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Dexter R. Voisin  
*Case Western Reserve University, drv22@case.edu*

Author(s) ORCID Identifier:

[Dexter R. Voisin](#)

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## A LONGITUDINAL EXAMINATION OF THE RELATIONSHIP BETWEEN SEXUAL SENSATION SEEKING AND STI-RELATED RISK FACTORS AMONG AFRICAN AMERICAN FEMALES

Dexter R. Voisin, Kevin Tan, and Ralph J. DiClemente

Sexual sensation seeking has been correlated with STI-related risk factors in numerous cross sectional studies. However, no current studies have examined whether sexual sensation seeking is longitudinally related to a broad spectrum of STI-related factors such as consistent condom use, number of sexual partners, frequency of partner sexual communication, self-efficacy to refuse sex, and fear of condom negotiation. We explored these relationships over a 12-month period among a sample of 715 African American females attending three STI clinics in Georgia that were recruited into a larger randomized clinic intervention study. Utilizing A-CASI technology to assess all self-reported measures and employing general estimation equations while controlling for age, peer norms, school enrollment and employment, major results indicated that higher sexual sensation seeking predicted lower percent of condom use in the last 14 and 60 days, lower consistent condom use and a higher number of lifetime sexual partners. Additionally, higher sexual sensation seeking predicted lower partner sexual communication, diminished self-efficacy to refuse sex, and a higher fear of condom negotiation. Findings suggest that STI/HIV prevention/intervention programs should assess for and target sexual sensation seeking behaviors in such efforts.

In the United States, adolescents and those who African American report the highest rates of sexually transmitted infections (STIs; Centers for Disease Control and Prevention, 2009). For instance, females compared to males, report rates of STIs (e.g., chlamydia) that are 2.5 times more than their male counterparts (Centers for Disease Control and Prevention, 2011). In addition, African-American females be-

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Dexter R. Voisin and Kevin Tan are affiliated with University of Chicago, School of Social Service Administration; Dexter R. Voisin, Kevin Tan, and Ralph J. DiClemente are associated with the STI/HIV Intervention Network; Ralph J. DiClemente is affiliated with Emory Center for AIDS Research, Department of Behavioral Sciences & Health Education, Rural Center for AIDS/STD Prevention at Indiana University, Emory University School of Medicine, Department of Medicine, and Emory University School of Medicine, Department of Pediatrics.

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Address correspondence to Dexter R. Voisin, PhD; School of Social Service Administration; University of Chicago, 969 E. 60th St.; Chicago, IL 60637; E-mail: d-voisin@uchicago.edu

tween ages 15 to 19, are 44 and 21 times, 95 times and 61 times more likely to be infected with gonorrhea and chlamydia, respectively, than their Latina and white female counterparts (Centers for Disease Control and Prevention, 2009). Behaviorally, epidemiological data suggests that consistent condom use, especially within the context of fewer sex partners are among some of the behavioral measures that have been associated with lower rates of STIs (Centers for Disease Control and Prevention, 2009).

