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## A Longitudinal Study of Truant Youths' Involvement in Sexual Risk Behavior

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### Introduction

Adolescence is often characterized as a period of increased risk-taking. Engaging in sexual risk behavior is highly related to engaging in other risk behavior among teenagers, such as marijuana use (Brodbeck, Matter, & Moggi, 2006; Centers for Disease Control and Prevention [CDC], 2009; Dembo et al., in press a; Elkington, Bauermeister, Brackis-Bott, Dolezal, & Mellins, 2009; Komro, Tobler, Maldonado-Molina, & Perry, 2010; Maynard, Salas-Wright, Vaughn, & Peters, 2012; Murphy, Brecht, Herbeck, & Huang, 2009; Wetherill & Fromme, 2007; Yan, Chiu, Stoesen, & Wang, 2007). Also, youth involved in sexual risk behavior place themselves and others at high risk for sexually transmitted diseases (STDs), including HIV (CDC, 2005; Whaley, 1999). Adolescents are among the highest risk groups for acquiring STDs and HIV (CDC, 2005), particularly youths having contact with the juvenile justice system (Bryan, Ray, & Cooper, 2007; Dembo, Belenko, Childs, Wareham, & Schmeidler, 2009; Hendershot, Magnan, & Bryan, 2010; Kingree, Braithwaite, & Woodring, 2000; Kingree & Phan, 2002). When compared to the general adolescent population, justice-involved youth have increased levels of sexual risk behavior (Morris, Harrison, Knox, Tromanhauser, & Marquis, 1995; Schmiede, Levin, Broaddus, & Bryan, 2009; Teplin, Mericle, McClelland, & Abram, 2003). According to the CDC (2012), in 2011, the overall infection rate for Chlamydia was 0.7% (percentage based on cases per 100,000) for males aged 15-19 and 3.4% for females aged 15-19, and the overall infection rate for Gonorrhea was 0.2% for males aged 15-19 and 0.6% for females aged 15-19. Infection rates among youths aged 12-18 in juvenile corrections facilities in 2011 were much

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higher, with overall rates of Chlamydia infection at 7.4% for males and 15.7% for females (rates based on percent tested positive for population of females [19,081] and males [64,350] tested in facilities) and rates of Gonorrhea infection at 1.2% for males and 4.4% for females (rates based on percent tested positive for population of females [16,991] and males [61,080] tested in facilities) (CDC, 2012).

There is a need to develop and evaluate intervention strategies to reduce sexual and other risk behavior among high-risk youth (Hawkins et al., 2000); and to track the outcomes of these interventions over time in reducing risk behaviors. Specific interventions should be targeted to different at-risk groups of youth, and can be especially beneficial in reducing their long-term participation in problem behavior, such as drug use. In this vein, there is some evidence to indicate that drug prevention interventions can have “spillover” effects in reducing sexual risk behavior among young adults (Ellickson, McCaffrey, & Klein, 2009).

The notion of “spillover” effects was, at first, seen to reflect the general concept of vicarious reinforcement (Bandura, 1971), and has been frequently observed in applied behavior analyses studies (e.g., Strain, Shores, & Kerr, 1976). These studies often documented that when a child’s behavior has been improved in a given area, such as appropriate academic behavior, improvements have been observed among non-reinforced peers (e.g., Strain et al., 1976; see also Jessor & Jessor, 1977). Several studies have investigated the connection between substance use and sexual risk behaviors (e.g., Collins, Ellickson, Orlando, & Klein, 2005; Ellickson, Collins, Bogart, Klein, & Taylor, 2005; Guo et al., 2002; Rees, Argyis, & Averett, 2001), but a limited number of studies have examined spillover effects of drug use prevention, in particular, on sexual risk behaviors. Generally, these studies have implemented substance use prevention programs in school settings to youth in middle/junior and high schools. Griffin, Botvin, and Nichols (2006) examined a growth model of spillover effects of a randomized drug prevention program implemented in New York junior and high schools. Youth who experienced growth (i.e., increasing trend/slope in the growth factor) in combined alcohol and marijuana use during junior and high school were more likely to report risky sexual behaviors (multiple sex partners and sex while under the influence of substances) eight years later in their young adulthood. These effects were less for youth involved in the drug prevention program. Ellickson and her colleagues (Ellickson, McCaffrey, & Klein, 2009) examined spillover effects of the Project ALERT drug prevention program administered to middle and high school students on sexual risk behaviors nine years later. The drug prevention program reduced the likelihood that participants had sex with multiple partners or engaged in unprotected sex because of substance use, but it did not impact inconsistent condom usage. Further, the intensity of drug prevention (14 vs. 24 weeks) did not affect future substance use. To our knowledge, no study to date has examined spillover effects of drug prevention on sexual risk behaviors in truant populations.

Drawing on the above discussed literature, we present findings from a recently completed NIDA-funded, experimental, prospective intervention project involving a specific high-risk group, truant youth. Truancy represents a very significant problem, and truant youth are at high risk of other problem areas (Arnette, 1995; Baker, Sigmon & Nugent, 2001; Center for Labor Market Studies, 2009). In addition to truant youth having problems in school, they

frequently experience troubled family situations, and psychosocial difficulties, including drug use (Dembo & Turner, 1994). The limited number of available studies involving selected samples of truant youths indicate they often experience serious interrelated problems in regard to a stressed family life (Baker et al., 2001; Kearney & Silverman, 1995), alcohol and other drug use (Baker et al., 2001; Dembo & Turner, 1994; Diebolt & Herlache, 1991; Pritchard, Cotton & Cox, 1992; Maynard et al., 2012), emotional and psychological functioning (Diebolt & Herlache, 1991; Dembo et al., 2012a; Dembo et al., 2012b, Egger, Costello, & Angold, 2003; Kearney & Silverman, 1995), delinquent behavior (Dembo et al., 2013; Maynard et al., 2012), and poor educational functioning (e.g., low grades, grade retention or placement in remedial or special programs) (Dembo & Turner, 1994; Garry, 1996; Ingersoll & LeBoeuf, 1997). Research also suggests that truant youth are at considerable risk of continuing their troubled behavior in school and entering the juvenile justice system (Dembo et al., in press b; Garry, 1996; Ingersoll & LeBoeuf, 1997; Loeber & Farrington, 2000; Puzzanchera, Stahl, Finnegan, Tierney, & Snyder, 2003; also see: Henry, Thornberry, & Huizinga, 2009). Given these problem behaviors found among truant youth, it is not surprising they are engaging in sexual risk behavior at a higher rate than the general youth population (Eaton, Brener, & Kann, 2008).

Specifically, the present study had four aims. First, using growth model analysis, we sought to determine if a growth model parameterization was consistent with the youth's involvement in sexual risk behavior across five time points. Second, we sought to assess the impact of a Brief Intervention (BI) targeting the youths' substance use, as well as demographic and background covariates, on their sexual risk behavior over time. As described in more detail in the Methods section, the BI involved two conditions: two sessions with the youth (BI-Y) and two sessions with the youth and one session with the parent (BI-YP). A third intervention condition involved Standard Truancy Services (STS). Our hypotheses were:

H1: Controlling for demographic and background covariates, youths' receiving BI intervention services (BI-Y, BI-YP) will show a greater reduction in sexual risk behavior over time, compared to youth receiving STS services.

H2: Controlling for demographic and background covariates, youths' receiving BI-YP intervention services will show a greater reduction in sexual risk behavior over time, compared to youth receiving BI-Y services. The hypothesized effect of BI-YP services is premised on epidemiological and clinical studies indicating that parent monitoring and support, addressed in the BI-YP session, are associated with reduced risk behavior (e.g., Clark, Kirisci, & Tarter, 1998; Gorman-Smith, Tolan, Loeber, & Henry, 1998; Liddle & Hogue, 2001; Waldron, 1997).

Third, we sought to identify subgroups of truant youth involved in sexual risk behavior. Finally, we sought to uncover any differential, longitudinal effects of the BI on sexual risk behavior across any identified subgroups of sexual risk behaviors for the youths over an 18-month follow-up period.

