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Outcomes of a Family-Based HIV Prevention Intervention for Substance Using Juvenile Offenders

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Abstract

Approximately 80% of all arrested youth are diverted from detention and supervised in the community through probation, specialty courts and other community-based diversion efforts. Justice-involved youth have greater psychiatric impairment, substance use and sexual risk behaviors than their non-justice-involved peers. Family-based interventions to address mental health, substance use and recidivism have been successful in improving these youth outcomes; but the lack of integration of HIV/STI prevention is notable given the co-occurrence of substance use, delinquency and sexual risk-taking behaviors among justice-involved youth. Moreover, emotion dysregulation may be an important and understudied underlying construct of these co-occurring risk behaviors for justice-involved youth. Study participants were 47 caregiver-youth dyads enrolled in a juvenile drug court program. As part of a pilot efficacy trial, dyads were randomized to a 5-session family-based integrated substance use and HIV/STI prevention intervention that relied on affect management strategies for risk reduction or an adolescent-only psychoeducation condition matched for time and attention. Data collected at baseline and 3 months post-intervention suggest that a family-based integrated affect management substance use and HIV prevention pilot intervention may lead to justice-involved youths' enhanced motivation to change their marijuana use, decreased marijuana use and decreased risky sexual behavior over time. Future research is required to replicate these pilot trial findings and should also examine family-level mediators and moderators of treatment response, particularly with respect to HIV prevention efforts for these youth.

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Introduction

Juvenile offenders use substances at significantly higher rates than their non-offending counterparts (NIJ, 2014; Rosenfeld, White, & Finn-Aage, 2012). Alcohol use is substantially more prevalent among youth with a recent arrest compared to youth with no arrest history (National Center on Addiction and Substance Abuse, 2004). Among juvenile offenders, while other offenses show desistance over time and into adulthood, marijuana use shows rates of persistence two to four times greater than offenses like theft or violence (NIJ, 2014; Rosenfeld et al., 2012). Youth with psychiatric disorders relative to no disorders have greater likelihood of committing crimes; alcohol and drug use disorders (and comorbidity with other psychiatric disorders) increases the likelihood of committing violent crime involving arrest (Coker, Smith, Westphal, Zonana, & McKee, 2014). Sexual risk behavior that places these youth at risk for contracting HIV and other Sexually Transmitted Infections (STIs) commonly co-occurs with psychiatric symptoms and increased substance use (L. Teplin et al., 2005). These data provide a compelling case to specifically target substance use within HIV prevention interventions for juvenile offenders. Underlying constructs contributing to and/or exacerbating psychiatric distress, substance use and sexual risk behavior among these youth, such as extensive trauma exposure (Evans-Chase, 2014), greater emotion dysregulation (Lescano, Brown, Miller, & Puster, 2007) and family dysfunction are also important to consider when developing and testing HIV prevention interventions for substance using offenders (Tolou-Shams, Stewart, Fasciano, & Brown, 2010). We briefly review the evidence for these associations and the rationale for targeting these areas in a comprehensive family-based HIV prevention program for juvenile offenders.

HIV risk

Adolescents and young adults (ages 13 through 24 years) currently account for 22% of new HIV infections annually and racial and ethnic minority youth are disproportionately affected, just as they are also overrepresented in the juvenile justice system (CDC, 2014 CDC, 2016). Age-typical initiation of sexual activity and drug use during adolescence heightens young people's risk for contracting HIV and other STIs. Normative developmental maturation is related to engaging in more risk behaviors during adolescence with declines typically witnessed into emerging adulthood; neuroscience literature to date suggests that offending youth do not have normative patterns of psychosocial maturation that contribute to increases in risk behavior relative to their peers (Evans-Chase, 2014; Steinberg, 2009). In addition, among serious offending youth, alcohol and marijuana use may suppress age-typical growth in psychosocial maturity from adolescence into young adulthood (Chassin et al., 2010). Such data might explain why juvenile offenders are particularly at risk for HIV because of their substantially higher rates of risk behaviors, especially using substances during sex (Donenberg, Emerson, Mackesy-Amiti, & Udell, 2015; Tolou-Shams, Hadley, Conrad, & Brown, 2011). Compared to their peers, juvenile offenders begin sexual activity earlier, have more partners, use condoms less often, and have high rates of sexually transmitted diseases/infections (STIs;) and pregnancy (Dembo, Childs, Belenko, Schmeidler, & Wareham, 2009; Donenberg et al., 2015; Tolou-Shams et al., 2010). Juvenile offenders are at increased risk for HIV infection secondary to their alcohol and drug use, which supports

the relevance of integrated substance use and HIV prevention interventions for this youth population.

Emotion regulation

Emotion dysregulation may be an important and understudied underlying construct of these co-occurring risk behaviors. Emotion dysregulation is generally defined as the inability to cope with heightened emotional states. A review of various conceptualizations of emotion dysregulation suggests that it is comprised of four areas of deficits: 1) a lack of emotional awareness, 2) inability to tolerate negative emotions, 3) poor behavioral control while experiencing heightened emotion, and 4) the limited use of situationally-relevant emotion regulation strategies (Gratz, & Roemer, 2004). Juvenile offenders display higher rates of many forms of emotion dysregulation, such as negative affect and psychological distress (Lucenko, Malow, Sanchez-Martinez, Jennings, & Devieux, 2003), impulsivity (Devieux et al., 2002), and sensation-seeking tendencies (Bryan, 2002) than their peers. High rates of negative affect, impulsivity and sensation-seeking have been associated with both greater alcohol and marijuana use and unprotected sexual activity among drug-abusing adolescent offenders (Devieux et al., 2002; Lucenko et al., 2003; Robbins & Bryan, 2004). Developmental neuroscience findings suggest that there are age-curve related distinct brain mechanisms and pathways responsible for co-occurring adolescent risk behavior, including adolescent sexual risk (Feldstein Ewing et al., 2016); self-regulation (including emotion) being a primary intermediary (or mediating) component of the relationship between trauma and behavioral outcomes, particularly for juvenile justice youth (Evans-Chase, 2014). Emotion dysregulation is a common hallmark of psychiatric disorders and juvenile offenders are diagnosed with psychiatric disorders, including posttraumatic stress disorder and substance use, at exceedingly high rates relative to non-offending counterparts (Kang, Eno Loudon, Ricks, & Jones, 2015; Wilson et al., 2013). Thus, teaching substance-abusing juvenile offenders how to manage distress and emotional dysregulation may reduce not only their criminal activity, but also their substance use and sexual risk behaviors, by self-regulating, managing their impulsivity and emotional “ups and downs”.

