

Toward a Person \times Situation Model of Sexual Risk-Taking Behaviors: Illuminating the Conditional Effects of Traits Across Sexual Situations and Relationship Contexts

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The present study examines the individual and joint contributions of personality, situations, and relationship contexts as they shape risky sexual behaviors. Data on 7,511 discrete sexual events collected from a community sample of 1,946 young adults were analyzed with multilevel modeling. Results showed that meaningful between-persons differences in risky sexual behavior exist and that these differences are predictable in theoretically reasonable ways by interindividual differences in personality. However, the majority of variance in risky behaviors was at the within-person level and could be reliably explained by within-person changes in personality, the situation, and the relationship context. Finally, personality interacted with context such that personality more strongly predicted risky behaviors in contexts that were ostensibly novel and ambiguous. Together these results suggest that risky sexual behaviors cannot be understood in a static, typical, or decontextualized way but rather must be viewed as a complex product of the person, the situation, and the relationship context.

Keywords: personality, person \times situation, close relationships, sexual behavior, sexual experience

More than one million people in the United States alone are living with HIV/AIDS (Centers for Disease Control and Prevention [CDC], 2006), and an additional 20 million are newly infected with sexually transmitted diseases (including AIDS) each year (Mokdad, Marks, Stroup, & Gerberding, 2004). Although AIDS was initially considered a disease of gay men and injection drug users, the reach of the epidemic now extends to broad segments of our society, including heterosexual youths and women (East, Jackson, O'Brien, & Peters, 2007). Indeed, 82% of all cases of HIV/AIDS recorded in 2006 were due to sexual contact, and roughly half of these were due to heterosexual contact (CDC, 2006). Thus, understanding sexual risk taking and factors that promote it is one of the critical tasks facing contemporary society.

The importance of this issue notwithstanding, a clear and comprehensive understanding of factors that promote and inhibit risky sexual behaviors is lacking. The present study contends that the limited success of past efforts can be attributed, at least in part, to two important limitations of this research: (a) an overemphasis on static person-level causes (especially background/demographic factors and health-relevant beliefs) of risky sexual behaviors to the exclusion of dynamic situational and relationship factors and (b) a

failure to systematically consider interactions between these factors. To address these limitations, the present study provides a comprehensive test of the person-by-situation perspective—the belief that behavior is best understood as an interaction between relevant aspects of the person and the situation (Funder, 2006)—on risky sexual behaviors with data from six different sexual events collected over 12 years from a community sample of adolescents and young adults. Sexual events were categorized along two dimensions that theoretically varied in the degree of novelty and ambiguity (viz., whether the event was a first-time sexual experience with a new partner and whether the partner was casual or committed), whereas person-level factors reflected traits representative of both the Big Five/five-factor model (Costa & McCrae, 1985) and the interpersonal circumplex (Wiggins, 1979). Finally, a range of risky behaviors—including behaviors that can directly (viz., condom use, poor or risky partner choice) or indirectly (i.e., drinking prior to intercourse, failure to discuss risk-relevant topics) increase the risk of exposure to HIV or other pathogens—was examined.

Person-Level Factors and Risky Sexual Behaviors

The overwhelming majority of past research on risky sexual behaviors has focused on interindividual differences in background and demographic factors, as well as health-specific knowledge, attitudes, and beliefs. With few exceptions, however, such factors appear to be only modestly predictive of risky sexual behaviors. In one particularly comprehensive meta-analytic review, for example, an average meta-analytic r of .08 (range = .02 to .18) was found across 24 effects linking condom use to factors such as gender, race, age, education, religiosity, sexual and STD history, beliefs about condoms and the threat of HIV, HIV knowledge, and prior sex education (Sheeran, Abraham, & Orbell, 1999).

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Indeed, the only associations to exceed .25 in this meta-analytic review involved partner or relationship factors, communication about condoms, and past or intended condom use.

Research examining interindividual differences in personality in relation to risky sexual behaviors has indicated, not surprisingly, that trait effects are also generally modest in magnitude. The most consistent patterns of effects have been found for two core dimensions of personality: Conscientiousness (marked by responsibility, orderliness, and self-control) and Agreeableness (marked by humility, trust, cooperation, and sympathy). Using data from 52 nations representing 10 regions of the world, Schmitt (2004) obtained an average r of .14 between (low) Conscientiousness and sexual promiscuity. In a meta-analysis of 53 studies, Hoyle, Fejfar, and Miller (2000) reported overall effect sizes ranging from .14 (sex without a condom) to .21 (number of sex partners) for impulsivity or low constraint (a core feature of [low] Conscientiousness). Similarly, Bogg and Roberts (2004) reported meta-analytic r s ranging from .09 to .15 for specific facets of (low) Conscientiousness and risky sexual behaviors, with the largest association found for impulsivity. For Agreeableness and low trait aggression, Hoyle and colleagues reported meta-analytic r s ranging from $-.20$ (number of partners) to $-.23$ (high risk encounters), whereas Schmitt obtained an r of $-.14$ between Agreeableness and sexual promiscuity in the 52-nation study.