We first discuss the results of our analyses in regard to the objectives and hypotheses informing our study. Next, we consider their service delivery implications.

## Methods

All study procedures were approved and monitored for ethics by the university Institutional Review Board (IRB). The baseline and follow-up interviews were conducted by trained research staff, following procedures approved by the IRB. As described in more detail by Dembo et al. (2013), the main place of recruitment into the BI project was a Truancy Intake Center (TIC) located at the Hillsborough County Juvenile Assessment Center. In addition, eligible participants were recruited from a community diversion program; and referrals from any Hillsborough County School District (HCSD) social worker or guidance counselor who knew of eligible youth. At both locations, project enrollment proceeded as follows. A project staff member met with the youth and his/her parent/guardian, and provided an overview of the project and its services. Eligible participants were informed that project services were free, voluntary, and provided in-home. For interested participants, an in-home meeting was scheduled to discuss the project further, to answer any questions they had, complete the consent and assent processes, and to conduct separate baseline interviews with the youth and his/her parent/guardian.

Following the completion of the consent and assent processes and baseline interviews, the youth and parent/guardian were randomly assigned to one of three project service conditions: (1) BI-Youth (BI-Y), (2) BI-Youth plus Parent (BI-YP), or (3) Standard Truancy Services (STS). Random assignment was implemented using a method to ensure it was balanced, where every 12 cases had an equal number assigned to the three groups (BI-Y, BI-YP, or STS). Data were also collected for four follow-up periods: the first three months after the intervention (referred to as 3-month follow-up period); the second three months, or months four through six after the intervention (referred to as 6-month follow-up period); months seven through twelve after the intervention (referred to as 12-month follow-up period); and months 13 through 18 after the intervention (referred to as 18-month follow-up period).

## Participants

Eligible youths met the following criteria: (1) age 11 to 17, (2) no official record of delinquency or up to two misdemeanor arrests, (3) some indication of alcohol or other drug use, as determined, for example, by a screening instrument (Personal Experience Screening Questionnaire [PESQ, Winters, 1992]) or as reported by a HCSD social worker located at the TIC, and (4) lived within a 25-mile radius of the TIC. The total sample consisted of 300 youths, who were enrolled and completed baseline interviews between March 2, 2007 and June 22, 2012.

## Interventions

**Brief interventions**—The primary goal of the BI therapist sessions was to promote abstinence and prevent relapse among drug using adolescents. The BI incorporated elements of Motivational Interviewing (MI), Rational-Emotive Therapy (RET) and Problem-Solving Therapy (PST) to develop adaptive beliefs and problem-solving skills. Drug involvement was viewed as learned behavior that develops within a context of personal, environmental, and social factors (Catalano, Hawkins, Wells, & Miller, 1991; Clark & Winters, 2002) that

shape and define drug use attitudes and behaviors. Maladaptive beliefs and problem-solving skill deficits, developed over the course of an adolescent's learning history and prior experience with drugs, were viewed as primary determinants of drug use. The goal of the BI therapy was to diminish factors contributing to drug use (e.g., maladaptive beliefs) and promote factors that protect against relapse (e.g., problem solving skills) (Winters, Fahnhorst, Botzet, Lee, & Lalone, 2012; Winters & Leitten, 2007). As noted earlier, the BI presented here was adapted from previous work using brief intervention on drug-abusing youth (Winters & Leitten, 2001).

A BI counselor received training on the treatment manual adapted from previous brief interventions for drug-using youth (Winters & Leitten, 2001), and personal training from a skilled trainer on all intervention components. Then, the counselor provided BI services to several practice cases. The BI trainer reviewed these sessions with a focus on developing therapist adherence (aided by a rating checklist) and competence (e.g., perceived warmth and interest in the client, presentation clarity, ability to elicit client feedback). Following approval by the trainer, the counselor began to receive project families. With youth and parent/guardian permission, the BI sessions were tape recorded for ongoing fidelity/adherence assessment. Similar to other BI research, fidelity measures of the BI counselor monitored session content and exercises, and whether the counselor adhered to principles of motivational interviewing (i.e., establishing rapport; being a good listener, etc.).

Depending upon the treatment condition, participating families received 2-3 BI sessions. Youths randomly assigned to the BI-Youth (BI-Y) condition were administered two BI sessions, while no sessions were held with their parents/guardians. Youths randomly assigned to the BI-Youth plus Parent (BI-YP) condition were administered two BI sessions, and their parents/guardians were administered a separate BI session.

Each BI session lasted for 1-1/4 hours, and the sessions occurred about a week apart. The first BI session with the youth focused on discussing the youth's substance use and related consequences, the level of willingness to change, the causes and benefits of change, and what goals for change the youth wanted to select and pursue. The youth was encouraged to pursue goals of drug abstinence or reduction in drug use. In the second session with the youth, the counselor reviewed the youth's progress with the agreed upon goals, identified risk situations associated with difficulty in achieving goals, discussed strategies to overcome barriers toward goal achievement, reviewed where the youth was in the process of change, and negotiated either continuation or advancement of goals. Informed by an integrated behavioral and family therapy approach, the parent BI session addressed the youth's substance use issues, parent attitudes and behaviors regarding this use, parent monitoring and supervision to promote progress towards their child's intervention goals, and parent communication skills to enhance youth-parent connectedness.

**Standard truancy services (STS)**—In addition to the normal truancy services provided by the HCSD, STS youths/families received a referral service overlay of three weekly hour-long visits by a project staff member. Reflecting the concept of equipoise (Freedman, 1987), this referral assistance provided truant youth and their families in the control condition with an additional resource that is not routinely available to them, and also controlled for service

exposure. On each contact occasion, the staff member carried a copy of a Hillsborough County government-developed agency and service resource guide. Developed over a period of several years, this resource guide contained hundreds of agency listings. The agency listing information included contact information such as a telephone number, e-mail/website address, and street address. Participants in the STS condition were provided with any agency listing information they felt they needed. In addition to a general inquiry on events since the last session, the staff member asked the youth and his/her parents/guardians: (1) if they used any services and (2) if there were any additional service needs—and, if so, provided an appropriate referral. The point of the STS condition was simply to provide publicly available contact information on local services available to the youth's family. No form of counseling or therapy was offered in the STS condition.

### Interview Procedures

Each youth and parent/guardian was paid \$15 for completing the in-home, baseline interview. The baseline interviews for parents/guardians averaged 30 minutes; the youth interviews averaged one hour. The 3-month follow-up interview was scheduled for 90 days from the date of the youth's last participation in project services (i.e., the last intervention or STS session). The 6-month follow-up interview date was scheduled for 90 days following completion of the 3-month follow-up interview; the 12-month follow-up interview was scheduled for 180 days after the completion date of the 6-month follow-up interview; and the 18-month follow-up interview was scheduled for 180 days after the completion date of the 12-month follow-up interview. On 16 occasions, when a follow-up interview was not performed near the scheduled time, a retrospective interview was performed at the same time as the following interview. For example, if a 6-month interview was not performed approximately three months after the 3-month interview, two interviews were performed approximately nine months after the 3-month interview. One was a retrospective 6-month interview, covering the period of three months after the 3-month interview. The other was the 12-month interview, from the end of the period covered in the retrospective 6-month interview until the time of the interview being conducted. Each youth and parent/guardian was paid \$15.00 for each follow-up interview. Most youths were interviewed in their homes; at each follow-up time point, fewer than 3% of the youths were interviewed in a secure program setting, such as a residential commitment program, county jail, or a juvenile detention center.

Completion of follow-up interviews depended on when youths entered the project: 3-month ( $n=282$ ), 6-month ( $n=281$ ), 12-month ( $n=245$ ), and 18-month ( $n=215$ ) follow-up interviews. Youth who began participation early in the project completed all four follow-up interviews, whereas youth who enrolled at the end of the enrollment period were eligible for only two follow-up interviews (as a result of the fact that the length of the study was not long enough for these late enrollees to complete all follow-up assessments). Overall completion rates of 94.0%, 93.7%, 92.1%, and 88.5% were achieved for the 3-month, 6-month, 12-month, and 18-month follow-up interviews, respectively. Of the completed follow-up interviews, 95.4% of the 3-month, 95.0% of the 6-month, 96.3% of the 12-month, and 99.1% of the 18-month interviews were completed within 60 days of the scheduled interview date.