Family factors

In addition to risk attributes of adolescents, family-level factors influence adolescent criminality, substance abuse and HIV risk (Elkington et al., 2014; Lee, 2005; Patterson, DeBaryshe & Ramsey, 1989). A variety of family and parenting factors have been associated with poor adolescent outcomes, including family demographics (e.g., single-parent households, disadvantaged economic status, racial/ethnic minority status), infrequent parental monitoring, less parental warmth and support, increased family conflict and parental psychopathology (Brennan, 2002; Elkington, Bauermeister, & Zimmerman, 2011; McBride, Paikoff, & Holmbeck, 2003; Miller, Forehand & Kotchick, 1999; Samaan, 1998). Data, derived primarily from studies of younger children, suggest that if parents cannot help their children manage their emotions, children have difficulty self-regulating in other environments (i.e., outside of family) which is then associated with poor interpersonal interactions often leading to aggression (Chang, 2003; Frick, 2005). Literature demonstrates an association between harsh or punitive parenting styles and a child's inability to manage their own emotions; the latter being then associated with child conduct problems and poor

peer relationships (Chang, 2003; Eisenberg, 1999; Parke, 1992). Patterson and colleagues' (1992) seminal work shows how within families of conduct disordered youth, there are patterns of parenting that result in these youth being reinforced for maladaptive communication skills and inappropriate expressions of emotion (Patterson, Reid & Dishion, 1992). That is, parents in these families tend to pay attention to their children in negative situations (e.g., when they are having behavioral outbursts) and fail to provide attention to their child when the child may be communicating or expressing their feelings appropriately (i.e., failing to provide positive reinforcement for more adaptive behavioral functioning). Prior studies indicate that emotionally dysregulated families are more likely to have aggressive children than families with parents who are more skilled with emotion regulation strategies. Therefore, youth with conduct disorder, such as substance abusing youth participating in a juvenile drug court program are perhaps more likely to have emotionally dysregulated parents. To date, however, no intervention has addressed the role of adolescent and family emotion regulation in relation to reducing adolescent substance use and HIV risk behaviors among juvenile offenders.

Existing interventions

HIV prevention interventions for juvenile offenders have primarily been brief and focused on psychoeducational, cognitive and/or skills-based factors. A recent small-scale adolescent-only HIV prevention intervention targeting affect regulation with youth on probation resulted in decreased substance use over time and moderate change in sexual risk behavior (Donenberg et al., 2015). Overall, outcomes of HIV prevention interventions for these youth have been mixed; juvenile offenders may improve condom use (or other harm reduction skills) and experience changes in attitudes and beliefs in the short-term, but data supporting long-term sexual risk reduction is limited (Tolou-Shams et al., 2010). Despite that these youth commonly use substances (including before and during sexual activity) very few interventions target both substance use and HIV risk. With the exception of one other intervention (Multidimensional Family Therapy) that demonstrated long-term reductions in the number of adolescent unprotected sex acts (Marvel, 2009; Rowe et al., 2016), to our knowledge, there have been no other published studies that incorporate family-based intervention for HIV/STI prevention for substance using juvenile offenders. The need to develop family-based HIV prevention interventions has received increasing attention because of studies highlighting important family structure and process correlates of adolescent HIV risk (Elkington et al., 2014; Perrino, Gonzalez-Soldevilla, Pantin, & Szapocznik, 2000). Interventions have been created to address these family factors for various subpopulations, such as within urban African American adolescents and their families [e.g., CHAMP; McKernan McKay et al., 2004 and The Mother-Son Health Promotion Project; Jemmott et al., 2000], younger African American children [e.g., Parents Matter program; Long et al., 2004], and families with adolescents in psychiatric care, [e.g., Project STYLE; (Brown et al., 2014; Jemmott et al., 2000; Long et al., 2004; McKernan McKay et al., 2004). Data suggest that family-based HIV prevention interventions are as efficacious, if not more, than individual or group-based cognitive-behavioral/skills adolescent interventions, [e.g., ImPact and Project STYLE (Brown et al., 2014; Stanton et al., 2004)]. Thus, family-based treatments that address HIV prevention for substance abusing juvenile offenders make sense to develop and test because of the existing strong empirical

support for family-based interventions for substance abusing juvenile offenders [e.g., Multisystemic Therapy (MST), Multidimensional Family Therapy (MDFT) (Henggeler, 2002; Liddle, Rowe, Dakof, Henderson, & Greenbaum, 2009).

Project RAP (Risk reduction for Adolescents and Parents)—Project RAP was adapted from the PATH program; an adolescent-only group-based HIV prevention intervention tested with juvenile drug court offenders (Tolou-Shams et al., 2011). The PATH program was adapted from an efficacious adolescent-only group based intervention developed for teens attending a therapeutic day school (Project BALANCE); the Project BALANCE curriculum focuses on teaching youth how to regulate their emotions in risky situations so that they can better negotiate sexual safety and reduce their HIV risk (Brown et al., 2013). Interventions centered on improving child and adolescent affect regulation have been successful in preventing mental health and behavioral problems (Bell & McBride, 2010). The PATH program focused on teaching young offenders affect management skills due to the high rates of psychiatric disorders and associated emotional and behavioral dysregulation documented among juvenile offenders (Teplin, Abram, McClelland, Dulcan, & Mericle, 2002; Tolou-Shams et al., 2014). The adolescent only group-based Affect Management Intervention (AMI) focused on managing emotions in risky situations to reduce HIV/STI risk behaviors (e.g., reducing anxiety in negotiating partner condom use) and also included content related to enhancing motivation for sexual safety and HIV prevention skills practice akin to other successful empirically supported adolescent HIV prevention programs (Johnson, Carey, Marsh, Levin, & Scott-Sheldon, 2003). However, results of the small efficacy trial of the PATH program suggested that adolescent-only HIV prevention interventions may be insufficient to garner sexual behavioral changes for substance using juvenile offenders ((Tolou-Shams et al., 2011). An extensive literature suggests that family-based interventions are most efficacious in improving juvenile offenders' substance use and legal outcomes; therefore, we hypothesized that a family-based HIV prevention intervention that focuses on teaching parents the same affect management skills as their adolescents, but in the context of improving their parenting skills (e.g., parent-child communication and monitoring), may be an efficacious approach to reducing substance use and sexual risk behaviors among substance using juvenile offenders.

Family-based Affect Management Intervention (FAMI) and Adolescent-Only Health

Promotion Intervention (HPI) comparison: Our active FAMI intervention was developed using the Social-Personal Framework (G. Donenberg & M. Pao, 2005). (Figure 1) that emphasizes the interplay between noncognitive factors and individual and social factors and incorporates the effects of psychopathology, substance use, personal attributes, family context, relationship concerns and peer influence. The framework is consistent with non-cognitive theories and research on adolescent risk-taking that implicate psychosocial determinants of HIV risk such as psychopathology, personal attributes, and peer influence (Bronfenbrenner, 1986; Voisin, DiClemente, Salazar, Crosby, & Yarber, 2006). It has shown particular utility in examining risk factors for adolescents in clinical settings and with youth on probation (L. K. Brown et al., 2014; G. Donenberg & M. Pao, 2005). Table 1 provides a brief description of the Project RAP FAMI intervention sessions and content as guided by the Social-Personal Framework. The intervention consisted of four “core” weekly, 2-hour

sessions and a fifth, “booster,” 2-hour session attended 3 weeks after the “core intervention” (a total of up to 10 hours of intervention time for each condition). The FAMI include two interventionists; each of whom met with the parent and juvenile separately for the first session hour and then who came together in the second hour with parent and juvenile together to co-lead the family session for the second session hour, which allowed for shared skills-building, practice and discussion. The adolescent-only HPI included one interventionist who met with the adolescent for the entire 2 hour session (matched for time and appeal to active condition) and included psychoeducational content (i.e., no skills-based learning or practice) on substance use, HIV prevention, tobacco use, sleep hygiene, exercise, and diet. All sessions used games and interactive activities to keep youth and families engaged.