The role of sexual sensation seeking (SSS) is one factor that has received increasing attention as a possible correlate of STI-related risk behaviors (Voisin, King, Schneider, DiClemente, & Tan, 2012). SSS is defined as a fondness for thrilling, optimal, and novel levels of sexual stimulation and arousal (Kalichman et al., 1994). Persons prone to SSS are often predisposed to adventure and frequently seek novel and unusual sexual experiences. Consequently such persons may engage in unprotected sex with multiple partners as a way of satisfying their need for novel stimulation and excitement (Boyle, Murray, & Boekeloo, 2002; Kalichman & Rompa, 1995; Reece, Dodge, & Cole, 2002). Several studies, mainly with sexual minorities have established that SSS is an established correlate of risky sexual behaviors (e.g., unprotected sex; Chng & Geliga-Vargas, 2000; Crawford et al., 2003; Dolezal, Meyer-Bahlburg, Remien, & Petkova, 1997; Kalichman et al., 1994; Kalichman, Heckman, & Kelly, 1996; Kalichman, Weinhart, & DiFonzo, 2002; McCoul & Haslam, 2001). The majority of these studies are conducted with mostly white male populations (Crawford et al., 2003; Dolezal et al., 1997; Kalichman et al., 1996; McCoul & Haslam, 2001) and homosexual men (Crawford et al., 2003; Kalichman, Heckman, & Kelly, 1996; McCoul & Haslam, 2001). In addition, prior studies have included mixed samples and usually did not control for ethnic differences. Unfortunately, fewer studies have examined the relationship between SSS and risky sex among heterosexual youth and especially among those who are female (Gullette & Lyons, 2005; Spitalnick et al., 2007). More importantly, there is a dearth of studies which have examined the relationship between SSS and risky sex using prospective data (Kalichman et al., 1994, 1996; McCoul & Haslam, 2001). Currently, only one study has explored longitudinally whether SSS predicts sexual behaviors among African-American youth ages 9 to 15 (Stanton, Li, Cottrell, & Kalijee, 2001). In this study, high sexual sensation seeking predicted the onset of sexual activity (i.e. vaginal sex). However, this study only examined the onset of sexual activity and not actual sexual risk behaviors. While sexual onset is an appropriate outcome given that the incidence of sexual activity is relatively low among females in this age range (9 to 15 years) it is important not to pathologize sexual activity. This is important because sexual activity is a normal part of healthy adolescent development (Santrock, 2001) and from a public health standpoint we rather need to evaluate risky sex versus sexual onset. Additionally, from a developmental standpoint, ages 15 to 24 represents a significant period of sexual activity and child bearing, therefore risky sex and STIs that occurs during this period culminates in high individual, medical, and social costs (Centers for Disease Control and Prevention, 2009). In summary, we need more longitudinal research which will help us to better understand whether SSS is related to known behavioral STI risk factors such as number of sexual partners and sex without condoms.

In addition, we also need a clearer understanding of whether SSS is related to relational dynamics which have been empirically shown to be associated with lower rates of risky sex and STIs (Crosby et al., 2002; Salazar et al., 2005). For instance, partnered sex by definition involves two persons, and a number of studies

provide evidence that several relational dynamics influence sexual behaviors. Gender power and male privilege in sexual relations would theoretically suggest that men hold more power than women during sexual negotiation (Wingood & DiClemente, 2002). Therefore, especially for females having greater self-efficacy in using condoms (Bandura, 1994; Jemmott, Jemmott, Spears, Hewitt, & Crfuz-Collins, 1992), being more confident in one's ability to communicate with an intimate partner about sex (Crosby et al., 2002; DiClemente, Wingood, Crosby, Harrington, & Davies, 2001) having the capacity to refuse sex without condoms (Sionean et al., 2002), and being less fearful about negotiating condom use (DiClemente et al., 2009; Wingood & DiClemente, 2002) are established correlates of unsafe sexual practices.

In examining the relationships between SSS and STI-related relational dynamics and unsafe sex it is important to control for several potentially confounding variables. Age is likely to be an important consideration given that younger girls may be more vulnerable to gender inequalities during sexual negotiation (Türmen, 2003). In addition, SSS as well as STI risk behaviors are thought to increase during the period of adolescence through young adulthood. Although SSS is generally considered a personality trait (DiClemente et al., 2010; Kalichman et al., 1994; Spitalnick et al., 2007), the expression of such behaviors might increase during adolescence when youth have more autonomy. Education is also likely to be another potential confounder given that more highly educated females might have greater control of their lives and subsequently may demonstrate more relational power during sexual encounters (Voisin, Tan, Diclemente, 2012). Furthermore, females who are employed and have a job may have more to protect in terms of "personal and future assets" and may demonstrate lower rates of SSS and risky sex (Voisin, Tan et al., 2012). Finally, perceived negative peer norms have been empirically and theoretically identified as a significant confounder of sexual sensation seeking and STI risks (DiClemente, Salazar, & Crosby, 2007; Kalichman et al., 1994; Spitalnick et al., 2007) such that high risk takers may tend to cluster together by seeking out persons with similar dispositions.