Results have appeared weaker or more inconsistent, however, for interindividual differences in other core personality dimensions. For example, Openness to Experience (marked by curiosity, imagination, and sophistication) was unrelated or weakly related to diverse forms of risky sexual behavior in both the Hoyle et al. (2000) meta-analysis and the Schmitt (2004) cross-cultural study. Neuroticism (marked by negative affect, moodiness, reactivity, and low self-esteem) was also unrelated to sexual promiscuity in the 52-nation study ($r = .01$) but was inconsistently related (r s ranged from $-.05$ to $.27$) across different measures of Neuroticism and risky behaviors in the Hoyle meta-analysis. Weak results ($r = .05$) were also reported by Crepez and Marks (2001), who meta-analyzed relatively stable measures of specific negative affects, including depression, anxiety, and hostility. Finally, Extraversion (marked by sociability, assertiveness, excitement seeking, and positive emotionality) exhibited similar inconsistencies. Hoyle and colleagues reported meta-analytic r s ranging from $-.09$ to $.15$, depending on risky behavior and Extraversion measure, whereas Schmitt obtained an r of $.13$ between Extraversion and sexual promiscuity in the 52-nation study.

In sum, past research has indicated that individuals low in Conscientiousness and Agreeableness engage in higher levels of risky sexual behaviors, whereas findings for other core dimensions of personality are weak or inconsistent. Additionally, the magnitude of trait effects is modest, generally in line with those observed for other person-level factors.

Relationship Context, Situation Type, and Risky Sexual Behaviors

In the present study, relationship context is operationalized as the distinction between a primary, main, regular, steady, or serious partner versus an occasional, secondary, or casual one, and sexual situations are defined in terms of the presence versus absence of prior sexual experience with the partner (i.e., a first vs. subsequent

sexual encounter). Although these distinctions overlap, they are not the same. People and couples vary in the timing of first sexual encounters: Some wait until the relationship has evolved to a highly committed stage before having sex, whereas others have sex at an early stage (Christopher & Roosa, 1991).

Despite the conceptual independence between sex occasions with new partners and sex occasions with casual partners, existing research has revealed parallel behavioral risk profiles for the two types of situations. Robust associations have been documented, for example, that people are more likely to use condoms on first (vs. subsequent) occasions of intercourse (LaBrie, Earleywine, Schiffman, Pedersen, & Marriot, 2005) and on occasions of intercourse with casual or occasional (vs. serious or primary) partners (see Misovich, Fisher, & Fisher, 1997, for a review). Moreover, existing research suggests that both effects are large. For example, results from several studies show that people are from one half (e.g., Macaluso, Demand, Artz, & Hook, 2000) to one fifth (Scheidt & Windle, 1996) as likely to use a condom with a serious versus casual partner and that rates of condom use drop by about one half over the first few weeks of a new sexual relationship (Fortenberry, Wanzhu, Harezlak, Katz, & Orr, 2002).

Although having sex with either a new or casual sex partner is associated with more cautious behavior in terms of condom use, these situations are otherwise characterized by greater risk taking. Specifically, individuals with a new or casual partner are more likely to drink in conjunction with sex (Cooper & Orcutt, 1997; Graves & Hines, 1997), less likely to use highly effective noncoital forms of birth control (Morrison, 1985), and less likely to discuss sexual risks and condom use before sex (Cleary, Barhman, MacCormack, & Herold, 2002).