Hypotheses—We hypothesized that, at 3 month post-intervention follow-up, substance using juvenile offenders who were randomized to the FAMI condition would report less quantity and frequency of alcohol and marijuana use and increased frequency of safer sexual behaviors (e.g., increased condom use at last sex, fewer unprotected sex acts, less substance use during sexual activity) compared to those receiving the adolescent-only HPI condition.

Methods

Participants

Adolescents (12–18 years old) were recruited from a northeastern juvenile drug court (JDC; a diversionary and post-plea, post-adjudication treatment program for nonviolent adolescents). Of the 283 families approached, 233 (82%) were eligible and 60 (26%) were enrolled (see Figure 2; Consort). Adolescents were deemed ineligible if: 1) they or their participating caregiver were non-English speakers; 2) if the adolescent had a disclosed history of a sex crime, and 3) if the adolescent self-reported HIV infection. Participants were randomized into the Family-Based AMI (FAMI; $n = 30$) or Adolescent-Only Health Promotion Intervention (HPI; $n = 30$) condition. Thirteen family dyads did not complete any dose of the intervention and Table 2 provides comparisons of dosed versus non-dosed participants.

Procedures

Youth and families were approached for research participation by study staff not affiliated with the court, after a referral was made by the drug court case manager and/or presiding judge. Assent and parental consent were obtained for those 12–17 years of age and informed consent from those who were 18. Research assessments took one hour and were administered by Audio Computer-Assisted Self-Interview (ACASI) on laptop computers at a site separate from the JDC to ensure privacy. Assurances of confidentiality were provided for the participants including notifying them that a Certificate of Confidentiality was obtained. In addition, no drug court staff were involved in the data collection process or had knowledge of whether juveniles in their caseload were completing computerized research questionnaires. The Hospital Institutional Review Board approved all study protocols. Upon completing baseline assessment, families were randomized either to the *family-based* AMI (FAMI) or to the HPI comparison condition. All sessions were led by trained clinicians and

the same clinician who led the FAMI or HPI core intervention sessions also provided the booster intervention session.

Intervention fidelity—Twenty percent of intervention sessions (across both conditions) were randomly selected for fidelity review via audiotape. A single rater assessed for fidelity to intervention content and activities using standardized fidelity forms. Interventionists adhered to 87% of intervention content and protocol for the family-based intervention and 92% of intervention content and protocol for the adolescent-only health promotion (control) condition, suggesting strong fidelity to implementing the intervention, as designed.

Measures

Demographics—For youth participants, demographic characteristics included gender, race and ethnicity and age. For caregivers, demographics included age, gender, relationship to youth participant, marital status, education level, and number of children living in the home.

HIV sexual risk and substance use behaviors

Adolescent Risk Behavior Assessment (ARBA; (Donenberg, Emerson, Bryant, Wilson, & Weber-Shifrin, 2001)—The ARBA is designed specifically for use with adolescents to assess their self-reported sexual and drug use behaviors. Adolescents were asked to report whether they had ever had vaginal or anal sex as well as age at time of first vaginal or anal intercourse. Sexually active participants (past 90 days) also provided the number of times they had vaginal or anal sex in the last 3 months, the number of times they used condoms during sexual activity and their lifetime and recent number of sexual partners; these data were used to calculate the proportion of recent protected (with condom use) sex acts and number of risky (without condom use) sexual acts. Participants also reported whether they used a condom during their last sexual intercourse. The ARBA also assessed adolescent lifetime, past 90 days and past 30 days substance use including alcohol, marijuana, cocaine, prescription medications (used to get high), club drugs and inhalants; item wording included examples and slang names. Participants also reported whether they had ever used alcohol or other drugs prior to having oral, vaginal, or anal sex.

Motivation to Change Substance Use

Readiness Rulers (Center on Alcoholism, 1995; Miller, 1999)—In addition to self-report behavioral measures, participants completed measures regarding the perceived importance of and their confidence related to changing marijuana and alcohol use in the future. Youth were asked to rate on a scale of 0 [not at all important] -100 [most important thing in my life] how important they thought it was to change their alcohol and/or marijuana use as well as on a scale of 0 [do not think I will achieve my goal] -100 [absolutely certain I will achieve my goal] how confident they were that they would change their alcohol and/or marijuana use. Higher scores indicate greater readiness to change.

The Stages of Change and Readiness and Treatment Eagerness Scale (SOCRATES; (Miller & Tonigan, 1996)—The SOCRATES is a 19-item experimental readiness to change measure that specifically addresses readiness to change alcohol and/or

drug use (separate measures). It has three factorially-derived scales: Recognition (7-items) ($\alpha = 0.78$), Ambivalence (4 items) ($\alpha = 0.68$), and Taking Steps (8 items) ($\alpha = 0.90$). Item responses are on a 1 (No, Strongly Disagree)–5 (Yes, strongly agree) point scale (total score ranges from 19 to 95). Examples of items include: I really want to make changes in my use of drugs (recognition); sometimes I wonder if I'm an addict (ambivalence) and I have already started making some changes in my use of drugs (taking steps). Higher scores indicate greater readiness to change substance use.

Caregiver and Family Emotion Regulation

Toronto Alexithymia Scale (TAS) (Bagby, 1994)—The TAS is 20-item scale designed to measure alexithymia, or individuals who have trouble identifying and describing their emotions ($\alpha = 0.85$). Examples of items include: “People tell me to describe my feelings more” and “I have feelings that I can't quite understand.” Item responses are on a 1 (Strongly Disagree) to 5 (Strongly Agree) point scale (total score ranges from 20 to 100). Scores <51 indicate non-alexithymia; scores between 52 and 60 are indicative of possible alexithymia; scores >61 indicate alexithymia.

Family Assessment Device (FAD)(Epstein, 1983)—The FAD is based on the McMaster Model of Family Functioning and measures the structural, organizational, and transactional characteristics of families. The current study included 3 of the six subscales: General Functioning (12 items) ($\alpha = 0.85$), Affective Responsiveness (6 items) ($\alpha = 0.77$), and Affective Involvement (7 items) ($\alpha = 0.84$). Item responses are on a 1 (Strongly Agree) to 4 (Strongly Disagree) point scale. Examples of items include: “Planning family activities is difficult because we misunderstand each other” (General Functioning); “We are reluctant to show our affection for one another” (Affective Responsiveness); “We show interest in each other when we can get something out of it” (Affective Involvement). Total summed possible subscale scores range from 1–24 (Affective Responsiveness); 1–48 (General Functioning) and 1–28 (Affective Involvement). Responses were recoded such that higher scores indicate better family functioning.

Difficulties in Emotion Regulation Scale (DERS) (Gratz & Roemer, 2004)—The DERS is a 36-item measure that examines multiple aspects of emotion dysregulation. Items comprise six subscales of 1) nonacceptance; 2) goals; 3) impulse control; 4) emotion regulation strategies; 5) clarity and 6) awareness. Bardeen and colleagues (Bardeen, Fergus, Hannan, & Orcutt, 2016; Bardeen, Fergus, & Orcutt, 2012) have demonstrated psychometric limitations to the DERS-Awareness subscale and as such, this subscale was not included in the current analysis (leaving a total of 30 items for analysis; $\alpha = 0.93$). Examples of items include: “When I am upset I become out of control” (impulse control), “When I am upset I have difficulty focusing on other things” (goals) and “When I'm upset, I believe that there is nothing I can do to make myself feel better” (strategies). Item responses were on a 1 (Almost Never) to 5 (Almost Always) point scale (total score ranges from 30 to 150). Lower scores indicate better caregiver emotion regulation.