In summary, this study makes several important contributions to the extant literature by: (1) focusing on African American females ages 15 to 21 who have the highest incidence of STIs compared to their other female counterparts; (2) examining the relationship between SSS on a broader number of established STI risk proxies (e.g., frequency of condom use, number of sexual partners, frequency of partner sexual communication, self-efficacy to refuse sex, and fear of condom use); (3) examining the relationships between SSS and STI-related risk behaviors longitudinally over a 12-month period; and (4) exploring for the effects of SSS on STI-related risk behaviors while controlling for the possible effects of age, education, employment, and perceived peer norms.

## METHODS

### SAMPLE AND PROCEDURE

From March 2002 to August 2004, African American adolescent females ( $n = 715$ ), 15 to 21 years were recruited from three comparable clinics in downtown Atlanta, Georgia. These clinics were comparable because they served similar demographics, were part of the same public health care system, had comparable staffing patterns, and were located in the city of Atlanta. These clinics became sites for a randomized

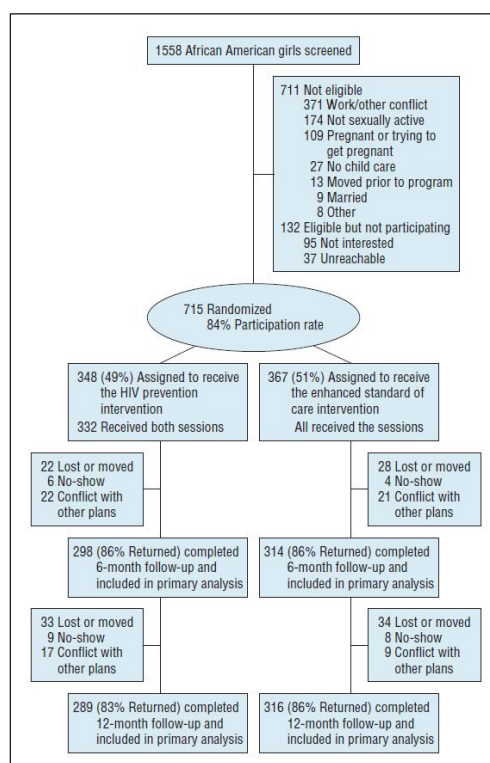


TABLE 1 . Participant Allocation to Randomized Clinical Intervention (From DiClemente et al., 2009)

clinical intervention to reduce incidences of STIs (Table 1). Selection criteria for this study were participants who self-identified as African American, were between the ages 15 to 21, reported vaginal intercourse in the past 60 days, were not married, currently pregnant, or attempting to get pregnant, and provided informed consent. If participants changed their intention to get pregnant between waves, this resulted in study exclusion. Of the eligible participants, 84.4% ( $N = 715$ ) enrolled in the study, completed baseline assessments and were randomized to study conditions. The intervention (HORIZONS) consisted of three components: (1) administering two 4-hour group STI/HIV prevention sessions, (2) providing vouchers to participants to give to their male sexual partners to facilitate STI screening/treatment, and (3) administering four brief telephone booster sessions to reinforce group intervention content. Three hundred and forty-eight participants (49%) were assigned to HIV intervention and 367 (51%) received enhanced standard of care intervention. There were no significant baseline differences in variables across study conditions, and study methods and interventions are described in greater detail elsewhere (DiClemente et al., 2009). Because participants were part of a randomized control trial, randomization ensured that any potentially confounding participant characteristics were equally assigned to each study arm. To further control for the effects of any potentially confounding variables, we included employment and school enrollment as covariates. Follow-up data was assessed at 6 and 12 months. The 12-month retention rate was 83%. Audio computer-assisted self-interview (ACASI) was used to

assess all measures, which enhances data accuracy, increase participants' comfort when answering sensitive questions and eliminates low literacy as a potential problem (Zimmerman, Atwood, & Cupp, 2006). Participants were compensated \$25 for their study involvement. The Emory University Institutional Review Board approved all study protocols.