## Measures

**Data collection instruments**—The main data collection instruments were the Adolescent Diagnostic Interview ([ADI], Winters & Henly, 1993) and the Adolescent Diagnostic Interview- Parent/Guardian ([ADI-P], Winters & Stinchfield, 2003). Both the ADI and ADI-P were designed to be delivered within a highly structured and standardized format (e.g., most questions are yes/no) to capture *DSM-IV* criteria for substance use disorders and related areas of functioning. Item construction was informed by the literature on structured interviews, advice from an expert panel and feedback from field testers (Winters & Henly, 1993). *DSM* guidelines and results from statistical analysis provided the basis for scoring rules. Reliability and validity studies, involving over 1000 drug clinic adolescents for the ADI and about 200 parents/guardians for the ADI-P, provide a wide range of psychometric evidence pertaining to inter-rater agreement, test-retest reliability, convergent validity (with clinical diagnoses), self-report measures, and treatment referral recommendations (Winters & Henly, 1993; Winters & Stinchfield, 2003).

**Background measures**—A number of sociodemographic covariates were used in this study: (1) age (in number of years); (2) gender (0 = male, 1 = female); (3) race (1 = African American, 0 = other); and (4) ethnicity (1 = Hispanic, 0 = other). Table 1 shows the distributions of the youths' demographic characteristics (age, gender, and ethnicity). Most of the youth were male; they averaged 14.8 years in age at entry into the study; and they were ethnically diverse.

**Who youth was living with**—Information was obtained from the youth and parent/guardian interviews regarding who the youth was living with. As seen in Table 1, relatively few youth were living with both of their biological parents (17%), birth father (3%), or grandparents (4%). On the other hand, a third of the youth were living with their mother alone. We created a variable reflecting youth residence with mother (1 = living with mother alone) or in another living arrangement (0 = other living arrangement) for our analysis.

**Family income**—At their baseline interviews, parents/guardians were asked for information regarding their annual family income. Overall, the families in the project had modest annual incomes (see Table 1). Nearly 40% of the families had an annual income of \$25,000 or less, 23% reported annual incomes between \$40,000 and \$75,000, and 10% indicated their annual incomes were greater than \$75,000. The median annual family income was between \$25,001 to \$40,000. A measure of family income was created where 1 = less than \$5,000, 2 = \$5,001-10,000, 3 = \$10,001-25,000, 4 = \$25,001-40,000, 5 = \$40,001-75,000, and 6 = more than \$75,000.

**Family experience of stressful/traumatic events**—The youths' parents/guardians were asked at baseline interview to indicate if the youth or their family ever experienced various stressful or traumatic events. Large percentages of families reported one or more of these experiences, with unemployment of parent (50%), divorce of parents (39%), death of a loved one (58%), serious illness (31%), and a legal problem resulting in jail or detention (26%) being noteworthy. In addition, 49% of the parents/guardians reported other stressful/traumatic experiences (e.g., youth being placed in foster care, not having a relationship with

father, fighting with brothers and sisters, losing the opportunity to obtain a driver's license, separation from mother). A measure of trauma was created by calculating the total number of traumatic events that each youth's parent/guardian reported. Overall, an average of 2.99 stressful/traumatic events were reported ( $SD=1.76$ ).

**Marijuana use at baseline**—Marijuana use was measured through self-report questions on the ADI (Winters & Henly, 1993) and the results of urine tests (UA), which were administered at baseline interview. The ADI questions probed the use of marijuana as: never, less than five times, or five or more times. Urine specimens using the Onsite CupKit® urine screen procedure were also collected to assess recent drug use. For marijuana (THC), urine test positive threshold levels were 50 ng/ml of urine. The surveillance windows were 5 days for moderate users of marijuana, 10 days for heavy users of marijuana, and 20 days for chronic users.

We combined the self-reported marijuana use and marijuana urine test data into an overall measure of marijuana use involving six categories: (1) marijuana use denied and UA test for marijuana negative (7%); (2) marijuana use denied and UA test data missing (due to reasons beyond the youth's control [e.g., incarcerated]) (0.3%); (3) marijuana use denied and UA test data missing (not due to reasons beyond the youth's control [e.g., participant refusal]) (0.3%); (4) UA test missing or negative for marijuana, but youth reported marijuana use one to four times (17%); (5) UA test missing or negative, but youth reported marijuana use five or more times (29%); (6) UA test positive for marijuana (46%). Since there were relatively few cases in categories (2) and (3), they were combined with category (1) for further analysis.

**Sexual risk behavior**—We probed youths' involvement in sexual risk behavior at baseline and at each follow-up interview using the POSIT HIV/STD Risk Behavior instrument. The POSIT 11-item HIV/STD risk scale was developed by the NOVA Research Company (Young & Rahdert, 2000). The instrument has been pilot tested and found to have very good psychometric properties (e.g., internal consistency = 0.80, one-week test-retest reliability = 0.90; concurrent validity with the Sexual Risk Questionnaire scores:  $r = 0.80$ ). In the current study, the internal consistency (Cronbach's Alpha) of the 11 items was 0.73.

Table 2 presents the baseline (lifetime) data for the sexual risk items. As can be seen, large percentages of youths reported close friends having had sex (78%), and 67% of the youths reported they had sexual intercourse. Importantly, sizable percentages of youths indicated they had sexual intercourse without using a condom (33%), and having 2 or more sexual partners (30%). In addition, 3% of the youths reported they ever had a sexually transmitted disease. Comparison of these results with findings reported in the Centers of Disease Control, 2009 Youth Risk Behavior Surveillance ([YRBS] CDC, 2011), indicates a much higher rate of ever having had sexual intercourse among youths in our study, than that reported by youths in the YRBS nationally (47%) or in Florida (48%; 9<sup>th</sup> grade, 31%; 10<sup>th</sup> grade, 45%; 11<sup>th</sup> grade, 57%). This result is consistent with the expectation, noted earlier, that truant youth engage in sexual risk behavior at a higher rate than the general youth population.

Lack of condom use and number of sexual partners are also widely used sexual risk behavior measures in related research (Brook, Balka, Abernathy, & Hamburg, 1994; Bryan et al., 2007; Cooper, 2002; Elkington et al., 2009; Goldstein, Barnett, Pedlow, & Murphy, 2007; Komro, Tobler, Maldonado-Molina, & Perry, 2010; Morris et al., 1995; Morris, Baker, Valentine, & Pennisi, 1998; Murphy et al., 2009; Wetherill & Fromme, 2007; also see: Warren et al., 1998; de Guzman & Bosch, 2007). Hence, we developed a summary measure involving the following four indicators reflecting the youths' involvement in sexual risk behaviors at each time point: (1) had sexual intercourse, (2) had sexual intercourse without using a condom, (3) had sex with two or more people, and (4) had a sexually transmitted disease. Table 3 shows the percent of youths replying affirmatively to each sexual risk behavior item at each time point and the results for the summary index we developed from the youths' replies to these questions across the five time points.

As can be seen, there is a gradual increase in the percent of youths reporting engagement in the sexual risk behaviors from 3-month to 18-month follow-up, and a corresponding, general decrease in the percent of youths reporting not engaging in any of these behaviors. Since there are relatively few youth who reported having an STD at each time point, we recoded the summary measure at each time point by including youth reporting all four sexual risk behaviors into category three of this ordinal measure. (Although sizable percentages of youth did not report engaging in one or more of the two sexual risk behaviors in Table 3, it is important to note that the vast majority of youth reported having some sexual experience [e.g., sexual contact with another person] at each time point [baseline, 80%; 3-month follow-up, 72%; 6-month follow-up, 72%; 12-month follow-up, 76%; 18-month follow-up, 75%]). There were no significant differences in the youths' reported sex risk behaviors and how the youths were recruited for the study (TIC vs. diversion program or referrals) across the five time points (baseline:  $\chi^2[3, 299]=1.53, p=.68$ ; 3-month follow-up:  $\chi^2[3, 282]=0.98, p=.81$ ; 6-month follow-up:  $\chi^2[3, 281]=0.52, p=.92$ ; 12-month follow-up:  $\chi^2[3, 245]=5.46, p=.14$ ; 18-month follow-up:  $\chi^2[3, 213]=0.69, p=.88$ ).

