0.54 (0.99)	$t = 7.06^{***}$
Positive pressures per month		0.15 (0.45)		0.17 (0.47)		0.12 (0.42)	$t = 2.08^{**}$
Parent meetings per month		1.52 (1.84)		1.27 (1.58)		1.77 (2.02)	$t = 5.57^{***}$
Substance abuse treatment programs		0.26 (1.09)		0.01 (0.13)		0.49 (1.49)	$t = 9.25^{***}$

+ $p < .10$.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 2
Multilevel poisson regression of monthly drug use on probation interventions.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Constant	-4.64***	-4.47***	-4.55***	-4.58***	-4.53***	-4.32***
Constant level 2	-0.44	-0.50	-0.44	-0.43	-0.37	-0.59
Month	-0.03	-0.04	-0.03	0.02	-0.03	-0.04
Probation contacts per month	0.09***	0.07***	0.09***	0.08***	0.09***	0.07***
Risk scale	0.43***	0.41***	0.43***	0.43***	0.41***	0.40***
1 Month lag drug use	0.19*	0.28*	0.21	0.37**	0.22†	0.27*
Negative pressure						
Current		0.24***				0.26***
1 Month lag		0.19*				0.15†
1 Month lag negXdrug		-0.07				-0.07
Positive pressure						
Current			-0.15			-0.03
1 Month lag			-0.34			-1.06**
1 Month lag posXdrug			-0.00			
Parent meetings						
Current				0.05		
1 Month lag				-0.03		
1 Month lag parentXdrug				-0.03		
Drug treatment						
Current					0.04	
1 Month lag					0.06	
1 Month lag txXdrug					-0.02	
Neg/pos pressure interaction						
Current						-0.08
1 Month lag						0.39*
F	22.23***	15.26***	12.97***	11.69***	13.01***	10.37***

† p < .10.
* p < .05.
** p < .01.
*** p < .001.

was retained in the model ($\beta = 0.43$, IRR = 1.54, $p < .001$). Finally, the estimate for drug use in the prior month was significant ($\beta = 0.19$, IRR = 1.21, $p < .05$), suggesting a modest level of stability in drug detection over the course of probation.

Initial models predicting the impact of four probation tactics evaluated in this study are shown in models 2–5 (see Table 2). Each model includes an estimate for the current month and one month lagged effect of the probation intervention on drug use, in addition to an interaction term between the one month lagged effects of probation intervention with one month lagged known drug use. Across the four models, only negative pressures were statistically significant (see model 2). Current month negative pressures ($\beta = 0.24$, IRR = 1.27, $p < .001$) and one-month lagged negative pressure ($\beta = 0.19$, IRR = 1.21, $p < .05$) both predicted increases in current month confirmed drug use. The non-significant interaction of lagged negative pressure and lagged known drug use indicated that the effect of one-month lagged negative pressure was independent of whether or not the youth was known to have used drugs during that month. Models 2–4 were replicated for two month lagged probation interventions. However, estimates were not significant.

Following, interactions among probation interventions were evaluated. Of all possible interactions, only an interaction between negative and positive pressures was statistically significant (see Table 2, model 6, and Fig. 1). The sign and strength of the interaction ($\beta = 0.39$, IRR = 1.48, $p < .05$) show that positive pressures (i.e., rewards and incentives) were associated with reduced drug use at low levels of negative pressure (i.e., pressure and threats); positive pressure in the previous month was not associated with reduced levels of drug use when paired with relatively higher levels of negative pressure.

Next, interactions were tested among probation interventions and time, gender, age, and risk level. Two additional interactions involving parent-probation officer meetings and substance abuse treatment involvement were detected in these analyses. Figs. 2 and 3 show how the effect of parent meetings with probation officers vary for boys and girls over time. For boys, higher numbers of prior month parent meetings

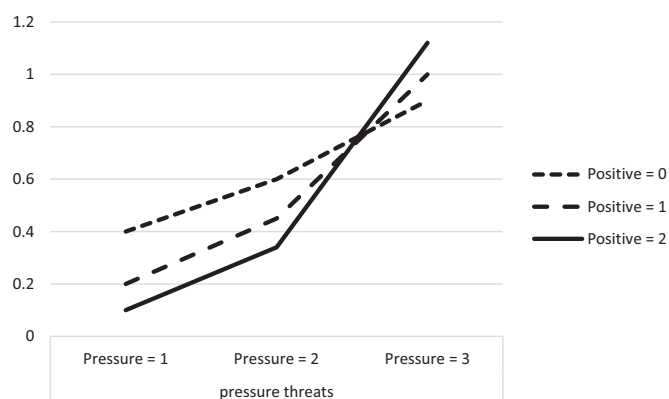


Fig. 1. Interaction of positive and negative pressure on monthly confirmed drug use.