Limitations of Past Research

Although past research has clearly demonstrated the relevance of factors at the level of the person, the situation, and the relationship, it nevertheless suffers from several important limitations. First, as Gullone and Moore (2000) have pointed out, the majority of past studies have examined only one or a few factors in isolation. This is true not only of studies focused on personality as predictors, the target of Gullone and Moore's comment, but also of research on risky sexual behaviors in general. As a result, we know little about the independent predictive validity of individual factors, be they at the level of the person, the situation, or the relationship. And perhaps more importantly for the present study, we know little about how these factors combine or interact to shape risky sexual behaviors. Indeed, only a handful of studies have tested the possibility that associations between person-level factors and risky sexual behaviors vary across relationship contexts or types of sexual situations. Of these, most have focused on intentions to use condoms, showing that intentions predict condom use more strongly with serious or established partners than with casual or new ones (Sheeran & Orbell, 1998), presumably owing to the greater predictability of behavior with established partners. In the only study to examine the differential predictive validity of specific traits across sexual or relationship contexts, Clift, Wilkins, and Davidson (1993) reported that venturesomeness and impulsivity predicted condom use more strongly with casual than with regular partners, though they did not explicitly test the interactions. In a study of sexual motives, my colleagues and I (Cooper,

Shapiro, & Powers, 1998) obtained similar results showing that one's own motives predicted sexual behavior more strongly among those who were single or unattached than among those in a committed, stable, or exclusive relationship, a pattern thought to stem from the greater interdependence of behavior among established, committed couples. To date, therefore, empirical evidence suggests that personality should predict sexual behavior more strongly in new or casual relationships than in established or serious ones. However, no study has directly tested this possibility.

Second, the overwhelming majority of past studies have used global measures of risky sexual behavior (e.g., "How often in the past year did you use a condom?"). For example, 92% of studies in the Sheeran et al. (1999) meta-analysis involved only global measures. Although in a more recent review researchers found that nearly 40% of studies included measures of condom use that differentiated among partners or partner types (Noar, Cole, & Carlyle, 2006), this review likely overrepresented (relative to the literature as a whole) studies including such measures given that it explicitly focused on partner communication and condom use. Regardless, it appears that a majority of studies involved global measures that require respondents to aggregate across occasions and partners to arrive at a single overall estimate of behavior. Such a strategy not only is more error-prone but also precludes the possibility of quantifying the between-persons and within-person components of behavior and of separately examining their causes and correlates.

Third, past research has disproportionately focused on some aspects of personality to the exclusion of others. For example, venturesomeness (a facet of Extraversion) and impulsivity have received considerable attention, whereas traits specified by the interpersonal circumplex (i.e., agency and communion; Wiggins & Trobst, 2002) have been relatively neglected despite their special relevance to understanding interpersonal behaviors (for a recent exception, see Markey & Markey, 2007). Similarly, past research has focused primarily on condom use and ignored other behaviors that either directly (e.g., having sex with a poorly known partner) or indirectly (e.g., failing to discuss condom use) increase the likelihood of exposure to HIV and other pathogens.

Finally, this body of research has relied almost exclusively on small samples of convenience—typically college students or high-risk (e.g., sexually transmitted infections clinic patients, drug users) samples. This feature of the literature raises concerns not only about the generalizability of findings to the larger population but also about the power of studies to detect important yet subtle effects, including interactions among situational, relational, and person-level factors.

The Present Study

The present study provides a comprehensive test of the Person \times Situation interactionist perspective on risky sexual behaviors with event-level data from a large community sample of adolescents and young adults. Figure 1 provides an organizing framework for the study. Although this model is not directly tested in the present study, it nevertheless accurately depicts assumptions regarding the causal order among categories of variables examined in the present study. As shown in Figure 1, personality is hypothesized to predict risky sexual behaviors both directly and indirectly via the likelihood of seeking and being in a committed or serious relationship. In addition, both situational and relationship contexts are hypothesized to directly predict risky sexual behaviors as well as to moderate the strength or nature of personality effects on risky sexual behaviors. (Because interactions are symmetrical, personality can also be seen as moderating situational or context effects on behavior.)

Situational factors, as operationalized in the present study, are treated as exogenous. Because respondents were asked to report on one first and one subsequent sexual experience at each wave, the relative frequency of these events may not accurately reflect the likelihood of their occurrence in an individual's life. Consequently, their occurrence cannot be readily attributed to the individual's propensities or opportunity structures. If events had been randomly sampled, however, so that they accurately reflected their relative occurrence in the individual's life, then both personality and background/demographic characteristics would be shown as direct causes of individual differences in the occurrence of these