Data Analysis

Dosed versus Non-Dosed—Participants were originally considered to have received a “dose” of the intervention if they completed at least 50% of the core intervention (4 of 8 hours). Of those who completed the baseline assessment and were randomized, 45 dyads (23 assigned to FAMI and 22 assigned to Adolescent-Only HPI) completed at least 50% of the four, core intervention sessions. Two dyads (one in each condition) completed only 25% of the intervention and all others ($n = 13$ family dyads) did not receive any intervention for various reasons (e.g., lost contact between baseline and first group session). Given our small study sample size, we ran analyses including only those dosed ($N = 45$) and combining “dosed” and “some dose” ($N = 47$) and outcome results did not vary by including the 2 dyads (balanced across conditions) who only received 25% of the intervention; therefore, we ran all outcomes analyses with final sample of $N = 47$ (i.e., if family or adolescent received at least one intervention session) and revised the definition of “dosed” to completing at least one session of the core intervention (see Figure 2; consort). Of these 47 dyads, almost all (85%) completed the 5th “booster” intervention session. Three-month post-intervention retention was high; 94% of families completed the 3-month follow-up assessment. We examined differences in sexual risk behaviors between juveniles with follow-up data, and those without follow-up data. Participants without postintervention data had a lower baseline proportion of protected sex acts ($M = 0.55$, $SD = 0.61$) than their counterparts with postintervention data ($M = 0.84$, $SD = 0.32$) and a high proportion of participants that were lost to follow-up reported (at baseline) ever having been sexually active in their lifetime (66.7%) and reported recent sexual activity (66.7%) (results not shown).

Final Sample ($N = 47$)—Univariate analyses were used to summarize characteristics of the study sample. Bivariate analyses (i.e., t -tests and Mann-Whitney U for continuous variables; chi-square tests or Fisher’s Exact test for dichotomous or categorical variables) were used to compare demographic and baseline outcomes for participants who were randomized but failed to receive at least one session of the core intervention (referred to as “Non-Dosed”) versus participants who received at least one session of the intervention (referred to as “Dosed”). Study participants who were not-dosed were excluded from subsequent analyses; following a modified intent to treat approach (Gupta, 2011). Next, family-based versus adolescent-only pre/post group comparisons were conducted (on past 90 day youth risk behavior and caregiver emotion regulation variables) using generalized linear models (SPSS version 24, Armonk, NY) that accommodate dependent variables with different distributions within a single analytic framework. Continuous variables, such as readiness rulers, were analyzed using a normal distribution and an identity link function; dichotomous variables, such as condom use at last sex,, were analyzed using a binomial distribution and a logit link function, and count variables, such as number of risky sexual acts and number of days of marijuana use, were analyzed using a negative binomial distribution with a log link function. All models examining youth risk behaviors as outcomes included age and baseline values of each measure as covariates; models examining pre and post-intervention caregiver measures excluded youth’s age as a covariate. Due to small sample size and limited power to detect group differences for behavioral outcomes, such as substance use and sexual activity, “no substance use” and “no sexual activity” were recoded as “0” (versus missing). Values on substance use and sexual behaviors that were missing at

3-month follow-up were imputed by carrying forward the individual's baseline value, which provides the most conservative test of a difference in change between groups. Between-group adjusted effect sizes (ES) were calculated using formulas suggested by Durlak and colleagues (Durlak, 2009). Cohen's *d* was adjusted to account for bias due to small sample size and odds ratios (OR) were calculated for dichotomous data. Positive Cohen's *d* values and ORs less than 1.0 represent risk reduction associated with the FAMI condition.

Results

Demographics

Juveniles ($N = 47$) had a mean age of 15.7 years, 75% were male and the sample was predominantly Caucasian (65.0%), but included 10.0% African American youth, 2.5% Asian youth, and 22.5% identified as other (American Indian or Alaskan Native, Native Hawaiian or Pacific Islander, or other). Roughly 17% percent of youth ethnically identified as Hispanic. The majority of juveniles had a biological (95.7%), female caregiver (87.2%), who was an average of 42.3 years of age ($SD: 9.7$; range: 31 – 81 years). The majority of juvenile caregivers had at least some college education ($n = 24, 53.3\%$) and were married or living with their romantic partner ($n = 25, 54.3\%$). Caregiver characteristics (age, gender, relationship to juvenile, race, ethnicity, education, marital status) did not significantly differ by intervention arm (results not shown).

Session attendance

The average number of sessions attended by those who received at least half of the core intervention ($N = 47$) was 3.90 ($SD = 0.32$; range 1–4 sessions). Of the participants ($N = 47$) who also completed the core intervention plus booster ($n = 40$), the average number of total sessions attended was $M = 4.64$ ($SD = 0.97$; range 1–5). Juveniles who completed a dose of the core intervention ($n = 47; 78.33\%$) and those who did not ($n = 13; 21.67\%$) differed on three baseline measures (Table 2). Juveniles who completed the intervention reported higher rates of lifetime HIV testing as well as lower reported rates of alcohol use, and less frequent endorsement of recent alcohol use (i.e., in the past 30 days).

Baseline variables

At baseline, 83.0% of the sample was sexually active in their lifetime and 57.4% reported recent (past 90 days) sexual activity with an average of two partners (range 1–7 partners) during that timeframe (Table 3). Of those recently sexually active, 66.7% reported using a condom at time of last sex and 77.8% reported substance use during sex. Baseline proportion of protected sex acts was high ($M = 0.89, SD = 0.28$), as was self-efficacy in using condoms ($M = 46.80, SD = 9.85$; possible range of 13–52). Over one-quarter (27.7%) of juveniles reported lifetime HIV testing (see Tolou-Shams et al., 2015). Prior to intervention, 89.4% of the sample reported using marijuana ever in their lifetime and reported using marijuana an average of 6 days out of the previous 30 days ($SD = 10.40$); 72.3% reported ever drinking alcohol in their lifetime and reported drinking an average of one day out of the previous 30 days ($SD = 2.59$). Baseline readiness to change future marijuana use ($M = 32.15, SD = 39.58$) was higher than readiness to change future alcohol use ($M = 27.00, SD = 38.32$). Over one-fifth of the sample (21.4%) reported heroin, cocaine, methamphetamine, or club

drug use in their lifetime. Caregivers' average baseline TAS scores for caregivers were low (i.e., not indicative of alexithymia; $M = 40.91$; $SD = 12.34$).