*Note, risk and number of probation contacts are held constant at mean values; month was assigned at the midpoint of the study observation period (month = 6), and prior month drug use was held constant at six.

were associated with more drug use, with this effect growing over time. For girls on the other hand, higher numbers of prior month parent meetings were associated with lower drug use during the early months of probation, though it appears that the positive effect of parent meetings for girls diminished in the later months of probation. Fig. 4 shows how the effect of youth engagement in drug treatment on drug use changes over time. Early in probation, case note mentions of drug treatment programs were associated with lower drug use; in the later months of probation, higher rates of drug treatment notations in case notes were associated with higher rates of drug use two months later.

4. Discussion

This study explored the effects of four types of probation

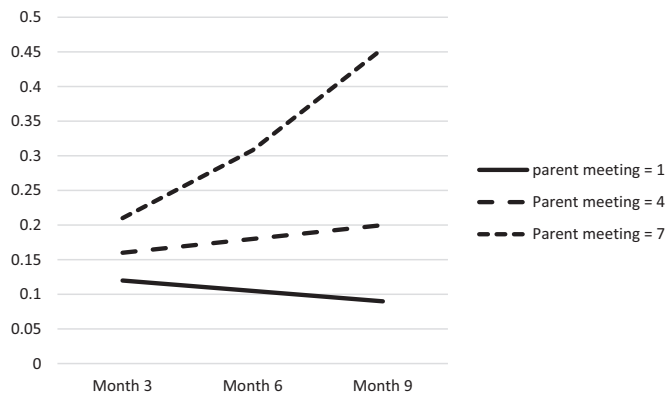


Fig. 2. Interaction of parent meetings with probation officers and time on probation on confirmed drug use for boys.
*Note, risk and number of probation contacts are held constant at mean values; prior month drug use was held constant at two.

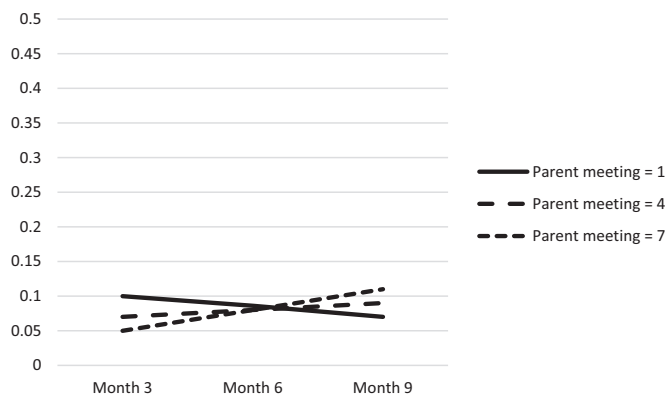


Fig. 3. Interaction of parent meetings with probation officers and time on probation on confirmed drug use for girls.
*Note, risk and number of probation contacts are held constant at mean values; prior month drug use was held constant at two.

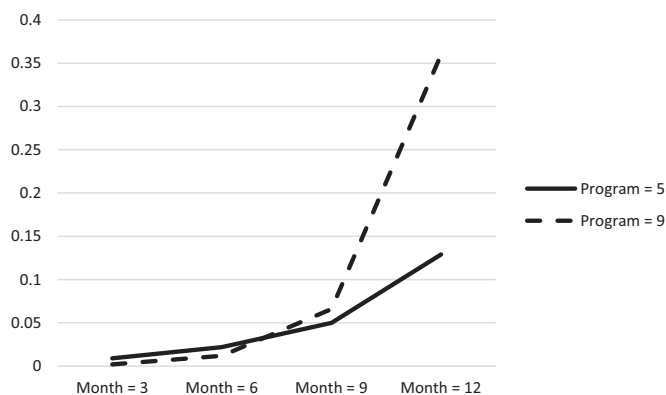


Fig. 4. Interaction of drug treatment program involvement and time on probation on confirmed drug use.
*Note, risk and number of probation contacts are held constant at mean values; prior month drug use was held constant at two.

intervention strategies on drug use outcomes for youths under probation supervision. The three main findings of this study focus attention on the interrelationship of positive and negative pressure, the impact of gender on the effect of parent involvement, and the impact of timing on probation intervention outcomes. More specifically, results of this study suggest that the effects of positive and negative pressures were

mutually dependent; that positive pressure reduced drug use in this sample of probation involved youths when rates of negative pressures were low, but that high rates of negative pressure were associated with higher rates of drug use irrespective of probation officer use of positive pressure. Further, that early parent involvement was associated with lower drug use for females but not for males, and that higher rates of parental involvement later in the course of probation was associated with higher rates of drug use for both boys and girls. Finally, that higher levels of treatment program involvement later in probation was associated with higher rates of drug use. These findings, elaborated in more detail below, provide practical guidance to probation officers and probation programs in their work with adolescents on probation who are known to use drugs.