**Treatment effects**—Measures for treatment effects were also included in analyses. The overall Brief Intervention Treatment effect was measured by a variable that contrasts youth and families receiving BI services (BI-Y + BI-YP) versus those receiving standard services (STS). In addition, specific comparisons were made between service conditions: (1) BI-Y vs STS, (2) BI-YP vs STS, and (3) BI-Y vs BI-YP. Tests of the efficacy of the BI treatment, particularly the BI-Y treatment, to reduce marijuana use among the present sample of truant youth have yielded significant effects (Dembo et al., accepted with minor revisions). These effects appear to be delayed with the BI reducing substance use in the 18-month follow-up, but not significantly affecting marijuana use during the 3-month to 12-month follow-up periods. It is possible that the BI will also impact sexual risk behaviors.

**Time in a secure setting**—Time in a secure setting reduces the likelihood of engaging in risk behavior. Hence, from official records and follow-up interviews with parents, we determined for each youth and in each follow-up period, the number of days he/she spent in a secure facility (e.g., detention center, jail, residential commitment program, detoxification facility, treatment program). Results indicated project youth spent an average of 1.2 days,

2.3 days, 4.4 days, and 5.8 days in a secure facility during the 3-month, 6-month, 12-month, and 18-month follow-up periods, respectively. Extremely few youths spend all days in a follow-up period in a secure facility (3-month follow-up [ $n=1$ ], 6-month follow-up [ $n=3$ ], 12-month follow-up [ $n=0$ ], 18-month follow-up [ $n=3$ ]). Since it is possible youth may have engaged in sexual risk behavior during their time in a secure facility, these cases were also included in the analyses.

Further, relatively few youths were placed in a secure facility during the 3-month, 6-month, 12-month, and 18-month follow-up periods: 8%, 8%, 16%, 13%, respectively. In addition, the correlations between the number of the days spent in a secure facility during each follow-up period and the youths' reported involvement in sexual risk behavior during that period were also low (3-month follow-up,  $r=.154$ ; 6-month follow-up,  $r=-.057$ ; 12-month follow-up,  $r=-.094$ ; 18-month follow-up,  $r=-.125$ ). Based on these results, there was no need to adjust for time at risk on our analyses.

## Results

### Strategy of Analysis

Latent growth modeling (see Duncan, Duncan, Strycker, Li, & Alpert, 1999) was used to examine growth in sexual risk behavior over five time points across 18 months. In latent growth models, longitudinal data are modeled as resulting from latent variables of a mean trend for the population while allowing for differences among individuals. The growth model analyses were completed using Mplus Version 7.0 (Muthèn & Muthèn, 1998-2012), a versatile, multivariate statistical modeling program that estimates a variety of models for continuous and categorical observed and latent variables. Since sexual risk behavior at each time point was measured by an ordinal (polytomous) variable, a robust weighted least square estimator, using a diagonal weight matrix, with mean-adjusted and variance-adjusted chi-square test statistics (WLSMV) (Muthèn & Muthèn, 2006-2012) was used in the growth models.

A non-significant chi-square value for WLSMV indicates an acceptable model fit. Mplus also provides a number of measures that aid in assessing the closeness of fit of the model to the data. Four fit indices were used to evaluate the model fit: (1) the comparative fit index (CFI) (Bentler, 1990); (2) the Tucker-Lewis coefficient (TLI) (Tucker & Lewis, 1973); (3) root mean square error of approximation (RMSEA) (Byrne, 2001); and (4) weighted root mean square residual (WRMR) (Yu & Muthèn, 2001). The typical range for both TLI and CFI is between 0 and 1 (although TLI can exceed 1.0), with values greater than .95 indicating a good fit (Browne & Cudeck, 1993; Hu & Bentler, 1999). For RMSEA, values at .05 or less indicate a close model fit, and values between .05 and .08 suggest a mediocre model fit (Browne & Cudeck, 1993). For WRMR, values less than .90 indicate a close model fit for both continuous and categorical outcomes (Yu & Muthèn, 2001).

Because the time of entry into the study determined the number of follow-up interviews each youth and parent/guardian received, the data that are missing are a consequence of the study design. Accordingly, the Mplus feature allowing for maximum likelihood estimation of missing values was used to treat the missing data (Muthèn & Muthèn, 1998-2012).

### Sexual Risk Behavior Growth Model

Linear and quadratic growth models were fit to the sexual risk longitudinal data. A quadratic growth model could not be estimated due to a non-positive definite residual covariance matrix ( $\theta$ ), and a non-positive latent variable covariance matrix ( $\psi$ ), encountered in the estimation procedure.

However, a linear growth model estimation of the sex risk behavior data found a good fit of the model to the data ( $\chi^2=20.31$ ,  $df=14$ ,  $p=0.12$ ; RMSEA=0.039; CFI=0.997; TLI=0.998; WRMR=0.660). The positive trend (estimate=0.042) indicates an increase in sexual risk behavior over time. There is a negative covariance between trend and level (estimate=-0.030), indicating an overall decline in sexual risk behavior over time, given one's baseline involvement in this behavior. Figure 1 presents the model, and Table 4 displays these results of our analysis.

### Sociodemographic and Intervention Condition Predictors of Growth Model Latent Variables

We completed an overall, covariate analysis of the data. The covariate analysis examined covariate effects on the growth model latent variables. The covariates included age, gender, family income level, living with mother, being African-American, Hispanic, family experience of stressful/traumatic events, marijuana use, and an overall intervention effect, comparing STS vs BI-Y + BI-YP groups. As the results in Table 5 show, significant: (1) level effects were found for age (estimate=0.149), family income level (estimate=0.112), being African American (estimate=0.375), family experience of stressful/traumatic events (estimate=0.077), and marijuana use (estimate=0.332), and (2) a significant trend effect was found for African American youth (estimate=-0.061. No significant, overall direct effect was found on the level or trend latent variables.

According to these findings, older youth, youth from families with higher incomes, African-American youth, youth whose families experienced stressful/traumatic events, and youth experiencing higher levels of marijuana use were significantly more likely to report more involvement in sexual risk behavior at baseline. In addition, the rate of change in involvement in sexual risk behavior was significantly lower among African American youth, compared to other youth in the study.

Next, we conducted the covariance runs by comparing three different intervention conditions: (1) STS vs BI-Y, (2) STS vs BI-YP, and BI-Y vs BI-YP. In each analysis, no significant level or trend effects were found. (Copies of detailed tables reporting these results are available from the senior author upon request.)

### Fit of the Linear Growth Model Across Gender Groups

We estimated the fit of the linear growth model across the male and female youths. Results indicated a good fit of the model across both gender groups ( $\chi^2=39.18$ ,  $df=30$ ,  $p=0.12$ ; RMSEA=0.045; CFI=0.995; TLI=0.997; WRMR= 0.916). (Due to space concerns, a table reporting these results has been omitted. A copy of the table can be obtained from the senior upon request.)

### Covariate Comparison within Gender Groups

Based on the finding of a similar, linear sexual risk behavior growth model across gender groups, we completed within group covariate analyses of the data. The comparative results are presented in Table 6. Several significant level and trend effects were found: (1) among males, older youth were significantly more likely to be involved in sexual risk behavior at baseline (estimate=0.277); (2) for both males and female youth, the more the involvement in marijuana use at baseline the greater the involvement in sexual risk behavior (males: estimate=0.523; females: estimate=0.439); (3) among males, the greater the involvement in marijuana use at baseline, the lower the increase in involvement in sexual risk behavior over time (estimate=-0.062). Relatedly, there was a significant, negative relationship between level and trend among male youth (estimate=-0.247). Again, no significant intervention effects were found.

