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Relationships Between Future Orientation, Impulsive Sensation Seeking, and Risk Behavior Among Adjudicated Adolescents

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Abstract

Because of high levels of risk behavior, adjudicated adolescents are at high risk for negative health outcomes such as nicotine and drug addiction and sexually transmitted diseases. The goal of this article is to examine relationships between future orientation and impulsive-sensation-seeking personality constructs to risk behaviors among 300 adjudicated adolescents. Significant relationships between impulsive sensation seeking and future orientation were found for several risk behaviors. Individuals with more positive future orientation were less likely to use marijuana, hard drugs, alcohol during sex, had fewer alcohol problems, had lower levels of alcohol frequency and quantity of use, and perceived greater risks associated with such behaviors. Higher impulsivity reliably predicted alcohol problems, alcohol use, condom use, and cigarette smoking.

Keywords

future orientation; impulsivity; sensation seeking; adolescent; risk behavior

Adolescents often underestimate their chances for negative outcomes (Quadrel, Fischoff, & Davis, 1993), thus making risk behaviors, such as alcohol use, drug use, and cigarette smoking, more likely. Early and acute drug and alcohol use can be linked to high school dropout

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(Newcomb & Bentler, 1985, 1986), adult criminality (Kandel, Simcha-Fagan, & Davies, 1986; Stacy & Newcomb, 1995), negative health outcomes (White, Hansell, & Vali, 1993), and higher levels of drug and alcohol dependence in adulthood (White, Bates, & Labouvie, 1998). Smoking in early adolescence has been linked to long-term smoking in adulthood (Chassin, Presson, Sherman, & Edwards, 1991), marijuana use, low academic achievement, and behavioral problems (Ellickson, Tucker, & Klein, 2001). Adolescents are also at great risk for sexually transmitted diseases and unplanned pregnancies (Center for Disease Control, Division of HIV/AIDS Prevention, 2000; Institute of Medicine, 2001; Whaley, 1999). Criminally involved and adjudicated adolescents are at even greater risk than are non–criminally involved adolescents (Jessor, Donovan, & Costa, 1991; Morris, Baker, Valentine, & Pennisi, 1998).

There has been extensive research on the relationship of personality traits such as impulsivity (Eysenck & Eysenck, 1977), sensation seeking (Zuckerman, 1984), and novelty seeking (Nelson & Cloninger, 1995) with involvement in risky behaviors. Much of this research has been conducted with college students (e.g., Horvarth & Zuckerman, 1992; Sher, Wood, Crews, & Vandiver, 1995; Wagner, 2001; Zuckerman & Kuhlman, 2000), community samples of adults (Howard, Kivlahan, & Walker, 1997; Jack & Ronan, 1998), and individuals in drug and alcohol treatment (Ball, 1995). Although there has been extensive research on the confluence of personality traits, typology, and developmental onset of juvenile delinquency (e.g., Daderman, 1999; Harris & Jones, 1999; Jones & Harris, 1999; Le Blanc & Kaspy, 1998), there has been comparatively little investigation of the linkages between personality and risk behavior among adjudicated adolescents, a population to whom these measures seem uniquely relevant.

These adolescents present an important population for investigating the relationship of personality to risk behaviors, as they exhibit a constellation of risky behavior (Donovan, Jessor, & Costa, 1991; Morris et al., 1998), which has been theoretically linked to underlying personality dispositions (Jessor, 1998). In addition, their involvement with the criminal justice system presents an opportunity to access them for risk-reduction intervention (Magura, Shapiro, & Kang, 1994; Robertson & Levin, 1999). The primary goal of this study was to examine the linkages between personality measures hypothesized to be related to risk behavior (e.g., impulsive sensation seeking and future orientation) and risky behaviors in a group of adjudicated adolescents. Adolescence, particularly for this high-risk group, is a time when impulsivity and sensation seeking, combined with a lack of orientation toward future consequences, are likely to be pronounced.