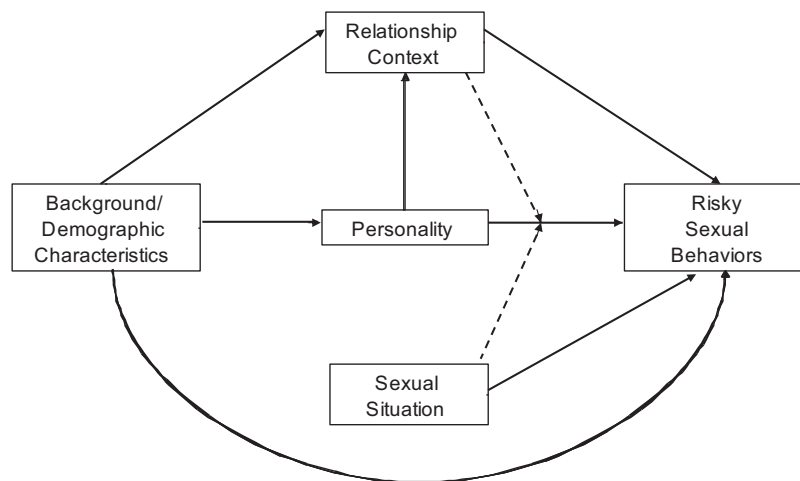


Figure 1. Hypothesized Person \times Situation interactionist model of sexual risk-taking behaviors.

events. Finally, background and demographic characteristics, though not an explicit focus of this study, are viewed as distal factors that directly and indirectly (via personality and the likelihood of being in a committed relationship) predict sexual risk taking. Specific hypotheses are elaborated in the following sections.

Hypothesized Main Effects of Situation Type and Relationship Commitment

We expect, on the basis of past research, that first sexual experiences and experiences with casual partners should predict more alcohol use, a riskier partner profile, and less risk discussion but more condom use. We also expect that partners will be more casual, on average, on first than on subsequent sex occasions. Finally, we expect that despite hypothesized overlap between situation type and relationship commitment, relationship commitment will vary significantly within situation type (i.e., within first and subsequent sex occasions) and that both factors will independently predict risky sexual behaviors.

Hypothesized Main Effects of Personality

The present study focuses on the following five personality traits that theory and research have suggested are important to an understanding of risky sexual behaviors: (a) communal orientation, (b) agency, (c) negative emotionality, (d) impulsivity, and (e) sexual venturesomeness. These represent four of the five dimensions of the five-factor personality model (all but Openness to Experience, which past research has indicated is unrelated), as well as both dimensions of the interpersonal circumplex. Although these factors have generally been examined in isolation, each is hypothesized to operate through a unique mechanism of action and should therefore independently predict sexual risk taking.

Communal orientation. Marked by warmth; a concern for others; and a preference for close, intimate relationships, communal orientation is a core aspect of Agreeableness and one of the two dimensions of the interpersonal circumplex (Wiggins, 1979). Individuals motivated by communal needs should seek out partners and circumstances conducive to the attainment of intimacy goals (e.g., partners with fewer past sex partners, more committed relationship contexts), engage in behaviors thought to facilitate these goals (e.g., discussing past experiences and feelings with their partner), and avoid behaviors such as condom use (thought to convey mistrust of one's partner; Misovich et al., 1997) that might jeopardize them. Interestingly, although these hypotheses are a straightforward extension of contemporary theorizing about communal orientation (e.g., Helgeson, 1994), the only studies to examine communality in relation to promiscuous or uncommitted sexual relations failed to yield clear support for these hypotheses. In one case, a curvilinear relationship was found in which individuals who were either extremely high or extremely low in communality were more promiscuous (Markey & Markey, 2007), and in the other case, highly communal men (but not highly communal women) had fewer uncommitted sex partners (Mosher & Danoff-Burg, 2005).

Agency. Agency, a facet of Extraversion, is the second dimension of the interpersonal circumplex (Wiggins, 1979). Highly agentic individuals are thought to be socially skilled and dominant

(Gurtman, 1997) and to have a positive focus on the self (Helgeson, 1994). Accordingly, individuals high in agency should be both better equipped and more motivated to engage in safer or less risky behaviors, particularly behaviors such as risk discussion and condom use, which require some degree of social skill (Helgeson & Fritz, 2000). At the same time, however, socially dominant individuals have been shown to drink more (Jackson & Matthews, 1988) and to have more promiscuous or uncommitted sexual relations (Markey & Markey, 2007; Mosher & Danoff-Burg, 2005). Thus, straightforward predictions for agency cannot be made.