The first notable finding is the interaction of positive and negative pressures. It is evident that negative pressures are associated with increased drug use. Moreover, negative pressures in this sample overwhelmed the otherwise helpful impact of positive pressure, which were only beneficial at lower levels of negative pressure. These findings are consistent with a balanced approach to probation practice (Skeem, Loudon, Polsachek, & Camp, 2007) where positive and negative pressures are expected to promote positive outcomes. But the data are strongly suggestive that the most effective balance of positive and negative pressures favor positive pressures like rewards, incentives, affirmation, and praise, calling to mind common rules of thumb that favor more liberal use of positive pressures relative to negative pressures. (e.g., four incentives for every one sanction; Heilbrun et al., 2017). The findings are also consistent with motivational interviewing approaches that train practitioners to avoid negative pressures and confrontations altogether in favor of reflective listening, open ended questions, and validation (Miller & Rollnick, 2013). It should be noted, however, that parameter estimates for positive pressures were only significant when an interaction with negative pressures were included in the model. Thus, findings of this study argue in favor of limited use of negative pressures but may not support their abandonment entirely.

What we cannot tease out from these data are the types of positive pressures that are more effective, and the specific type of negative pressures that lead to increased drug use. As coded from probation case notes, both are broad categories of probation activities. Positive pressures included affirmations and encouragement as well as token rewards and the promise of future rewards like relaxed curfew and early discharge, whereas negative pressure included reminders of potential negative sanctions, as well as confrontation about past misbehavior and consequences for past misbehavior. What can be said is that these findings are consistent with rewards systems like contingency management and other reinforcement/reward-based interventions based on operant conditioning and social learning theory. More fine-grained recommendations require experimental research designs to test specific combinations of positive and negative pressures on youth drug outcomes.

Findings involving gender differences in the effect of parental involvement are intriguing, pointing to the possible need for gender-specific probation supervision approaches regarding youth drug use. Findings reported here mirror data from research suggesting that family processes differentially affect developmental outcomes for adolescent boys and girls. For example, recent systematic reviews of the effect of parenting on youth alcohol use outcomes suggests that girls may be more sensitive to parent-child relationship quality and to the effects of parental monitoring (Kopak, Chen, Haas, & Gillmore, 2011; Yap, Cheong, Zaravinos-Tsakos, Lubman, & Jorm, 2017). For girls, the interaction uncovered in this study is consistent with the hypothesis that direct parental involvement in the probation process suppresses drug use, at least earlier in the probationary period. The mechanism of this effect is not clear, but it could be that parental involvement in probation triggers greater monitoring. For boys, the interaction is consistent with the hypothesis that parent meetings rather lead to greater rates of detection.

The interaction of time on probation with the effects of substance abuse treatment presents a puzzle. It appears that drug treatment programs are most effective when initiated in the early months of probation, and that more aggressive involvement of probation with substance abuse treatment providers later in the period of probation is an indicator of more serious and intractable drug use. Why this is the case is a puzzle and not explained in these data. The least likely outcome is that time on probation has a direct effect on the effectiveness of drug treatment. Rather, this interaction is most likely an indicator of other processes. For example, it may be an indicator of youth resistance to engage in treatment, a factor that was unmeasured in this study. Or, it may be an indicator of ambivalent case work practice. Or, it could be that hope for change diminishes over the course of probation. Further analysis is required to illuminate the meaning of this finding.

Overall, findings of this study have practical implications for juvenile probation programs. These include minimizing the use of negative pressure while emphasizing positive pressure, involve youths in drug abuse treatment programs in the early months of probation supervision, and engage families in the process, especially for girls. However, these implications are conditioned by certain limitations of the current study. First and foremost, data about probation practices derive from probation case notes. Thus, hidden measurement error includes factors related to what probation officers choose to include in their case notes. Unfortunately, direct observation of probation practices were not available. Second, the reliance on case notes for our measure of confirmed drug use likely introduced measurement error into the study. It is possible that measurement error was attenuated somewhat by more rigorous probation monitoring of drug use when youth risk for drug use was recognized. Nevertheless, it is very likely that drug use by youths in this study was underreported. Finally, as a study of naturalistic probation processes, officers in this study were not specifically trained in evidence-based practices. Thus, this study design lacks the rigor of an experimental study with respect to threats to internal validity. In light of these limitations, confirmation of the effect of probation practices on youth drug outcomes await research using experimental designs.

In the end, what can be said about the implications of this study for the role of probation vis-à-vis drug use among justice-involved youths? The Cascade model (Belenko et al., 2017) sharpens our understanding of where probation is likely to have its greatest impact – on screening, assessment, and referral. Results of this study argue for a more fully integrated view of probation in the change process. As a partner and complement to formal treatment, probation officers can incentivize and reward pro-social behavior while strategically using their authority to influence youth's behavioral choices over the short term, and they can integrate themselves helpfully into systems that matter for youth outcomes – families and formal treatment services.

Declarations of interest

None.

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