A number of researchers have documented a strong relationship between Zuckerman, Kuhlman, Joireman, and Teta's (1993) impulsive-sensation-seeking (ImpSS) personality measure and risky behaviors. The ImpSS is one dimension of the Zuckerman-Kuhlman Personality Questionnaire (Zuckerman et al., 1993). Impulsive sensation seeking reflects the tendency to be willing to take risks for the sake of having novel, varied, and intense experiences (Zuckerman, 1984) and has been consistently linked to risk behaviors including substance use and risky sex (Wagner, 2001). Horvarth and Zuckerman (1993) found sensation seeking to be a strong predictor of risky behaviors (crime behaviors, risky financial behaviors, social violations, and AIDS risk behaviors), particularly of criminal behavior and social violations, in a sample of undergraduates. Within a community sample of young adult women, Stein, Newcomb, and Bentler (1994) found that sensation seeking predicted greater use of alcohol and more AIDS-related risk behaviors. In a study of African American adolescents, Xiaoming et al. (2000) found elevated sensation-seeking scores among participants who had engaged in both risky sex and drug use. It follows that impulsive sensation seeking should also be a significant correlate of risk taking among adjudicated adolescents, though this has yet to be shown empirically.

Orientation toward the future has also been examined in relationship to risky behaviors. For this study, we conceptualize orientation toward the future as the degree to which individuals possess positive attitudes toward their futures. This includes believing that good outcomes are possible for them in domains of work, family, and social life and perceiving a high degree of control over future outcomes, the idea being that individuals who are pessimistic about their future are more likely to take risks with their health and safety. Put bluntly, a young person who believes that he or she may be dead by age 30 is unlikely to protect his or her long-term health and well-being.

Consistent with this theorizing is the work of other researchers who suggest a direct relationship between a pessimistic future orientation and adolescent risk behaviors. Nurmi (1991) points out that although normal adolescents are shown to actively plan for and be oriented toward the future, some are not oriented toward the future. These adolescents "may manifest other types of problem behaviors … such as delinquency, problems in school and drug use" (p. 45). Others have suggested a negative relationship exists between future orientation and failure in school, delinquency (Nurmi, 1991), drug and alcohol abuse (Trommsdorf, 1986), early initiation of sexual activity (Gilchrist & Schinke, 1987), and unprotected sexual intercourse (Mindick, Oskamp, & Berger, 1977). In addition, a relationship between pessimism about the future and high-risk sexual behavior among both normal adolescents and incarcerated adolescents has been subsequently suggested (Brener & Collins, 1998; Canterbury, Clavet, McGarvey, & Koopman, 1998; Morris et al., 1998; Whitaker, Miller, & Clark, 2000). As far as we are aware, however, these relationships have not been explicitly tested, and this is one goal of the current research. Specifically, we tapped adolescents'orientations toward the future through questions that assessed positive and negative attitudes about the future (Whitaker et al., 2000). We hypothesized that adolescents with a more pessimistic attitude toward the future, who perceive little control over their future, and who have more negative attitudes toward the future will exhibit more risk behaviors and have a decreased perception of risk compared with adolescents who have a more positive orientation toward the future.

Guided by previous research on impulsivity and future orientation, we further hypothesized that future orientation might have a moderating effect on impulsivity such that the influence of impulsivity on risk will depend on future orientation. We suspected that future orientation would serve as a protective factor for those with high impulsivity and that it is those adolescents with high impulsivity and a negative future orientation who will exhibit the highest levels of risk behavior. Some support for this hypothesis comes from a similar line of research by Zimbardo and colleagues (Agnew & Loving, 1999; Keough, Zimbardo, & Boyd, 1999; Rothspan & Read, 1996; Wills, Sandy, & Yaeger, 2001; Zimbardo & Boyd, 1999; Zimbardo, Keough, & Boyd, 1997). Their work has shown that individuals higher in impulsive personality traits (a measure they designate "present time perspective") have reliably higher levels of risky behavior. Moreover, these studies have shown that individuals who are more oriented toward the future tend to be less involved with risk behaviors. These studies have been conducted predominantly with college populations.

In sum, this study tested the following hypotheses:

1. Impulsive sensation seeking and optimistic future orientation are negatively correlated such that those higher in sensation seeking are less oriented toward the future.
2. Impulsive sensation seeking and pessimistic future orientation are negatively associated with alcohol use, cigarette smoking, marijuana use, hard-drug use, alcohol related problems, frequency of alcohol use during sexual intercourse, frequency of condom use, and low perceived risk.

3. Impulsive sensation seeking and future orientation, when entered as predictors in a simultaneous regression model, both independently predict risk behavior and show an interactive effect such that pessimistic future orientation and high impulsive sensation seeking result in the highest levels of risk behavior.