### Growth Mixture Modeling with Sexual Risk Behavior Trajectory Classes

We examined the possibility that the sexual risk behavior data across the five time points contained subgroups of youth differing in their risk behavior (Murphy et al., 2009). Growth mixture modeling was used in this effort (Muthèn & Muthèn, 1998–2012). Figure 2 presents the growth mixture model we estimated for sexual risk behavior over time. Latent class analysis estimated a series of models including one, two, three, and four classes. Maximum likelihood estimation, involving standard errors and chi-square test statistics that are robust to non-normality, was used in these analyses.

For the sexual risk data, results indicated a much better fit of the 3-class model to the data, than the 1-class or 2-class solutions (Bayesian information criterion [BIC] =3224.29, vs 3675.77 or 3307.74, respectively). A 4-class solution could not be reliably estimated. Further, Vuong-Lo-Mendell-Rubin likelihood ratio test (LRT), Lo-Mendell-Rubin Adjusted LRT (aLRT), and Parametric Bootstrapped Likelihood Ratio Test (bLRT) (Nylund, Asparouhov, & Muthèn, 2007) results indicated a significant improvement of the 3-class model over the 2-class model (each  $p=0.000$ ). This was not the case for the 2 latent class model. The entropy value for the 3-class model was a very high: 0.823.

The three subgroups identified in the sexual risk behavior data over time were among the 300 youth: (1) a high sexual risk behavior group ( $n=122$ , 40.5% of the youths), (2) a low level sexual risk behavior group ( $n=80$ , 26.6%), and (3) a sexual risk behavior group which increased, then decreased their sexual risk behavior over time ( $n=99$ , 32.9%). Growth mixture model analyses, with the intercepts and slopes permitted to vary within each class, found no significant, overall BI intervention effect (combined BI-Y and BI-YP) for any of these three sexual risk behavior subgroups. Additional analyses, comparing the effects of STS vs BI-Y, and STS vs BI-YP, on the growth model level and trend latent variables, found one significant effect: a significant, negative effect of STS vs BI-YP (coded STS=0, BI-YP=1) on level (estimate = -6.11, SE=1.20, critical ratio= -5.09,  $p < .001$ ). That is, BI-YP youths reported lower levels of sexual risk behaviors at baseline compared to STS youths. A model involving a comparison between BI-Y and BI-YP could not be estimated. (Tables reporting these results are available from the senior author upon request.)

There was a possible assessment validity problem for 13 follow-up interview cases completed by a former staff member. These assessments occurred during the first two years of the project and involved several assessments at each follow-up. The analyses reported in the present paper were re-computed with the thirteen cases suspected of having validity issues excluded. The results were unaffected by excluding these cases.

## Discussion

Truant youth represent an at-risk segment of our population. Whereas the extent to which truancy has an etiological role in other functioning problems remains to be fully elucidated, truancy has been associated with an increased risk for problems related to educational, family, personal issues and sexual risk behaviors (e.g., Henry & Huizinga, 2007; Henry & Thornberry, 2010).

As noted in the introduction, this study had four major objectives. First, using growth model analysis, the objective was to determine if a growth model parameterization was consistent with truant youth involvement in sexual risk behavior across five time points. Second, the objective was to assess the impact of a BI targeting youth substance use, as well as demographic and background covariates, on youths' sexual risk behavior over time. That is, the second goal was to examine "spillover" effects of treatment for substance use behavior on sexual risk behavior. Specifically, the first hypothesis for "spillover" effects was: Controlling for demographic and background covariates, youths' receiving BI intervention services (BI-Y, BI-YP) will show a greater reduction in sexual risk behavior over time, compared to youth receiving STS services. The second "spillover" hypothesis was: Controlling for demographic and background covariates, youths' receiving BI-YP intervention services will show a greater reduction in sexual risk behavior over time, compared to youth receiving BI-Y services. The third objective was to identify subgroups of truant youth involved in sexual risk behavior over time. The final objective was to assess the differential, longitudinal effects of the BI on the subgroups of sexual risk behavior for the youths over an 18-month follow-up period.

Regarding the aims and hypotheses informing this study, the results reported partial support. Regarding the first objective, a linear growth model fit the sexual risk longitudinal data. There is evidence to suggest that the youth's sexual risk behavior at various time points is linearly related across time. Pertaining to the second objective, several sociodemographic covariates effects, previously reported, on the youths' sexual risk behavior over time were found. Importantly, however, no significant, overall BI effect was uncovered. Additional analyses, comparing three different intervention conditions ([1] STS vs BI-Y, [2] STS vs BI-YP, and [3] BI-Y vs BI-YP) found no significant level or trend effects. Therefore, the study found no support for the two hypotheses for "spillover" effects.

Relating to study objectives three and four, subgroups of truant youths were identified based on their reported sexual risk behaviors, but the BI intervention had little impact on these subgroups. Latent class analyses indicated a three-group solution best fit the youths' sexual risk data. The largest group of youths (40%) reported high rates of sexual risk behavior over time; a second group (27%) reported low levels of participation in sexual risk behavior

across the five time periods; and a third group of youths (33%) reported involvement in sexual risk behavior reflecting an increase, then a decrease, in sexual risk behavior group. These findings suggest that more than one-third of the sample were consistently engaged in risky sexual practices; while one-third of the sample demonstrated a high risk that changed to lower risk over the study period; and approximately one-quarter of the truant sample consistently engaged in low sexual risk behaviors. Future research should examine what types of risk and protective factors differentiate the subclasses sexual risk behaviors among truant. Such investigations may better inform prevention strategies for sexual risk and other problem behaviors among youth.

Further, growth mixture model (GMM) analyses of the latent classes based on sexual risk behaviors found no significant, overall BI intervention effect (combined BI-Y and BI-YP) on any of the three sexual risk behavior subgroups. Additional analyses, comparing STS vs BI-Y and STS vs BI-YP youth, found only one significant effect: a negative effect on level of BI-YP. Youths involved in the BI-YP intervention had lower baseline sexual risk behaviors compared to youth receiving standard treatment. The BI-YP intervention did not affect changes over time (i.e., trend), however, in sexual risk behaviors. Future research should examine whether these treatment effects hold over a longer period of follow-up.

Based on the results of our analyses, there is little support for the hypotheses specifying any BI effect on the sexual risk behavior data, nor any indication of a differential BI-Y vs BI-YP effect. It is relevant to keep in mind that the BI program does not contain any specific focus on sexual risk behaviors, so the absence of an intervention effect is not surprising. Furthermore, we found no evidence of spillover effects from the BI addressing the youth's drug use to their sexual risk behavior over an 18-month follow-up period. We appreciate that our follow-up period was considerably shorter than the eight or nine year period examined in the previous studies of spillover effects of drug prevention on sexual risk behavior (Ellickson et al., 2009; Griffin et al., 2006). It is possible that the BI may have a greater impact on sexual risk behaviors farther in the future than the 18-month follow-up period. Moreover, previous studies of spillover effects from drug prevention on sexual risk behaviors utilized school-based interventions with greater intensity and frequency involving more than 10 classes on the prevention delivered over one or more academic years. In comparison, the BI program utilized less intensive and less frequent in-home interventions limited to 2-3, 1-1/4 hour sessions with the youths. It may be that the prevention program presented in the current study was too temperate to affect future sexual risk behavior. Future research examining BI spillover effects on sexual risk behavior should consider longer spans of time between treatment and sexual risk outcomes and varying the frequency and intensity of treatment.

At the same time, there is a serious need to provide effective sexual risk reduction intervention services to truant youth. As our latent class analysis indicated, 40% of the youths in the study maintained high risk sexual risk behavior over an 18-month period covered. Recall that sexual risk behaviors included having sexual intercourse, having sexual intercourse without using a condom, and having sex with multiple partners over time. Therefore, 40% of the youths in our study indicated engaging on all three of these behaviors over the 18-month period. A second group, consisting of 33% of the youth, indicated high

levels of these behaviors during first half of the 18-month period, but decreasing involvement during the second half of the 18-month period. Given the health and social consequences associated with sexual risk behaviors, these findings should be alarming to scholars and practitioners interested in truant youth. Furthermore, as our covariate results suggest, brief intervention protocols seeking to reduce youth drug use should also include modules that address sexual risk behavior specifically. Implementing interventions that target both adolescent substance use and sexual risk behavior can provide an opportunity to encourage healthier behavior and may prove beneficial in avoiding adverse outcomes such as STDs and HIV/AIDS.