## MEASURES

*Sexual Sensational Seeking.* This variable was assessed by a nine-item scale previously validated for African American youth (DiClemente et al., 2010): I enjoy having sex on the spur of the moment, Having sex with a new partner is exciting to me, Stopping to use a condom during sex takes the fun out of sex, When it comes to sex, I'm willing to try anything, I act out sexual scenes from movies/videos, I like to try new positions when having sex, I enjoy the thrill of having sex in public places, I use sex toys to make sex more exciting, and I have sex with guys I meet on telephone chat-lines or on the Internet (1 = Strongly disagree to 4 = Strongly Agree). In this study, the Cronbach alpha for this scale was 0.72.

*Sexual Communication Frequency with male partners about safer sex.* This was assessed using an established five-item scale (DiClemente et al., 2009; Wingood & DiClemente, 2002); e.g., During the past 60 days, how many times have you and your boyfriend or sex partners(s) talked about how to prevent STIs? (1 = Never to 4 = 7 or more times). This scale had a good Cronbach alpha of 0.84.

*Refusal to Have Sex Self-Efficacy.* This was based on a previously validated seven-item scale (DiClemente et al., 2009; Wingood & DiClemente, 2002); e.g., How sure are you that you would be able to say no to having sex with someone you have known for a few days or less? (1 = I definitely can't say no to 4 = I definitely can say no). The Cronbach alpha for this scale was very good at 0.87.

*Fear of Condom Negotiation.* This was measured using a previously validated eight-item scale (DiClemente et al., 2009; Wingood & DiClemente, 2002); e.g., I have been worried that if I talked about using condoms with my boyfriend or sex partner he would ignore my request (1 = Never to 5 = Always). The Cronbach alpha for this scale was good at 0.84.

*Total Number of Lifetime Sexual Partners.* This was measured based on a single question asking participants the total number of men that had vaginal sex with them in their entire life.

*Percentage of Condom Use (14 Days and 60 Days).* This was calculated as the number of times a condom was used during vaginal intercourse divided by the total number of vaginal intercourse occasions (DiClemente et al., 2009). These two time frames were chosen in order to reduce recall error and are consistent.

*Consistent Condom Use (14 days and 60 days).* This is a binary-coded variable that was defined as the use of a condom on every sexual episode (1 = Yes; 0 = No). Although similar to the earlier measure of percentage of condom use, consistency in condom use is considered a stronger protective measure against STIs than proportion of condom use (DiClemente et al., 2009).

TABLE 2. Comparability Between Study Conditions at Baseline

	Mean (SD)	
	STD/HIV Intervention ( <i>n</i> = 348)	Enhanced Standard of Care ( <i>n</i> = 367)
Age	17.79 (1.71)	17.78 (1.73)
School enrollment, <i>n</i> (%)	230 (66.1%)	237 (64.6%)
Employment, <i>n</i> (%)	106 (30.5)	104 (28.3)
Peer norms supporting risk	20.25 (4.92)	20.44 (4.80)
Sexual sensation seeking	17.41 (3.79)	17.65 (4.10)
Partner sexual communication frequency	11.58 (4.55)	11.37 (4.09)
Refusal self-efficacy	24.49 (4.04)	24.50 (3.62)
Fear of condom negotiation	10.21 (4.29)	10.15 (4.13)
Total lifetime sexual partners	8 (10.83)	9.2 (24.45)
Condom use in past 14 days	50.42 (44)	53.28 (45)
Condom use in past 60 days	51.00 (41)	52.22 (41)
Consistent condom use 14 days, <i>n</i> (%)	97 (35.1)	128 (41.6)
Consistent condom use 60 days, <i>n</i> (%)	69 (23.1)	86 (27.2)

*Covariates: Age, School Enrollment, Employment and Perceived Peer Norms.* Age was based on participants' self-reports. School enrollment was assessed by one item "Are you currently attending school?" Employment was assessed by one item "Do you have a job for which you are paid?" Perceived risky peer norms were based on an established eight-item scale that evaluates participant's perception of their friends' risky sexual practices (DiClemente et al., 2009; Wingood & DiClemente, 2002); e.g., How many of your friends do you think are having sex without condoms? (1 = None to 5 = All). Higher scores indicate greater perceived peer norms supporting risky sexual behavior. The Cronbach alpha for this scale was 0.68.