Baseline comparison by condition

The FAMI and HPI conditions differed at baseline on three measures related to marijuana use and one measure related to sexual risk behavior (Table 3). At baseline, juveniles in the FAMI condition reported a higher average number of risky sexual acts ($M = 5.05$, $SD = 12.28$) than their HPI counterparts ($M = 2.32$, $SD = 10.09$; Wald Chi-Square = 4.67; $p = 0.03$). Groups also differed in their recent marijuana use (past 90 days); juveniles in the FAMI condition reported more frequent recent marijuana use than their HPI counterparts. Lastly, groups differed on their readiness to change and confidence in ability to change future marijuana use such that the HPI scores indicated greater motivation to change their marijuana use than for those randomized to the FAMI. There were no statistically significant differences between the two groups with regard to the caregiver emotional regulation measures.

Three-month post-intervention follow-up

Table 4 presents follow-up data on recent (past 90 day) sexual risk and substance use behaviors by condition. Approximately 60% of juveniles reported recent sexual activity with an average of one partner (range 1–6 partners) during that timeframe. Average recent marijuana use was 23 out of the previous 90 days ($SD = 34.59$) and recent alcohol use was less frequently endorsed ($M = 3.25$ day; $SD = 5.97$). Readiness to change future marijuana use ($M = 35.41$, $SD = 45.50$) was higher than readiness to change future alcohol use ($M = 27.35$, $SD = 38.32$).

When controlling for juvenile age, those in the FAMI condition reported a higher number of risky sexual acts than the HPI condition; however those in the FAMI condition decreased their number of risky sexual acts from pre to post intervention whereas the HPI condition increased their risky sexual acts over time (FAMI $M_{pre} = 5.05$ versus $M_{post} = 4.01$; HPI $M_{pre} = 2.32$ versus $M_{post} = 2.95$; Wald Chi-Square = 14.19, $p < 0.001$, $d = 0.10$). Between group differences emerged (in the direction of FAMI) with respect to two measures related to marijuana use. The FAMI condition reported greater past 90 day marijuana use than the HPI condition; however those in the FAMI condition decreased their marijuana use from pre to post intervention whereas the HPI condition increased their use over time (FAMI $M_{pre} = 36.64$ days versus $M_{post} = 26.24$ days; HPI $M_{pre} = 15.36$ days versus $M_{post} = 19.45$ days; Wald Chi-Square = 4.49, $p = 0.03$, $d = 0.20$). Further, the FAMI condition reported greater desire to change their marijuana use over time ($M_{FAMI} = 40.95$ versus $M_{HPI} = 28.13$; Wald Chi-Square = 8.95, $p = 0.003$, $d = 1.03$). Using the same readiness rulers but for assessing motivation to change alcohol use, no between-group differences emerged over time on readiness to change alcohol use (Wald Chi-Square = 0.76, $p = 0.38$) or in confidence in ability to change alcohol use (Wald Chi-Square = 0.04, $p = 0.84$).

No between group differences emerged on measures of caregiver emotion regulation with the exception of scores on the FAD affective responsiveness subscale: caregivers in the FAMI condition reported greater affective responsiveness than the HPI condition, and those

in the FAMI condition increased their affective responsiveness from pre to post intervention whereas the HPI condition decreased their affective responsiveness over time (FAMI $M_{pre} = 17.72$ versus $M_{post} = 19.09$; HPI $M_{pre} = 17.23$ versus $M_{post} = 17.11$; Wald Chi-Square = 4.49, $p < 0.001$, $d = 0.68$).

Discussion

Results from our small-scale efficacy trial suggest that a family-based HIV prevention and substance use intervention for substance using juvenile offenders may lead to enhanced motivation to change marijuana use, a decrease in marijuana use and risky sex acts over time. Additionally, per caregiver report, the family's ability to express feelings openly and be more emotionally responsive to one another appeared to improve but only for those in the active family-based affect management intervention.

Attendance in our family-based intervention was high and once families engaged in the first session of the FAMI, they were likely to complete the entire 5-session (10 hour intervention). This is an encouraging finding given that substance use treatments for juvenile offenders have typically been intensive and lengthy and can have lower attendance or intervention dosage because of the many legitimate demands on these court-involved families. The field is in desperate need of understanding efficacy of brief interventions for this population for whom treatment engagement, lack of resources and overburdened service systems are significant challenges to treatment access. Our 5-session intervention to reduce substance use and co-occurring risk behaviors for juvenile offenders would be considered brief amidst other existing, more intensive empirically-supported interventions for this population, such as Multisystemic Therapy and Multidimensional Family Treatment (see (Dauria, McWilliams, & Tolou-Shams, In press). For a population of youth for whom relatively few empirically-supported marijuana use and HIV prevention interventions exist, our pilot study suggests that incorporating the young offenders' family into a 5-session intervention may lead to adolescent changes in motivation to reduce use and appears promising in reducing actual use. In addition, use of brief assessment tools, such as readiness rulers, to measure change in motivation are likely more feasible and acceptable for use in busy court or treatment settings and thus may be a promising tool for case managers and clinicians to use to inform treatment progress and goals. Per qualitative exit interview data also collected, families also liked this intervention and the court found the intervention feasible, which provides promise for the study of future real-world implementation and integration of integrated substance use and HIV prevention interventions into juvenile drug court settings.

Changes in sexual risk behavior for those youth in the family-based intervention also hold promise. Both groups reduced their frequency of substance use during sex and reductions in unprotected sex acts were observed in the FAMI versus HPI condition at 3 month follow-up. Although the effect size revealed small reductions in sexual risk behavior, these preliminary findings suggest that a family intervention focused on parenting practices as well as emotion regulation strategies may be a successful way of improving sexual safety for these youth. In fact, caregivers who learned affect management skills in relation to parenting reported significantly improved ability (moderate effect size of $d = .68$) to express feelings and

respond to emotions in their family. Future research to understand more about how these caregiver and family emotion regulation related variables may be tied to change in offending youths' substance use and HIV/STI risk behavior will be of critical importance to developing necessary tailored and integrated prevention and treatment interventions.

Limitations

It is important to note that study design issues may have also adversely affected outcomes. Despite that this pilot study utilized rigorous randomization techniques, groups were significantly different at baseline on primary outcomes, such as marijuana use. Analyses statistically controlled for group baseline differences when examining post-intervention effects and post-intervention group differences were as hypothesized. Nevertheless, youth behavioral change in the family-based intervention might represent a regression to the mean effect for risky sex acts and marijuana use and as such, a larger trial is needed for replication of these findings. Despite significant group differences on key primary behavioral outcomes, effect sizes were small, but not too distant from prior HIV prevention trial findings with juvenile offenders (Tolou-Shams et al., 2010). Structural or systems-level interventions may be more effective in achieving greater behavioral change for youth on a broader scale. Challenges with referral to enrollment (26% of those referred) also resulted in a small self-selected sample of youth and families. This percentage reflects the challenges to recruiting court-involved families into behavioral intervention trials and as such, the generalizability of our findings must be considered within this sampling constraint. The limited resources for this pilot efficacy trial also precluded an ITT design to follow all families and our dataset was too small for any meaningful imputation. We chose a per protocol analysis which we felt was reasonable in a pilot trial to discern a signal of intervention impact but ITT results might reveal different pattern (e.g., those that did not get intervention may have been riskier or they may have been a safer group whose families felt that they did not really "need" the intervention). Likewise study resources precluded our ability to extend follow-up out beyond a 3 month window but future research should consider longer term follow-up particular since the few published HIV prevention interventions for juvenile offenders have been plagued with primarily short-term (3 month) follow-ups (Tolou-Shams et al., 2010). Our sample was predominantly male, which prevented us from examining or detecting gender differences to inform intervention development. Future work must include a larger sample of girls and/or examine findings by gender in order to inform the development of gender-responsive HIV prevention and substance use interventions for justice-involved girls; this is particularly critical given that the proportion of justice-involved girls continues to grow despite that numbers of justice-involved youth overall continues to decline. Lastly, examining parent-level data as family-based mediators and moderators of treatment response exceeded the scope of the current primary outcomes analysis, but will be a focus for future analysis and dissemination. Nevertheless pre/post change on theorized family-based emotion regulation constructs was observed.