Negative emotionality. Negative emotionality is considered a core feature of Neuroticism. Individuals high in negative emotionality should exhibit higher levels of risk taking due to one of two plausible mechanisms. Because the experience of negative emotions is aversive, individuals prone to experience negative emotions should be motivated to engage in risky behaviors to the extent that these behaviors alleviate distress directly (e.g., through pharmacological action) or indirectly (e.g., through distraction; Cooper et al., 1998). Alternatively, the experience of negative emotions might interfere with one's ability to process information and engage in rational decision making (Leith & Baumeister, 1996). Although the two mechanisms are not necessarily mutually exclusive, a pattern of differential effects might suggest that one mechanism is predominant. If, for example, the effects of negative emotionality were primarily observed for risk discussion and condom use (behaviors without obvious mood-altering potential), cognitive impairment would be implicated as the primary mechanism. Conversely, if effects were present only or primarily for alcohol use and sex with a casual or risky partner, then sex-to-cope might provide a more compelling explanation given that these behaviors have obvious mood-altering potential.

Impulsivity. Defined as the tendency to act hastily and without thought, impulsivity is a core feature of (low) Conscientiousness. Highly impulsive individuals show increased sensitivity to rewards (Mitchell et al., 2007); have difficulty regulating affect, motivation, and arousal in a manner consistent with longer term needs and goals; and suffer deficits in working memory and higher order cognitive functions that would ordinarily give rise to foresight, goal setting, and planning (Barkley, 1997). Such individuals should therefore be more likely to choose the risky alternative to the extent that it affords immediate benefit (e.g., having sex with a desirable partner, avoiding the hassle or reduced pleasure of using a condom), either because they do not perceive possible future costs associated with their choice or, if they do, because they are unable to regulate their behavior in line with longer term goals.

Sexual venturesomeness. Sexual venturesomeness (hereafter referred to as venturesomeness) can be viewed as a domain-specific instantiation of excitement seeking, a facet of Extraversion thought to be particularly relevant to risk-taking behaviors (Horvath & Zuckerman, 1993). Defined by a preference for novel sexual experiences and a need for and interest in sex, sexually adventurous individuals should have more risky and less intimate partners owing to their stronger desire for sex and preference for sexual novelty. Such individuals might also drink more prior to intercourse as a way to enhance or disinhibit their sexual experience. Lastly, highly adventurous individuals should be less likely to engage in precautionary behaviors, such as prior risk discussion

and condom use, because doing so would likely interfere with excitement or pleasure.

Hypothesized Person \times Situation Interactions Predicting Risky Sexual Behaviors

The effects of personality on sexual risk taking are hypothesized to be stronger on first sex occasions and with more casual partners. This hypothesis rests on the idea that personality exerts stronger effects on behavior in novel or ambiguous situations where there is a press to behave, yet behavioral expectations are weak and ill defined (e.g., Caspi & Moffitt, 1993; Mischel, 1977; Snyder & Ickes, 1985). In such situations, people are prone to fall back on their predominant feelings, preferences, and styles of behaving—in other words, on generally well-rehearsed, familiar, and accessible responses, responses that will on average clearly reflect their underlying personality (Caspi & Moffitt, 1993). The ambiguity inherent in such situations further allows people to interpret the situation in ways that are consistent with preexisting schemas, belief structures, and motivational biases (Caspi & Moffitt, 1993), providing yet another avenue for expression of their personality. In contrast, sex occasions with established or serious partners are likely to elicit normatively prescribed patterns of behavior, patterns that more strongly reflect shared dyadic scripts that evolve over time as relational partners interact and intimacy develops (e.g., Cupach & Metts, 1991; Simon & Gagnon, 1986) than one's own personality. Consequently, rules governing interaction within the relationship are thought to become increasingly particular to the dyad and less predictable by intraindividual factors. Thus, for both reasons, the influence of one's personality on shared dyadic behaviors such as sex would be expected to wane over time as the relationship becomes more established and committed.

Method

Sample of Respondents

The present study includes data from the first three waves of a longitudinal study of adolescents 13 to 19 years of age at Time 1 (T1) who were interviewed up to five times over more than a decade (range = 11.2–15.0 years). In 1989, in Buffalo, New York, 2,544 eligible adolescents were identified through a random-digit dial procedure that oversampled exchanges in predominantly Black neighborhoods. Of these, 82% ($n = 2,051$) completed interviews. A comparison of respondents and nonrespondents showed no differences in race or age, but female adolescents (83% vs. 79% for male adolescents, $\chi^2 = 5.8, p < .05$) and those with better educated parents (13.1 vs. 12.8 years of schooling, $t(2540) = 2.2, p < .05$) were more likely to participate. In 1994–1995, 88% of the initial cohort ($n = 1,813$) were interviewed a second time, and about six years later 73% ($n = 1,488$) were interviewed a third time. Data from the last two waves are not included because complete information on sexual encounters was not obtained.