METHODS

Participants and Recruitment

Three hundred probated adolescents (73% male, 27% female) were recruited from juvenile probation offices, treatment facilities for adjudicated adolescents, and a youth center providing support and services to troubled youth. Twenty-seven percent of the adolescents we approached refused to partake in the study with the common explanation that they were just not interested. Research staff had to turn down 11 adolescents because they were over age 17. Mean age was 15.3; self-reported ethnicity was 23% Caucasian, 21% African-American, 49% Hispanic American, just more than 5% Native American, 1% Asian or Pacific Islander, and less than 1% other. Thirty-five percent reported living with both their mother and father; 40% reported living with just their mothers; 9% reported living with just their fathers; 6% reported living with a guardian; and 10% reported some other type of living arrangement. Of those in school, average grade level was 9.5; 17.4% were no longer in school. A number of participants reported having at least one child (8.6% of females, 6.5% of males). Participants ranged from first-time offenders to repeat offenders with probation sentences varying from just a few months to several years ($M = 12$ months) depending on the severity of the crime. Possession of a controlled substance (11.6%), stealing or theft (20%), auto theft (8.8%), and assault or fighting (14.9%) were the most common offenses committed by the participants.

Our research staff maintained a regular presence at the Denver probation office and recruited participants in the waiting room. However, at probation offices that did not service a large juvenile population and at the youth center, we arranged for probation officers and youth center staff to help facilitate our recruitment efforts. Because the youth center provided services to many adolescents who were on probation, had recently been on probation, or had histories of juvenile offenses, we asked the directors to recruit only those participants and not adolescents who had never been involved with the juvenile justice system.

Regardless of the recruitment modality, to ensure confidentiality, members of the research staff were the only personnel authorized to administer the survey. Both parental consent and participant assent forms stated that taking part in the study was voluntary and confidential. Prior to beginning the survey, research staff asked participants to answer honestly, as neither their probation officers nor their parents would ever see their answers. Our research staff was trained to inquire whether participants needed help reading, and when participants identified themselves as illiterate, staff read the questionnaire to them.

Assessment and Measures

All participants were given self-administered, paper-and-pencil questionnaires assessing psychological, behavioral, and sociodemographic variables. Administration of the questionnaires took place at the probation offices, treatment facilities, and youth center. Signed parental consent and participant assent forms were obtained prior to participation. Remuneration of $15 was provided to all adolescents for their participation.

ImpSS.—Scores on the ImpSS were computed by summing the responses to the 19-item Impulsive Sensation Seeking Scale adapted from the Zuckerman-Kuhlman Personality Questionnaire (Zuckerman & Kuhlman, 2000). Participants were asked whether statements such as “I don’t spend much time on the details of planning ahead” and “I like doing things

just for the thrill of it" were either true (coded 1) or false (coded 0) about themselves. After reverse coding, the summed possible scores ranged from 0 to 19, with higher numbers indicating higher impulsivity (coefficient alpha reliability [α] = .77)

Future orientation.—Future orientation was assessed with seven questions addressing attitudes about the future (Whitaker et al., 2000). Participants were asked to respond on a 4-point Likert-type scale ranging from 1 = *disagree a lot* to 4 = *agree a lot* to statements such as "what happens to me in the future mostly depends on me" and "I just live for today." Future orientation scores were computed as the mean of responses to these seven items (α = .73)

Rutgers Alcohol Problem Index (RAPI).—The RAPI (White & Labouvie, 1989) asks 23 questions addressing behaviors that occurred while a participant was drinking alcohol or because of their use of alcohol. The instructions read, "How many times did the following happen to you while you were drinking alcohol or because of your alcohol use during the last year?" Items included the following: "Got into fights, acted bad, or did mean things" and "Went to work or school high or drunk," and response options ranged from 1 = *never* to 5 = *more than 10 times* on a 5-point scale. RAPI scores were the mean of 23 items, and thus higher scores reflect higher alcohol problems (α = .93). Participants who did not use alcohol at all were assigned the lowest RAPI score of 1.

Use of alcohol.—Frequency of consumption was measured by the question, "In the last six months, how often did you consume at least one alcoholic drink?" Participants responded on a 9-point scale ranging from 1 = *never* to 9 = *every day*. The number of drinks consumed at one time was assessed by asking participants the following: "In the last six months, how many drinks did you usually have at one time?" followed by a 10-point scale ranging from 1 = *none* to 10 = *more than 20 drinks*. Finally, frequency of getting drunk was evaluated by the following question: "In the last six months, when you drank alcohol how often did you get drunk?" Participants answered using a 5-point scale ranging from 1 = *never* to 5 = *always*. These items were summed to produce an overall measure of use of alcohol, where higher numbers indicated higher use of alcohol (α = .87).