There were several limitations to this study. First, there were limitations due to the nature of the sample, which consisted, primarily, of truant youth picked up by law enforcement or placed in a diversion program. Hence, the results of the study may not generalize to truant youth who do not have such agency contact/involvement. Second, similar limitations in the previous studies of spillover effects from drug prevention programs on sexual risk behaviors (Griffin et al., 2006; Ellickson et al., 2009), the sexual risk behavior data were based on self-reports. We had no way of validating these data. Third, the truant youth were living in one geographical area. It would be helpful for researchers to consider future studies examining the effects of interventions focusing on one domain of at-risk behavior may have on other risk behavior among youth living in diverse sociodemographic circumstances.

Brief interventions targeting drug use should consider including modules focusing on self efficacy vis-a-vis sexual pressure and beliefs about the links between drug use and sexual risk behavior (Ellickson et al., 2009). We appreciate there are other domains of youth outcome that are important to examine, such as improvements in psychosocial functioning. These will be the subject of other future project studies.

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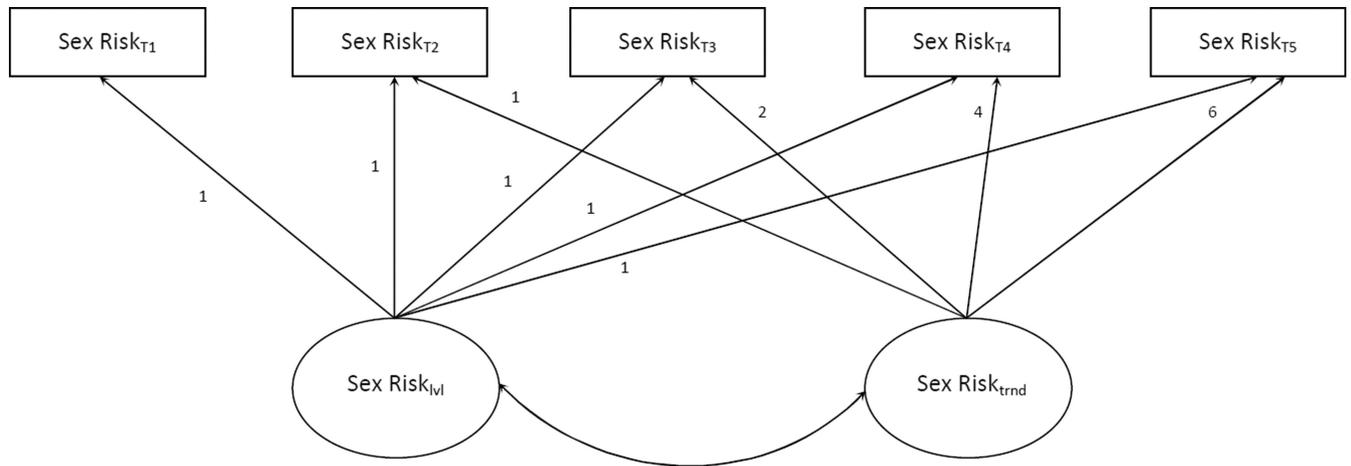
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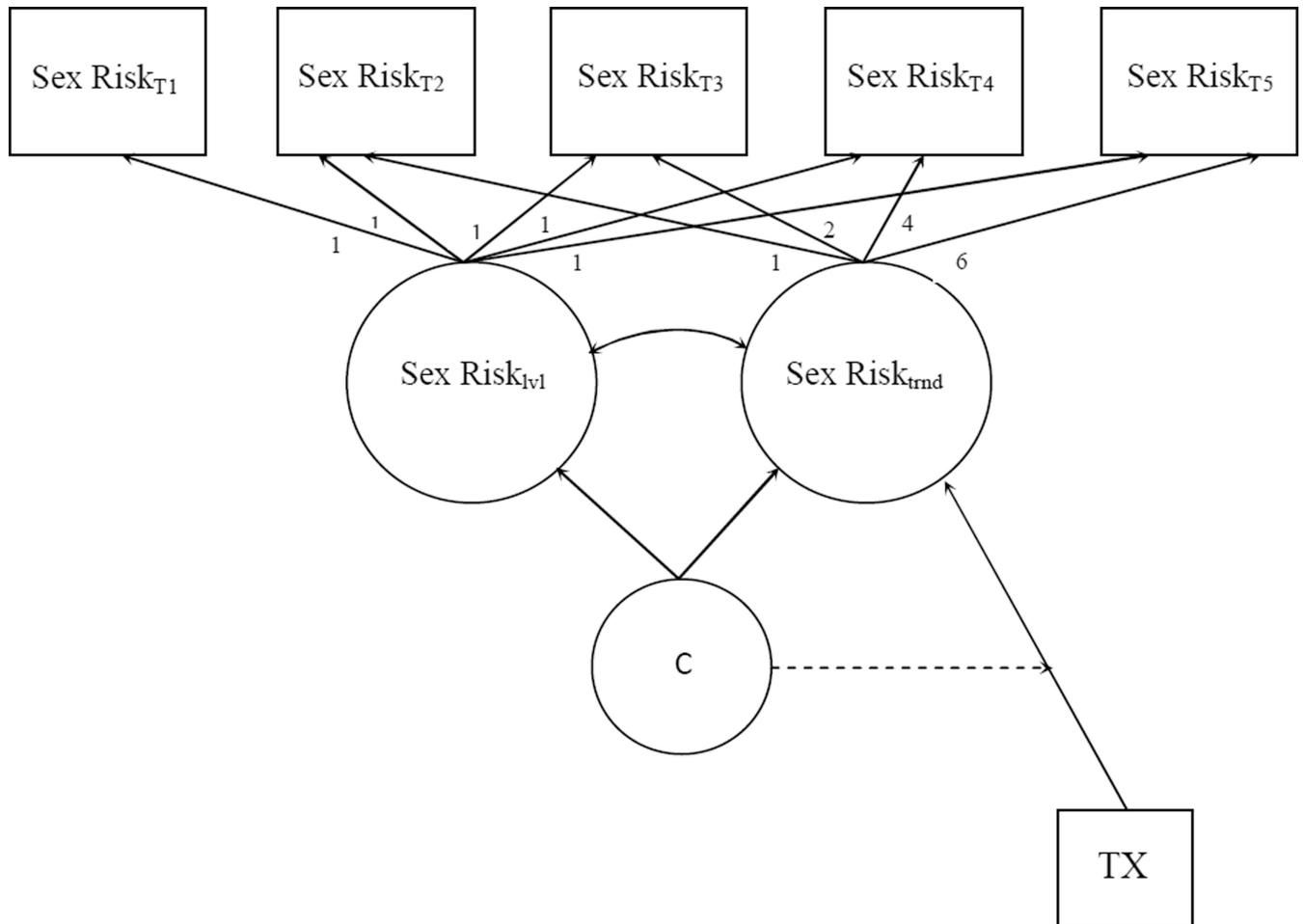
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**Figure 1.**

**Linear Growth Model for Sexual Risk Behavior**

*Note:* Sex Risk<sub>T1</sub>, Sex Risk<sub>T2</sub>, Sex Risk<sub>T3</sub>, Sex Risk<sub>T4</sub>, Sex Risk<sub>T5</sub> = Sexual Risk Behavior at baseline, time 1 (T1) to 18-month follow-up, time five (T5), respectively. Lvl = Latent level (intercept) measure for sexual risk behaviors. Trnd = Latent trend (slope) measure for sexual risk behaviors. The double-headed arrow between Sex Risk<sub>Lvl</sub> and Sex Risk<sub>trnd</sub> indicates the level and trend factors are correlated. The paths for the level growth factor are fixed to 1 to allow the residual variance for the variables to be free. The paths for the trend growth factor are fixed to 0 (not shown), 1, 2, 4, and 6 to define a linear growth model with equidistant (3-months) time points. The 0 time score path from trend to Sex Risk<sub>T1</sub> serves as an initial status factor and is omitted from the figure.