## STATISTICAL ANALYSES

Univariate analyses described the overall sample. Generalized estimating equation (GEE) regression models were used to evaluate the influence of SSS on STI-related risk factors over the 6-month and 12-month follow-up for an average participant. The strength of GEE models lies in its ability to control for repeated within-subject measurements over the longitudinal course of the study. In this study, the use of GEE models allow us to take into account the 6-month and 12-month follow-up results for each participant in our analyses. Interpretation of GEE regression coefficients are similar to linear regression models (for continuous outcome variables) and logistic models (for categorical outcome variables). SSS at baseline was used to predict STI-related risk factors over the 12-month period. All fitted models were adjusted for intervention effects.

## RESULTS

The analytical sample comprised of 715 African American females aged 15–21 years. As shown in Table 2 both groups were comparable across all major study variables at baseline. Their mean age at baseline was 17.8 (*SD* = 1.7). At baseline risky peers

TABLE 3. Generalized Estimating Equations Models: Effects of Sexual Sensation Seeking on STI-Related Risk Factors (Baseline to 12-Month Assessment)

	OLS Regression				Logistic Regression			
	Partner sexual communication frequency	Refusal self-efficacy	Fear of condom negotiation	# of total lifetime sexual partners	% condom use 14 days	% condom use 60 days	Consistent condom use 14 days Odds Ratio (95% CI)	Consistent condom use 60 days Odds Ratio (95% CI)
<sup>1</sup> Model A: Age	-0.22*	-0.08	0.07	0.72**	-0.04***	-0.03***	0.87*** (0.80-0.94)	0.92* (0.84-0.99)
<sup>1</sup> Model B: Peer Norms	-0.04	-0.08***	0.14***	0.39***	-0.01***	-0.01***	0.94*** (0.91-0.97)	0.92*** (0.89-0.95)
<sup>1</sup> Model C: School Enrollment	0.42	0.45	-0.59*	-7.03***	0.10**	0.07*	1.46* (1.07-1.97)	1.22 (0.89-1.66)
<sup>1</sup> Model D: Employment	-0.40	0.20	-0.18	-0.11	-0.01	0.01	0.88 (0.67-1.15)	0.94 (0.72-1.23)
<sup>1</sup> Model E: Sexual Sensation Seeking	-0.14***	-0.11***	0.17***	1.08***	-0.02***	-0.02***	0.92*** (0.89-0.96)	0.91*** (0.87-0.94)
<sup>1</sup> Model F: Sexual Sensation Seeking + age + peer norms + School Enrollment + Employment	-0.14***	-0.11***	0.14***	0.92***	-0.01**	-0.01***	0.93*** (0.89-0.97)	0.92*** (0.88-0.96)

Note. <sup>1</sup>Controlled for intervention effects. \* $p \leq .05$ . \*\* $p \leq .01$ . \*\*\* $p \leq .001$ .



norms mean was 20.3 (Range 8–40;  $SD = 4.9$ ) and SSS mean was 17.5 (Range 9–36;  $SD = 3.9$ ). Mean sexual communication frequency was 11.5 (Range 5–20;  $SD = 4.3$ ), refusal to have sex self efficacy mean was 24.5 (Range 7–28;  $SD = 3.8$ ), fear of condom negotiation mean was 10.2 (Range 9–36;  $SD = 4.2$ ).