Current smoking.—After a question asking if participants had ever smoked a cigarette, current smoking level was assessed by asking participants the following question: "Do you smoke cigarettes now?" Participants answered either yes or no.

Current marijuana use.—After a question asking if participants had ever smoked marijuana, they were asked to respond to the following question: "Do you smoke marijuana now?" Participants answered either yes or no.

Hard drug composite.—Composite scores of hard-drug use (crack, cocaine, crystal methamphetamine, and others) were assessed by three questions. Participants were asked the following: "Are you using cocaine or crack now?" and "Are you using crystal methamphetamine now?" These two questions were answered either yes or no. The third question asked participants to list any other drugs they were currently using. The hard drug composite was thus the sum of the number of hard drugs (cocaine or crack, crystal methamphetamine, and other listed drugs) that a participant reported currently using.

Perceived Risk Behavior Questionnaire (PRBQ).—The PRBQ, an adaptation of the Reckless Behavior Questionnaire (Shaw, Wagner, Arnett, & Aber, 1992), assessed participants' perceptions of the risk associated with certain behaviors. Participants are asked to rate 15 statements (i.e., driving while under the influence of alcohol, stealing or shoplifting, and having sex with someone you don't know) on a 5-point scale ranging from 1 = *not at all*

risky to 5 = *very risky*. Scores for the PRBQ were derived by calculating the mean of responses to the 15 items such that higher scores reflect greater perceived risk (α = .93).

RESULTS

As can be seen from Table 1, the mean value of the ImpSS was 10.59 (*SD* = 4.01), slightly higher than mean ImpSS scores obtained in other research for cocaine abusers (*M* = 9.4) and undergraduate college students (*M* = 9.5) (Ball, 1995). These young people had fairly positive beliefs about their future, as evidenced by a mean score of 3.28 (*SD* = .53) on the 4-point scale. The correlation between impulsive sensation seeking and future orientation was $r = -.26$, $p < .001$, suggesting that young people who are more impulsive are less likely to think about and have high hopes for the future.

Mean scores on each of our measured risk behaviors as well as perceived risk appear in Table 1. We first examined the bivariate association of ImpSS and future orientation with each of the risk behaviors of interest as well as with perceptions of risk. As can be seen in Table 2, there were significant bivariate associations between ImpSS and almost all of the risk behaviors. Individuals high in impulsivity were more likely to use alcohol, smoke cigarettes, use hard drugs, have alcohol-related problems, were less likely to use condoms during intercourse, and were less likely to perceive risk behaviors negatively. Furthermore, individuals with a more positive future orientation were less likely to use marijuana and hard drugs, have sex while drinking alcohol, and have alcohol related problems and were more likely to use condoms during intercourse and more likely to perceive risk behaviors negatively. Age of participant was also positively related to future orientation, and age was similarly related to risk behaviors including condom use, sex with alcohol, alcohol use, alcohol-related problems, and cigarette smoking. Older adolescents tended to have higher rates of risky behaviors in most domains. Gender was related to condom use such that males were more likely to use condoms than were females.

The next step in our analyses was to conduct independent regression equations for each of our eight risk behaviors. For our continuous criterion variables (condom use, sex with alcohol, alcohol problems, alcohol use, hard-drug use, and perceived risk), ordinary least squares (OLS) regression was employed. For the two dichotomous criteria (cigarette use and marijuana use), we used logistic regression (Hosmer & Lemeshow, 1989; Menard, 1995). In each equation, ImpSS, future orientation, and the interaction between the two were included as predictors. To calculate the interaction term, the continuous measures of future orientation and ImpSS were centered (i.e., the mean was subtracted from each individual score so that the resulting variables have a mean of zero), and the resulting centered versions of the variables and their interactions were entered as predictor variables. Centering the continuous variables serves to reduce multicollinearity among the interaction term and main effects but, more importantly, facilitates the interpretation of the main effects in the regression model (see Aiken & West, 1991). Age and gender served as covariates in each equation. The results of each regression are presented in Table 2. Because we had directional predictions, we used a one-tailed alpha level of .05 for significance tests in all regression equations.