**Figure 2.**

Growth Mixture Model of Intervention Effect on Sexual Risk Behavior Among Sex Risk Behavior Subgroups

*Note:*  $\text{Sex Risk}_{T1}$ ,  $\text{Sex Risk}_{T2}$ ,  $\text{Sex Risk}_{T3}$ ,  $\text{Sex Risk}_{T4}$ ,  $\text{Sex Risk}_{T5}$  = Sexual Risk Behavior at baseline, time 1 (T1) to 18-month follow-up, time five (T5), respectively.  $\text{Lvl}$  = Latent level (intercept) measure for sexual risk behaviors.  $\text{Trnd}$  = Latent trend (slope) measure for sexual risk behaviors.  $C$  = Latent class indicator where the level and trend factors of sexual risk behavior varies across the classes, as indicated by arrows leading to level and trend factors from  $C$ .  $\text{TX}$  = treatment effect for substance use. The broken arrow from  $C$  to  $\text{TX}$  indicates that the slope (trend) in the regression of sexual risk behavior on treatment varies across the classes of  $C$ . The double-headed arrow between  $\text{Sex Risk}_{\text{lvl}}$  and  $\text{Sex Risk}_{\text{trnd}}$  indicates the level and trend factors are correlated. The paths for the level growth factor are fixed to 1 to allow the residual variance for the variables to be free. The paths for the trend growth factor are fixed to 0 (not shown), 1, 2, 4, and 6 to define a linear growth model with equidistant (3-months) time points. The 0 time score path from trend to  $\text{Sex Risk}_{T1}$  serves as an initial status factor and is omitted from the figure.

**Table 1**Sociodemographic Characteristics of the Youths ( $n = 300$ )

Variable			
<i>Gender</i>		<i>Who Youth Lived With:</i>	
Female	37%	Birth mother and father	17%
Male	<u>63%</u>	Birth mother alone	33%
<i>Age</i>		Birth mother and stepfather or boyfriend	23%
11	1%	Birth mother with relative or friend	10%
12	3%	Birth father alone	3%
13	11%	Birth father with stepmother or girlfriend	
14	22%		
15	37%	Birth father with relative or friend	<1%
16	13%	Adoptive parents	3%
17	11%	Grandparent(s)	4%
18*	<1%	Other relative(s)	2%
	98%	Other arrangement	<u>&lt;1%</u>
Mean = 14.80; SD = 1.30			99%
		<i>Annual Family Income Range (n=297)</i>	
<i>Race/Ethnicity</i>		Less than \$5,000	5%
Asian	1%	More than \$5,000 up to \$10,000	8%
African-American	26%	More than \$10,000 up to \$25,000	26%
Hispanic	29%	More than \$25,000 up to \$40,000	28%
Anglo	37%	More than \$40,000 up to \$75,000	23%
Other	<u>7%</u>	More than \$75,000	<u>10%</u>
	100%		100%

\* Turned 18 after enrollment, but before baseline interview

**Table 2**

## Self-Reported Sexual Risk Behaviors: Baseline

	<b>Ever (%) (n=299)</b>
1. Have any of your close friends had sex?	78
2. Have you had any kind of sexual contact with another person?	80
3. Have you had sexual intercourse?	67
4. Have you had sexual intercourse without using a condom?	33
5. Do you find it difficult to use condoms every time you have sex?	12
6. Have you thought you or your partner might be pregnant?	27
7. Have you been or gotten someone pregnant?	5
8. Have you been tested for HIV?	17
9. Have you had sex with two or more people?	30
10. Have you had anal intercourse (sex in the butt)?	5
11. Have you had a sexually transmitted disease (STD)?	3

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**Table 3**  
Percent of Youths Reporting the Sexual Risk Behaviors at Various Time Points

<i>Sexual Risk Behavior</i>	<b>Baseline (n=299)</b>	<b>3 months follow-up (n=282)</b>	<b>6 months follow-up (n=281)</b>	<b>12 months follow-up (n=245)</b>	<b>18 months follow-up (n=215)</b>
Had sexual intercourse	67.0%	62.4%	61.9%	62.8%	63.4%
Had sexual intercourse without using a condom	33.3%	28.4%	31.7%	33.5%	36.2%
Had sex with two or more people	29.7%	32.3%	33.6%	33.8%	33.7%
Had a sexually transmitted disease (STD)	2.7%	1.4%	2.1%	2.6%	3.7%
<i>Number of Sexual Risk Behaviors</i>					
0	32.4%	36.9%	36.7%	30.2%	25.8%
1	23.7%	19.1%	18.9%	21.6%	18.8%
2	23.7%	27.3%	25.3%	26.5%	29.6%
3	18.7%	16.3%	18.5%	20.8%	24.9%
4	1.3%	0.4%	0.7%	0.8%	0.9%

**Table 4**Linear Growth Model of Youths' Sexual Risk Behavior ( $n = 300$ )

WLSMV Estimates	Estimate	SE	Critical-Ratio
<i>Means:</i>			
Level	0.000	0.000	999.000
Trend	0.042	0.011	3.669***
<i>Level:</i>			
Sexual Risk T1	1.000	0.000	999.000
Sexual Risk T2	1.000	0.000	999.000
Sexual Risk T3	1.000	0.000	999.000
Sexual Risk T4	1.000	0.000	999.000
Sexual Risk T5	1.000	0.000	999.000
<i>Trend:</i>			
Sexual Risk T1	0.000	0.000	999.000
Sexual Risk T2	1.000	0.000	999.000
Sexual Risk T3	2.000	0.000	999.000
Sexual Risk T4	4.000	0.000	999.000
Sexual Risk T5	6.000	0.000	999.000
<i>Covariances:</i>			
Trend with level	-0.030	0.012	-2.463*
<i>Thresholds:</i>			
Sexual Risk T1\$1	-0.322	0.064	-5.025***
Sexual Risk T1\$2	0.180	0.062	2.926**
Sexual Risk T1\$3	0.890	0.071	12.551***
Sexual Risk T2\$1	-0.322	0.064	-5.025***
Sexual Risk T2\$2	0.180	0.062	2.926**
Sexual Risk T2\$3	0.890	0.071	12.551***
Sexual Risk T3\$1	-0.322	0.064	-5.025***
Sexual Risk T3\$2	0.180	0.062	2.926**
Sexual Risk T3\$3	0.890	0.071	12.551***
Sexual Risk T4\$1	-0.322	0.064	-5.025***
Sexual Risk T4\$2	0.180	0.062	2.926**
Sexual Risk T4\$3	0.890	0.071	12.551***
Sexual Risk T5\$1	-0.322	0.064	-5.025***
Sexual Risk T5\$2	0.180	0.062	2.926**
Sexual Risk T5\$3	0.890	0.071	12.551***
<i>Variances:</i>			
Level	0.690	0.051	13.448***
Trend	0.011	0.003	3.728***

WLSMV Estimates	Estimate	SE	Critical-Ratio
<i>Scales:</i>			
Sexual Risk T1	1.000	0.000	999.000
Sexual Risk T2	1.078	0.045	24.156***
Sexual Risk T3	1.048	0.051	20.374***
Sexual Risk T4	1.061	0.074	14.318***
Sexual Risk T5	0.092	0.105	10.427***

Two-tailed p-values:

\*  
p<.05;

\*\*  
p<.01;

\*\*\*  
p<.001

$\chi^2=20.31$ ;  $df=14$ ;  $p=0.12$ ; RMSEA=0.039; CFI=0.997; TLI=0.998; WRMR=0.660

*Note:* T1 = Ever or before baseline interview; T2 = During first follow-up period (after 3 months); T3 = During second follow-up period (after 6 months); T4 = During third follow-up period (after 12 months); T5 = During fourth follow-up period (after 18 months).