As shown in Table 3, models A, B, and C reported the independent effects of age, peer norms, and SSS on STI-related outcomes respectively. Model D reported the effects of SSS on STI-related outcomes controlling for age, peer norms, and intervention effects. As shown in Table 3, after controlling for intervention effects, age, peer norms, school enrollment, and employment (Model F), over the entire 12-month period, higher SSS predicted diminished sexual partner communication frequency ( $\beta = -0.14$ ;  $p \leq .001$ ), reduced self-efficacy to refuse sex ( $\beta = -0.11$ ;  $p \leq .001$ ), increased fear of condom negotiation ( $\beta = 0.14$ ;  $p \leq .001$ ) and more lifetime sexual partners  $\beta = 0.92$ ;  $p \leq .001$ ). Additionally, higher SSS predicted a lower proportion of condom use over 14 days ( $\beta = -0.01$ ;  $p \leq .01$ ) and 60 days ( $\beta = -0.01$ ;  $p \leq .001$ ). Furthermore, a one-unit increase in sexual sensation seeking was associated with 7% lower odds of consistent condom use in the last 14 days (Adjusted OR = 0.93; 95% CI [0.89, 0.97]) and 8% lower odds of consistent condom use in the last 60 days (Adjusted OR = 0.92; 95% CI [0.88, 0.96]). There were no differences in SSS based on group assignment.

## DISCUSSION

This is the first study to longitudinally examine the relationship between SSS and a broad spectrum of STI-related factors among African American females. Findings from this study provide evidence that higher SSS, even after controlling for the effects of age, employment, school enrollment, and risky peer norms is longitudinally predictive of a broad spectrum of STI-related risk factors such as lower percentage of condom use in the last 14 and 60 days, lower consistency of condom use, a higher number of lifetime sexual partners, lower partner sexual communication, diminished self-efficacy to refuse sex, and a higher fear of condom negotiation. Prior cross sectional studies, mostly with sexual minorities who are white males have indicated that SSS is associated with risky sex behaviors (Chng & Geliga-Vargas, 2000; Crawford et al., 2003; Dolezal et al., 1997; Kalichman, Heckman, & Kelly, 1996; Kalichman, Weinhart, & DiFonzo, 2002; McCoul & Haslam, 2001). Additionally, a handful of studies which included mostly mixed female samples have noted similar findings between SSS and risky sexual behaviors (Gaither & Sellbom, 2003; Hendershot, Stoner, George, & Norris, 2007; Jones, 2004; Stanton et al., 2001). These prior studies reported SSS means that ranged from 13.3 to 22.1 (Gaither & Sellbom, 2003; Jones, 2004; Stanton et al., 2001), which was inclusive of the mean (17.5) reported in this study. The present study extended prior research in several ways. Using prospective data it clarified the temporal ordering between SSS and STI-related risk behaviors. It examined these relationships among a population of females who report the highest incidence of STIs—African American females. Finally, it clarified these relationships using a wide spectrum of STI-related predictors.

These study findings have several important implications for STI/HIV prevention. However, several limitations first warrant discussion. These study findings are limited to young African American girls in Georgia attending STI clinics and those attending STI clinics in similar urban cities. Findings are also limited by the use of self-reported data, although we used sophisticated A-CASI technology, which has

been shown to reduce inaccurate recall, under-reporting and socially desirable responses (Zimmerman et al., 2006).

Given the high rates of STIs among this population (Centers for Disease Control and Prevention, 2009) these findings have important prevention/intervention implications. Interventions that aim to enhance protective STI behaviors should assess for SSS among young African American females. Additionally, eroticizing safer sex massages (Roberti, 2004) and using highly novel stimulation to tailor embedded prevention messages may be effective STI/HIV prevention and intervention strategies for females who are sexual sensation seekers (Jones, 2004). Moreover, given that SSS does reliably associate with STI-related risk, clinicians and interventionists might also need to focus on the developmental and familial factors that contribute to adolescents desiring SSS. Such a focus might enhance the development of intervention approaches that target potential underlying mechanisms (Kalichman et al., 1994). Moreover, although sexual education alone does not automatically translate into lower STI risk behaviors, the absence or presence of such information has been shown to be associated with lower rates of risky sex even among populations that are disproportionately impacted by STIs (Voisin, Tan, & DiClemente, 2012). Consequently, it would be important to provide adolescent females with comprehensive sexual information in addition to risk reduction strategies for these who report high SSS and may not be willing to modify their behavioral risk but may be open to reducing the level of risk associated with such behavioral practices.

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