Risky Sexual Behavior

Most participants (78% of the males and 75% of the females) reported being sexually experienced. Mean age of first intercourse was 13 and median number of sex partners was 5 (mode = 3). Only 36% of sexually active participants reported having always used a condom when having sexual intercourse in the past 6 months, whereas 40.7% reported having used alcohol while having sexual intercourse at least sometimes. After controlling for age and gender, those with higher impulsive sensation seeking were significantly less likely to use

condoms. Adolescents with positive future orientation were significantly less likely to report using alcohol during sex (see Table 2).

Alcohol Use and Alcohol Problems

Alcohol use in the past 6 months was reported by 61.4% of the sample. After controlling for age and gender, there was a significant positive relationship between ImpSS and alcohol use (see Table 2) and a significant negative relationship between future orientation and alcohol use. In line with our hypotheses, we found that impulsive-sensation-seeking adolescents had significantly more alcohol problems, and adolescents with more positive future orientation scores had significantly fewer alcohol problems. Importantly, we found a marginal interaction ($B = -.08$, $p = .06$, one-tailed) between impulsivity and future orientation.

Given the relatively low power in field studies to detect interaction effects (McClelland & Judd, 1993), we felt that probing this interaction was warranted, particularly because we had specific interaction hypotheses. Two additional regression equations were thus calculated, one for the effect of future orientation on alcohol problems for adolescents 1 standard deviation above the mean ImpSS score and one for the effect of future orientation on alcohol problems for adolescents 1 standard deviation below the mean ImpSS score. This approach resulted in significance tests for the regression coefficient of the effect of future orientation on alcohol problems at each of these levels of ImpSS (c.f., Aiken & West, 1991, pp. 54–58). The relationship between future orientation and alcohol problems got stronger as ImpSS scores increased (see Figure 1). The coefficient for the effect of future orientation on alcohol problems was $B = .36$, p .001 at 1 standard deviation above the mean of ImpSS, $B = .27$, p .001 at the mean of ImpSS (from original equation), and $B = .17$, p .05 at 1 standard deviation below the mean of ImpSS. As predicted, the highest levels of alcohol problems were observed for participants high on ImpSS and low on future orientation.

Cigarette Smoking, Marijuana Use, and Hard-drug use

Almost half (42.7%) of participants reported currently smoking cigarettes, and the average number of cigarettes smoked per day was two to three. In logistic regression analyses, impulsive sensation seeking was significantly positively associated with cigarette smoking. Twenty-seven percent of participants (27.8%) currently smoked marijuana. Logistic regression analyses showed a significant negative relationship between marijuana use and positive future orientation.

Hard drugs reported being using included crack or cocaine, LSD, ecstasy, crystal methamphetamine, opium, ketamine, and mushrooms (psilocybin). A small percentage (3.8%) reported using one substance, 5.8% reported using two, and 8.9% reported using more than two and up to five. Typical of assessments of hard-drug use, this variable was extremely skewed, and thus we undertook a rank-transformation procedure so that it would approximate normality and could be included as a criterion variable in OLS regression (Blom, 1958). Though impulsivity was unrelated, as positive future orientation increased, use of hard drugs significantly decreased.

Perceived Risk

We initially hypothesized that individuals lower in positive future orientation and higher in impulsive sensation seeking might engage in higher levels of risk behavior because they perceived there to be less risk associated with these behaviors. Consistent with our hypothesis, those with a more positive future orientation had significantly higher perceived risk.

DISCUSSION

In our sample of adjudicated adolescents, we found initially weak to moderate bivariate relationships between future orientation and impulsive sensation seeking and risk variables in the direction that would be expected. Less positive future orientation and higher impulsive sensation seeking were related to higher levels of risk behavior and less perceived risk, which was directly in line with our first hypothesis. These relationships weakened considerably, however, when age and gender were controlled in the regression analyses. In the final analyses, future orientation was more strongly related to our outcome behaviors than was impulsive sensation seeking. Less positive future orientation was significantly related to having sex while using alcohol, more alcohol problems, higher perceived risk associated with deviant behaviors, more marijuana use, more hard-drug use, and more quantity and frequency of alcohol use. This lends additional empirical support to previous studies indicating a negative relationship between future orientation and risk behaviors. Joining with previous research on impulsivity, we found that higher impulsive sensation seeking was related to more alcohol problems, alcohol use, cigarette smoking, and less condom use. Much of the prior work on the relationship of impulsivity and future orientation to risk behavior has been conducted with low-risk populations (e.g., college students, non-adjudicated adolescents). Our results show that findings obtained with predominantly low-risk populations appear to generalize to young people who engage in substantially more risk behavior.