**Table 5**

Linear Growth Model of Youths' Sexual Risk Behavior with Covariates

WLSMV Estimates	Estimate	SE	Critical-Ratio
<i>Regression Weights:</i>			
Level on age	0.149	0.047	3.142**
Level on gender (1=female)	0.045	0.119	0.374
Level on family income level	0.112	0.049	2.282*
Level on who youth lives with (1=mother only)	-0.176	0.124	-1.423
Level on race (1=African-American)	0.375	0.151	2.487*
Level on ethnicity (1=Hispanic)	0.149	0.140	1.068
Level on trauma	0.077	0.034	2.260*
Level on marijuana use	0.332	0.068	4.868***
Level on intervention (1=BI-Y + BI-YP)	0.127	0.120	1.066
Trend on age	-0.011	0.012	-0.933
Trend on gender (1=female)	0.004	0.025	0.158
Trend on family income level	0.002	0.015	0.135
Trend on who youth lives with (1=mother only)	0.029	0.024	1.201
Trend on race (1=African-American)	-0.061	0.030	-2.059*
Trend on ethnicity (1=Hispanic)	-0.037	0.027	-1.376
Trend on trauma	-0.002	0.010	-0.183
Trend on marijuana use	-0.025	0.020	-1.265
Trend on intervention (1=BI-Y + BI-YP)	0.006	0.027	0.217
<i>Intercepts:</i>			
Level	0.000	0.000	999.000
Trend	0.270	0.265	1.017
<i>Covariances:</i>			
Trend with level	-0.039	0.033	-1.198
<i>Thresholds:</i>			
Sexual Risk T1\$1	3.453	0.743	4.644***
Sexual Risk T1\$2	3.965	0.743	5.336***
Sexual Risk T1\$3	4.681	0.783	5.975***
Sexual Risk T2\$1	3.453	0.743	4.644***
Sexual Risk T2\$2	3.965	0.743	5.336***
Sexual Risk T2\$3	4.681	0.783	5.975***
Sexual Risk T3\$1	3.453	0.743	4.644***
Sexual Risk T3\$2	3.965	0.743	5.336***
Sexual Risk T3\$3	4.681	0.783	5.975***
Sexual Risk T4\$1	3.453	0.743	4.644***
Sexual Risk T4\$2	3.965	0.743	5.336***

WLSMV Estimates	Estimate	SE	Critical-Ratio
Sexual Risk T4\$3	4.681	0.783	5.975***
Sexual Risk T5\$1	3.453	0.743	4.644***
Sexual Risk T5\$2	3.965	0.743	5.336***
Sexual Risk T5\$3	4.681	0.783	5.975***
<i>Residual Variances:</i>			
Level	0.625	0.071	8.852***
Trend	0.011	0.005	2.207*
<i>Scales:</i>			
Sexual Risk T1	1.000	0.000	999.000
Sexual Risk T2	1.131	0.124	9.123***
Sexual Risk T3	1.104	0.201	5.501***
Sexual Risk T4	1.155	0.396	2.915**
Sexual Risk T5	1.272	0.720	1.767

Two-tailed p-values:

\* p<.05;

\*\* p<.01,

\*\*\* p<.001

Note:  $\chi^2=42.92$ ;  $df=41$ ;  $p=0.39$ ; RMSEA=0.013; CFI=0.999; TLI=0.998; WRMR=0.530; T1 = Ever or before baseline interview; T2 = During first follow-up period (after 3 months); T3 = During second follow-up period (after 6 months); T4 = During third follow-up period (after 12 months); T5 = During fourth follow-up period (after 18 months).

**Table 6** Linear Growth Model of Youths' Sexual Risk Behavior with Covariates: Fitted for Females ( $n = 110$ ) and Males ( $n = 187$ ) Separately

WLSMV Estimates	Females			Males		
	Estimate	SE	Critical Ratio	Estimate	SE	Critical Ratio
<i>Regression Weights:</i>						
Level on age	0.204	0.110	1.860	0.277	0.115	2.420*
Level on family income level	0.199	0.115	1.741	0.124	0.118	1.050
Level on who youth lives with (1=mother only)	-0.335	0.247	-1.355	-0.233	0.275	-0.848
Level on race (1=African-American)	0.612	0.370	1.655	0.452	0.319	1.419
Level on ethnicity (1=Hispanic)	0.299	0.255	1.173	0.147	0.346	0.423
Level on trauma	0.138	0.083	1.665	0.109	0.077	1.415
Level on marijuana use	0.439	0.206	2.130*	0.523	0.181	2.896**
Level on intervention	0.042	0.206	0.204	0.367	0.294	1.248
Trend on age	-0.044	0.024	-1.808	-0.027	0.018	-1.467
Trend on family income level	-0.017	0.021	-0.814	0.010	0.024	0.417
Trend on who youth lives with	0.084	0.057	1.471	0.037	0.044	0.843
Trend on race	-0.131	0.077	-1.711	-0.047	0.053	-0.885
Trend on ethnicity	-0.136	0.072	-1.905	-0.005	0.054	-0.092
Trend 1 on trauma	-0.018	0.018	-0.991	-0.006	0.014	-0.388
Trend on marijuana use	-0.035	0.046	-0.772	-0.062	0.029	-2.154*
Trend on intervention	0.042	0.059	0.721	-0.040	0.047	-0.863
<i>Intercepts:</i>						
Level	1.253	2.633	0.476	0.000	0.000	999.000
Trend	0.925	0.483	1.915	0.620	0.326	1.901
<i>Covariances:</i>						
Trend with level	-0.007	0.071	-0.105	-0.247	0.084	-2.953**
<i>Thresholds:</i>						
Sexual Risk T1\$1	6.160	1.814	3.396***	6.160	1.814	3.396***
Sexual Risk T1\$2	6.795	1.872	3.631***	6.795	1.872	3.631***

WLSMV Estimates	Females			Males		
	Estimate	SE	Critical Ratio	Estimate	SE	Critical Ratio
Sexual Risk T1\$3	7.683	1.983	3.875***	7.683	1.983	3.875***
Sexual Risk T2\$1	6.160	1.814	3.396***	6.160	1.814	3.396***
Sexual Risk T2\$2	6.795	1.872	3.631***	6.795	1.872	3.631***
Sexual Risk T2\$3	7.683	1.983	3.875***	7.683	1.983	3.875***
Sexual Risk T3\$1	6.160	1.814	3.396***	6.160	1.814	3.396***
Sexual Risk T3\$2	6.795	1.872	3.631***	6.795	1.872	3.631***
Sexual Risk T3\$3	7.683	1.983	3.875***	7.683	1.983	3.875***
<i>Thresholds:</i>						
Sexual Risk T4\$1	6.160	1.814	3.396***	6.160	1.814	3.396***
Sexual Risk T4\$2	6.795	1.872	3.631***	6.795	1.872	3.631***
Sexual Risk T4\$3	7.683	1.983	3.875***	7.683	1.983	3.875***
Sexual Risk T5\$1	6.160	1.814	3.396***	6.160	1.814	3.396***
Sexual Risk T5\$2	6.795	1.872	3.631***	6.795	1.872	3.631***
Sexual Risk T5\$3	7.683	1.983	3.875***	7.683	1.983	3.875***
<i>Residual Variances:</i>						
Sexual Risk T1	0.605	0.591	1.025	1.000	0.000	999.000
Sexual Risk T2	0.211	0.161	1.315	0.892	0.408	2.185*
Sexual Risk T3	0.330	0.230	1.433	0.684	0.345	1.986*
Sexual Risk T4	0.245	0.186	1.317	0.578	0.368	1.572
Sexual Risk T5	0.280	0.336	0.833	0.000	0.000	999.000
Level	0.617	0.529	1.167	2.190	0.711	3.083**
Trend	0.008	0.009	0.863	0.036	0.013	2.902**

Two-tailed p-values:

\* p<.05;

\*\* p<.01;

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Note:  $\chi^2=81.61$ ;  $df=78$ ;  $p=0.37$ ;  $RMSEA=0.018$ ;  $CFI = 0.997$ ;  $TLI = 0.996$ ;  $WRMR = 0.770$ ; T1 = Ever or before baseline interview; T2 = During first follow-up period (after 3 months); T3 = During second follow-up period (after 6 months); T4 = During third follow-up period (after 12 months); T5 = During fourth follow-up period (after 18 months)