Conclusions

This is the first study to incorporate specific intervention content related to the role of parent and family emotion regulation in relation to juvenile offenders' sexual risk and substance use. Our prior work suggests that family affective functioning plays a key role in

determining substance use and sexual risk for substance using young offenders (Tolou-Shams et al., 2011); however, knowledge of how to effect change in family affective functioning such that it directly impacts substance use and sexual risk behavior remains in the nascent stages. Our intervention attempted to target, for example, the level of discomfort the parent and child experience during discussions about substance use and sexual risk behavior conceptualizing that those conversations might serve as a proxy for degree of heightened emotional response or reactivity. The intervention also targeted reasons for these types of discussions occurring infrequently perhaps suggesting that such conversations are too uncomfortable or emotionally arousing, in which case the parent and/or child become avoidant as a self-soothing strategy to alleviate their heightened affect. Skills were provided to both adolescent and parent for ways to manage those strong feelings in order to reduce adolescent risk behaviors (and improve parenting ability to protect against adolescent risk). Identifying what might be the key aspects of parent and adolescent emotion regulation to target to effectuate young substance using offender's behavioral change and how that can translate particularly to improved sexual health remains an area for future research.

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Highlights

- HIV and substance use intervention increases youths' motivation to reduce marijuana use
- Family-based intervention is linked to youths' increased readiness to change
- Greater understanding of ways to increase youths' safer sex behaviors is needed

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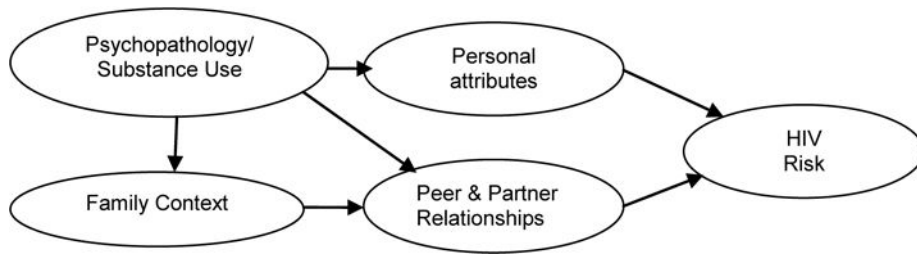


Figure 1.
The Social-Personal Framework for HIV-Risk Behavior (G. Donenberg & M. Pao, 2005)