Though we thought it likely that these variables might interact, only one of the eight interactions tested approached significance (that for alcohol problems). We found, as predicted, that those adolescents lowest in future orientation and highest in impulsive sensation seeking had the highest levels of risk behavior (see Figure 1). It would be desirable to test these relationships again with a larger sample to replicate these findings and have more power to detect other interactive effects that might exist. In sum, the variables of age, gender, impulsive sensation seeking, and future orientation account for modest proportions of the variance in risk behavior. The strongest prediction occurred for alcohol use and alcohol problems, where 10% and 16% of the variance was accounted for, respectively.

As in previous studies (e.g., Bryan, Aiken, & West, 2002; Loeber, 1998), age was a significant predictor for four outcome variables (see Table 2), exhibiting a positive relationship to sex with alcohol, alcohol problems, alcohol use, and cigarette smoking. This indicates that as age increases, participants are more likely to use alcohol during sexual intercourse, have more alcohol-related problems, use alcohol more frequently, and smoke cigarettes. To some degree, this is simply a pragmatic resultthose who have been alive longer have simply had more time to engage in problem behaviors. The important point this finding makes is that age is a crucial variable to take into consideration when conducting research on risk behavior with adolescents at different stages of development. Had we not controlled for age in these analyses, we would have concluded that there were much stronger relationships between our personality variables and risk variables. Gender was related to condom use such that males were actually behaving safer (i.e., they were using condoms more) than were females. This gender difference is consistent with previous research among adjudicated involved adolescents (e.g., Bryan et al., 2002) and may reflect either the use of other birth control by women or a lack of control over condom-use behavior with their partners. The only other gender difference was for hard-drug use, where females were more likely to report hard-drug use than were males.

One limitation of this study is that the probation department requires adolescents to undergo drug testing via urinalysis on a regular basis while they are involved with the criminal justice system. Rates of recent drug and alcohol use reported by participants are probably lower than when they are not on probation. But the argument could also be made that the rates of alcohol use, marijuana use, and hard-drug use were surprisingly high given the consequences of testing

positive for these substances. To fail a regular screening is considered violation of probation. A second limitation of the study was the location of data collection. Having participants fill out questionnaires at probation offices and self-report illegal behaviors may have influenced how they answered questions via social desirability. Finally, the data are cross-sectional, so we are unable to draw any conclusions about causality with regard to these data. Though it is reasonable to conclude that dispositions involving impulsivity and future orientation are likely to be fairly stable, and to exert influence on levels of both perceptions of risk and on actual risk behavior, our design does not provide any certainty in this regard.

Our results indicate small but reliable relationships between future orientation and risk behaviors. We also show some relationships of impulsive sensation seeking to alcohol use and problems, cigarette smoking, and condom use. There is also some evidence to suggest an interactive effect such that higher levels of impulsivity combined with more negative future orientation results in higher levels of risk behavior. As impulsivity is conceptualized as a relatively immutable personality factor, it appears that it might be useful to target future orientationwhich may be more malleablein interventions with young people. An alternative strategy is to gear intervention content toward present-oriented consequences. For particularly high-risk, present-oriented youth, it may make more of an impact to discuss the immediate consequences of behavior (e.g., girls will not want to kiss you if you smoke) rather than future consequences (e.g., smoking causes lung cancer). Present-oriented messages are becoming the norm in media-based interventions targeted to young people (e.g., Worden, Flynn, Solomon, & Secker-Walker, 1996), and this focus may be even more important for impulsive and sensation-seeking high-risk youth.

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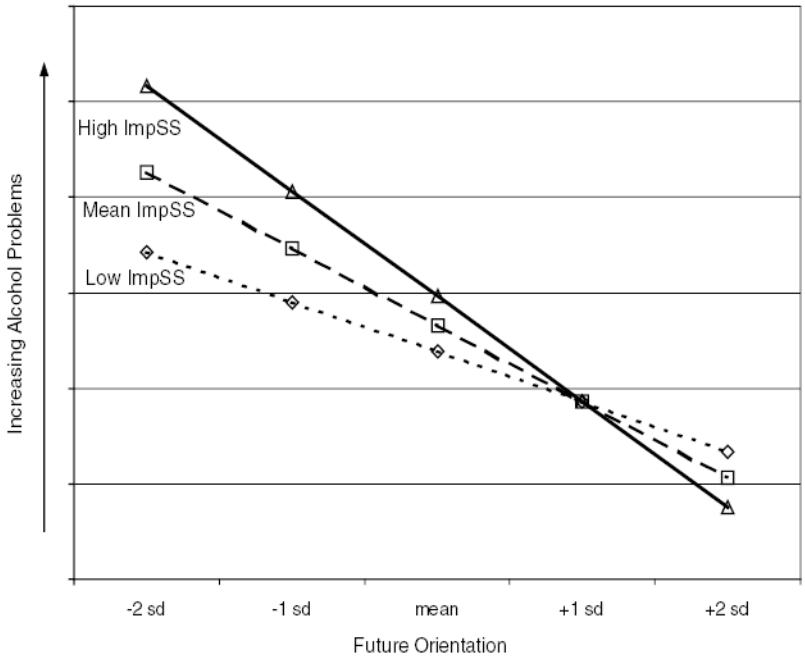

Figure 1. Effects of future orientation on alcohol problems at the mean of impulsive sensation seeking (ImpSS) 1 standard deviation above the mean on ImpSS and 1 standard deviation below the mean on ImpSS.

NOTE: This analysis controlled for the effects of gender and age. The interaction was marginally significant, $B = .09$, p .10.

TABLE 1

Risk-Behavior Variable Means, Standard Deviations, and Range

Variable	M	SD	*Range*
Condom use	3.77	1.23	1–5
Sex while drinking	2.22	1.18	1–5
RAPI	1.81	0.79	1–5
PRBQ	3.65	1.14	1–5
Alcohol use	8.47	5.50	3–24
Cigarette smoking[a]	0.42	0.50	0–1
Marijuana use[a]	0.27	0.45	0–1
Hard-drug use[b]	0.55	1.31	0–11
Impulsive sensation seeking	10.59	4.01	0–19
Future orientation	3.28	0.53	1–4

NOTE: RAPI = Rutgers Alcohol Problem Index; PRBQ = Perceived Risk Behavior Questionnaire.

[a] Question asks if participant currently smokes (yes = 1, no = 0) or uses marijuana (yes = 1, no = 0).

[b] Measure is sum of current use of crystal methamphetamine, crack or cocaine, or other drugs listed by participants.

TABLE 2

Bivariate Correlations and Analyses Regressing Future Orientation, ImpSS, and Their Interactions on Risk Variables Controlling for Age and Gender

	Condom Use	*Sex While Drinking*	*Alcohol Use*	*Alcohol Problems*	*Cigarette*	*Marijuana Use*[a]	*Hard-drug Use*[b]	*Perceived Risk*
Bivariate Correlations								
ImpSS	.16*	.08	.16*	.25***	.14*	.08	.13*	.13*
Future orientation	.14*	.15*	.09	.28***	.05	.12*	.14*	.23***
Full regression model								
Age	.006	.20	.27	.19	.37	.09	.10	.08
Gender (1 = male, 0 = female)	.18	.05	.03	.03	.03	.06	.04*	.06
ImpSS	.12	.03	.12	.20	.20	.06	.08	.08
Future orientation	.11	.17	.11	.26	.08	.15	.17	.20
ImpSS Future Orientation	.04	.007	.006	.08	.07	.05	.03	.04
R^2	.07	.06	.10	.16	.09	.02	.05	.07

NOTE: ImpSS = impulsive sensation seeking.

a. These variables used dichotomous outcomes, and thus, coefficients were estimated using logistic regression. For these variables, R^2 is the percentage of for which model deviance is accounted. This is the logistic regression analog to variance accounted for in ordinary least squares regression (Hosmer & Lemeshow, 1989, p. 148; Menard, 1995, p. 22). There are no significance tests associated with these estimates.

b. Because of a skewed right distribution, a rank-transformation (Blom, 1958) procedure was employed to normalize the data.

* p .05, two-tailed.

** p .01, two-tailed.

*** p .001, two-tailed.

p .05, one-tailed.

p .01, one-tailed.

p .001, one-tailed.