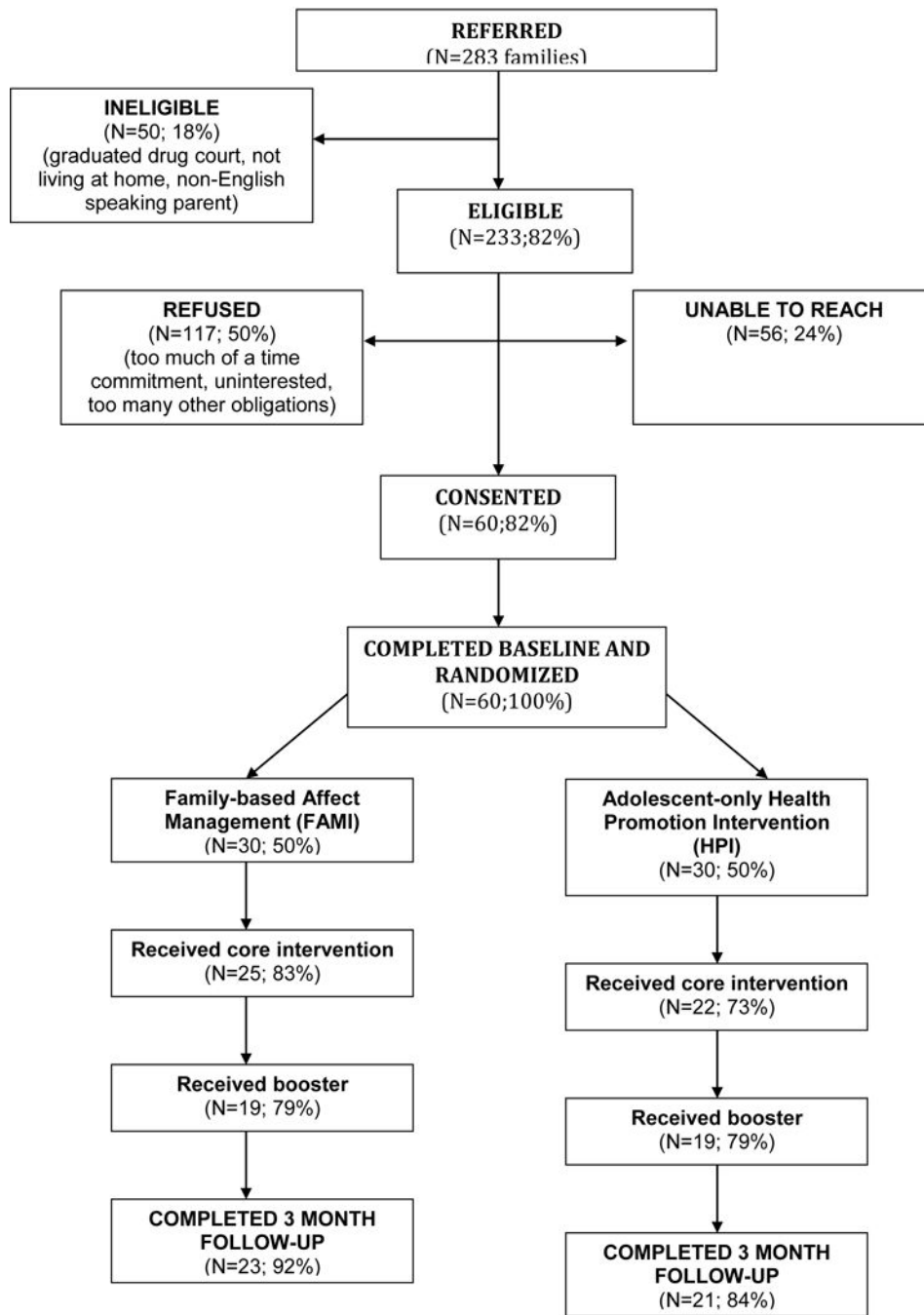


Figure 2.
Study Consort

Table 1

Risk reduction for Adolescents and Parents (RAP) Session content

Session	Topics	
1	Adolescent	Parent
	General HIV/STI Information	Adolescent Sexual Development & HIV/STIs
	Intro to Feelings/Affect Management	Intro to Feelings/Affect Management
Family	Affect Management and Communication (<i>e.g., strengths and weaknesses in communication and monitoring; affect as barrier to effective parent-teen communication; sexually specific parent-teen communication</i>)	
Homework	Practice identifying feelings	
2	Adolescent	Parent
	Managing Feelings/the 3R's	Adolescent Development
	Linking Feelings to Risk	Parental Monitoring/ACE IT
	Parent Challenge (set-up)	3R's and Positive Parenting
Family	Parent-Teen "RAPping", Part 1: Parent-Child communication role-plays and the Parent Challenge (<i>identifying how teens can be in risk situations and how challenging it can be to stay safe, even for parents</i>)	
Homework	Parent-Teen talk about sensitive topic	
3	Adolescent	Parent
	"RAPping" (Assertive Communication) with Parents	Parental monitoring plans
	"RAPping" with Partners/Peers about sex risk/drug use	"RAPping" (Assertive Communication) and using 3Rs* with Teen
	HIV/STI Risk situations and using Affect Management (3R)	"RAPping" (Assertive Communication) with Teen about sex risk/drug use
	Family	Parent-Teen "RAPping", Part 2: Parent-Child communication skills practice
Homework	Parent: Monitoring plan practice; Teen: RAP (risk) plan practice	
4	Adolescent	Parent
	Condom use skills	Condom use skills
	Preparing for parent-teen values discussion	Preparing for parent-teen values discussion
	Family	Condom use skills activities, family values discussion, family communication plan about risky behaviors that includes affect management (3R) strategies
Homework	Family Communication plan practice; continued individual parent monitoring and teen RAP risk reduction plan practice	
5 (Booster)	Adolescent	Parent
	Intervention content review	Intervention content review
	Condom skills practice/review	Condom skills practice/review
	Discussion about sex with parent	Discussion about sex with teen
Family:	Family Communication Plan review, condom knowledge and skills	

* 3R's = Affect Management strategies of Remove (and return), Release and Reframe

Table 2

Baseline demographic, sexual and substance use risk characteristics of participants who received at least one intervention session (“Dosed”) and those who did not receive any (“Not Dosed”), N = 60.

Characteristic	Total N = 60 Mean (SD) or N (%)	Dosed n = 47 Mean (SD) or N (%)	Not Dosed n = 13 Mean (SD) or N (%)	Test Statistic [^]
Demographics				
Intervention Arm				0.20
Affect	30 (50.0%)	25 (53.2%)	5 (38.5%)	
HP	30 (50.0%)	22 (46.8%)	8 (61.5%)	
Referral Source[†]				1.32
Intake	22 (36.7%)	19 (40.4%)	3 (23.1%)	
Drug Court	38 (63.3%)	28 (59.6%)	10 (76.9%)	
Age	15.62 (1.26)	15.72 (1.28)	15.23 (1.17)	235.50
Gender[†]				2.06
Male	42 (70.0%)	35 (74.5%)	7 (53.8%)	
Female	18 (30.0%)	12 (25.5%)	6 (46.2%)	
Race[†]				1.43
White	35 (68.6%)	26 (65.0%)	9 (81.8%)	
African-American	5 (9.8%)	4 (10.0%)	1 (9.1%)	
Asian	1 (2.0%)	1 (2.5%)	0 (0%)	
Other	10 (19.6%)	9 (22.5%)	1 (9.1%)	
Ethnicity[†]				1.12
Non-Hispanic	47 (79.7%)	38 (82.6%)	9 (69.2%)	
Hispanic	12 (20.3%)	8 (17.4%)	4 (30.8%)	
Risk Behaviors				
Ever sexually active, lifetime [†]	50 (83.3%)	39 (83.0%)	11 (84.6%)	0.02
Age at first sex	14.07 (1.31)	14.05 (1.31)	14.25 (1.50)	61.50
Sexually active, past 90 days	35 (58.3%)	27 (57.4%)	8 (61.5%)	0.70
Used condom at last sex [†]	22 (62.9%)	18 (66.7%)	4 (50.0%)	0.73
Number of sexual partners	2.14 (1.78)	2.41 (1.95)	1.25 (0.46)	73.00
Proportion of protected sex acts	0.85 (0.31)	0.89 (0.28)	0.73 (0.38)	187.50
Number of risky sexual acts	3.83 (10.57)	3.78 (11.27)	4.0 (8.12)	195.50
Ever HIV tested, lifetime [†]	13 (21.7%)	13 (27.7%)	0 (0%)	4.59*
Marijuana use				
Lifetime [†]	54 (90.0%)	42 (89.4%)	12 (92.3%)	0.10
Number of days used, past 90	24.53 (34.38)	26.68 (35.16)	16.77 (31.46)	245.00
Number of days used, past 30	6.47 (10.57)	6.47(10.40)	6.46 (11.61)	292.50
Alcohol use				
Lifetime [†]	47 (78.3%)	34 (72.3%)	13 (100.0%)	4.59*
Number of days used, past 90	3.87 (7.56)	3.36 (7.69)	5.69 (7.08)	220.00

Characteristic	Total N = 60	Dosed n = 47	Not Dosed n = 13	Test Statistic [^]
	Mean (SD) or N (%)	Mean (SD) or N (%)	Mean (SD) or N (%)	
Number of days used, past 30	1.67 (3.49)	1.05 (2.59)	4.40 (5.42)	<i>132.50**</i>
Other drug use, lifetime ⁺	15 (28.3%)	9 (21.4%)	6 (54.5%)	4.71

Note:

[^] Chi-square statistic is reported dichotomous data, t-test or Mann-Whitney U test (in italics) is reported for continuous data;

⁺ Fischer's Exact test is reported;

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Table 3

Demographic, sexual and substance use risk characteristics by intervention arm at baseline, N = 47.

Characteristic	Total N = 47 Mean (SD) or N (%)	Family-Based Affect Management Intervention (FAMI) n = 25 Mean (SD) or N (%)	Health Promotion Statistic Intervention (HPI) n = 22 Mean (SD) or N (%)	Test
Youth Demographics				
Number of total sessions attended	4.64 (0.97)	4.52 (1.05)	4.77 (0.97)	235.00
Age	15.72 (1.28)	16.04 (1.31)	15.36 (1.18)	126.00
Gender				0.17
Male	35 (74.5%)	18 (72.0%)	17 (77.3%)	
Female	12 (25.5%)	7 (28.0%)	5 (22.7%)	
Race⁺				2.35
White	26 (65.0%)	15 (68.2%)	11 (61.1%)	
African-American	4 (10.0%)	3 (13.6%)	1 (5.6%)	
Asian	1 (2.5%)	0 (0%)	1 (5.6%)	
Other	9 (22.5%)	4 (18.2%)	5 (27.8%)	
Ethnicity⁺				0.84
Non-Hispanic	38 (82.6%)	21 (87.5%)	17 (77.3%)	
Hispanic	8 (17.4%)	3 (12.5%)	5 (22.7%)	
Caregiver Demographics				
Age	41.96 (8.90)	42.72 (10.31)	41.09 (7.11)	260.00
Gender⁺				0.50
Male	6 (12.8%)	4 (16.0%)	2 (9.1%)	
Female	41 (87.2%)	21 (84.0%)	20 (90.9%)	
Relationship to child⁺				1.84
Natural parent	45 (95.7%)	23 (92.0%)	22 (100.0%)	
Adoptive parent	2 (4.3%)	2 (8.0%)	0 (0.0%)	
Marital Status⁺				1.49
Single	10 (21.7%)	6 (25.0%)	4 (18.2%)	
Married/ Living with partner	25 (54.3%)	14 (58.3%)	11 (50.0%)	
Divorced/Separated	11 (23.9%)	4 (16.7%)	7 (31.8%)	
Highest level of education⁺				1.34
< High school education	8 (17.8%)	5 (21.7%)	3 (13.6%)	
High school graduate/ GED	13 (28.9%)	5 (21.7%)	8 (36.4%)	
Some college/ college graduate/ advanced degree	24 (53.3%)	13 (56.5%)	11 (50.5%)	
Number of children <18 in home	2.11 (1.31)	1.96 (0.98)	2.27 (1.61)	265.50
Youth Risk Behaviors				
Ever sexually active, lifetime	39 (83.0%)	21 (84.0%)	18 (81.8%)	0.04
Age at first sex	14.05 (1.31)	14.35 (1.09)	13.71 (1.49)	2.43
Sexually active, past 90 days	27 (57.4%)	15 (60.0%)	12 (54.5%)	0.14
Used condom at last sex	18 (66.7%)	9 (60.0%)	9 (75.0%)	0.67

Characteristic	Total N = 47 Mean (SD) or N (%)	Family-Based Affect Management Intervention (FAMI) n = 25 Mean (SD) or N (%)	Health Promotion Statistic Intervention (HPI) n = 22 Mean (SD) or N (%)	Test
Number of sexual partners	2.41 (1.95)	2.53 (2.00)	2.25 (1.96)	0.70
Substance use at last sex	21 (77.8%)	12 (80.0%)	9 (75.0%)	0.10
Number of risky sexual acts	3.78 (11.27)	5.05 (12.28)	2.32 (10.09)	4.67*
Ever HIV tested, lifetime	13 (27.7%)	7 (28.0%)	6 (27.3%)	0.003
Marijuana use				
Ever [†]	42 (89.4%)	21 (84.0%)	21 (95.5%)	1.43
Number of days used, past 90	26.68 (35.16)	36.64 (40.14)	15.36 (24.79)	8.44**
Number of days used, past 30	6.47 (10.40)	7.44 (10.97)	5.36 (9.84)	1.08
Readiness to change marijuana use	32.15 (39.58)	18.33 (32.69)	47.42 (41.68)	6.41**
Confidence in ability to change marijuana use	47.36 (46.53)	33.81 (45.00)	63.17 (44.33)	4.41*
Alcohol use				
Ever	34 (72.3%)	19 (76.0%)	15 (68.2%)	0.36
Number of days used, past 90	3.36 (7.69)	3.56 (5.54)	3.14 (9.71)	0.14
Number of days used, past 30	1.05 (2.59)	0.91 (1.66)	1.18 (3.30)	0.38
Readiness to change alcohol use	27.00 (38.32)	21.75 (33.30)	34.50 (44.78)	0.97
Confidence in ability to change alcohol use	60.0 (43.58)	52.32 (46.14)	72.00 (38.56)	1.79
Other drug use, lifetime	9 (21.4%)	7 (29.2%)	2 (11.1%)	1.86
SOCRATES				
Recognition	13.53 (5.03)	12.76 (4.32)	14.40 (5.71)	1.31
Ambivalence	8.40 (3.23)	8.48 (3.48)	8.32 (3.01)	0.30
Taking steps	24.75 (9.10)	26.00 (9.13)	23.32 (9.06)	1.06
Caregiver Emotional Regulation				
Toronto Alexithymia Scale (TAS)	40.91 (12.34)	38.80 (10.34)	43.43 (14.21)	1.70
FAD General Functioning	38.17 (5.43)	37.92 (5.24)	38.45 (5.75)	0.12
FAD Affective Responsiveness	17.49 (3.26)	17.72 (3.12)	17.23 (3.48)	0.27
FAD Affective Involvement	20.47 (3.65)	21.08 (3.28)	19.77 (3.99)	1.59
Difficulty in Emotion Regulation (DERS)	54.19 (16.34)	52.80 (17.69)	55.77 (14.91)	0.40

Note: Chi-square statistic is reported for dichotomous data, t-test or Mann-Whitney U test (in italics) is reported for continuous data;

[†]Fischer's Exact test is reported; Wald Chi Square is reported for youth risk behaviors and caregiver emotional regulation variables;

* $p < 0.05$;

** $p < 0.01$;

*** $p < 0.001$.

Table 4
 Postintervention differences in youth and caregiver characteristics by intervention arm, N = 47

Characteristic	Total N = 47		Family-Based Affect Management Intervention (FAMI) n = 25		Health Promotion Intervention (HPI) n = 22		Wald Statistic	Effect size
	M or N	SD or %	M or N	SD or %	M or N	SD or %		
Youth Risk Behaviors								
Sexually active, past 90 days	28	59.6%	16	64.0%	12	54.5%	0.35	1.48
Number of sexual partners	1.75	1.11	1.81	1.28	1.67	0.89	0.16	0.13
Used condom at last sex	15	53.6%	8	50.0%	7	58.3%	0.99	0.71
Substance use at last sex	12	52.2%	8	57.1%	4	44.4%	0.14	2.44
Number of risky sexual acts	3.58	10.55	4.01	10.98	2.95	10.22	14.19***	0.10
Marijuana use								
Number of days used, past 90	23.06	34.59	26.24	37.15	19.45	31.90	4.49*	0.20
Readiness to change marijuana use	35.41	45.50	40.95	48.67	28.13	41.35	8.95**	1.03
Confidence in ability to change marijuana use	54.54	49.14	54.67	49.67	54.38	50.06	1.60	0.01
Alcohol use								
Number of days used, past 90	3.25	5.97	3.48	5.36	3.00	6.71	0.40	0.08
Readiness to change alcohol use	27.35	38.32	31.50	38.56	21.43	38.60	0.76	0.26
Confidence in ability to change alcohol use	57.56	46.00	55.35	47.52	60.71	45.31	0.04	-0.12
SOCRATES								
Recognition	14.16	7.52	15.09	7.39	13.14	7.72	1.12	0.26
Ambivalence	8.43	3.97	8.39	3.61	8.47	4.42	0.01	-0.02
Taking steps	23.50	10.79	23.78	9.98	23.19	11.86	0.003	0.05
Caregiver Emotion Regulation								
Toronto Alexythymia Scale (TAS)	38.97	10.68	36.95	10.15	41.44	11.07	1.49	-0.42
FAD General Functioning	39.33	6.60	39.77	6.17	38.78	7.23	0.81	0.15
FAD Affective Responsiveness	18.20	3.03	19.09	2.65	17.11	3.18	4.49*	0.68
FAD Affective Involvement	20.78	3.79	21.00	4.44	20.56	2.91	0.04	0.12
Difficulty in Emotion Regulation (DERS)	47.49	16.97	45.43	16.74	49.57	17.46	0.19	-0.24

Note: With the exception of models examining caregiver emotional regulation measures, all models controlled for youth age and for measure at baseline;

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p<0.001

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