Attrition analyses revealed demographic differences in retention across waves. Results showed that younger ($\beta = -.067, p < .01$), White ($\beta = .055, p < .01$), female ($\beta = .208, p < .001$) respondents and those from higher socioeconomic status (SES) backgrounds ($\beta = .068, p < .01$) completed more interviews. With the

exception of gender, however, these effects were small. In short, although retention rates were generally excellent and there was little systematic race, SES, or age bias, the final sample is likely to be more representative of female than male participants due to their higher overall retention across waves.

Data for the present study were provided by a subset of 1,946 individuals (95% of the sample). Excluded individuals included T1 or T2 virgins who were lost to follow-up ($n = 56$), those who were still virgins at T3 ($n = 35$), and those who provided no valid event reports ($n = 11$) or reported on only same-sex events ($n = 3$). Excluded respondents were younger at T1 (15.6 years vs. 16.3 years), $t(2049) = -3.3, p < .001$, and more likely to be White (71% vs. 55% for non-White), $\chi^2(1) = 9.3, p < .01$, than included respondents. However, there were no gender or SES differences.

Sample of Event Reports

At each wave, respondents were asked a series of questions regarding the most recent time they had had sex, followed by a parallel series of questions about the first time they had had sex with that partner. If the most recent experience was a first-time sexual experience, then no further event reports were obtained at that wave. The number of waves for which sexual experience reports were provided by each person also depended on attrition and age of sexual debut. Accordingly, respondents provided from one ($n = 160$; 8%) to six ($n = 510$; 26%) nonoverlapping sexual-event reports for a total of 7,653 event reports ($M = 3.9$ events per person).

Event reports were dropped when physical coercion ($n = 61$) or a same-sex partner ($n = 76$) was involved or if the respondent was younger than 10 years old at the time of sex ($n = 5$). Although the number of reported sex events for adolescents between ages 10 and 13 was small (<1% of event reports), all of these reports involved consensual intercourse and were thus retained. For analyses predicting condom use, event reports were dropped if the couple was trying to conceive ($n = 293$). Thus, all analyses except those for condom use were based on 7,511 reports (analyses for condom use were based on 7,218 events).

Table 1 presents descriptive information for the 7,511 events, broken down by first versus subsequent sex event. As shown in Table 1, there were no differences in the racial or SES composition of individuals who provided first and subsequent sex reports, though a small but significant difference was found in gender composition. Because of the way in which information about events was elicited, individuals were necessarily younger on first than subsequent sex occasions, and first sex occasions occurred longer ago than did subsequent sex occasions. Finally, a larger proportion of all first-sex reports was provided at Wave 2, whereas a larger proportion of subsequent-sex reports was provided at Wave 3. This pattern likely reflects developmental trends in which people have more sex partners in their early to mid 20s and then fewer as they approach 30 (Arnett, 2000).

Interview Procedures

At T1, informed consent was obtained from participants prior to the interview, as was parental consent for minors. A structured face-to-face interview was conducted by a professionally trained interviewer who was always matched on gender and 75% of the

Table 1
Descriptive Information Broken Down by Sexual Situation

Characteristic	First sex	Subsequent sex	Test statistic
<i>n</i>	4,326	3,185	
Mean age (in years)	19.8	23.1	$t(6232.6) = 33.5^{**}$
Male (%)	47	45	$\chi^2(1) = 4.69^*$
Black (%)	47	47	$\chi^2(1) = 0.00, ns$
Mean Time 1 parental SES	0.00	0.00	$t(7509) = -0.08, ns$
Mean time since event (in years)	2.42	0.14	$t(4702.5) = -51.2^{**}$
Wave data collected			$\chi^2(2) = 79.0^{**}$
% at Time 1	29.1	27.2	
% at Time 2	38.1	30.5	
% at Time 3	32.7	42.3	

Note. SES = socioeconomic status.

* $p < .05$. ** $p < .001$.

time on race. The interview lasted an average of 2 hr and contained both interviewer- and self-administered portions. Respondents completed self-administered questions with the interviewer present (though seated at a discreet distance) to assist, if needed. Simply worded definitions or line drawings ensured that respondents had a common understanding of key sexual terms. More sensitive questions (e.g., on sexual behavior) were contained in a self-administered booklet, which respondents sealed in a privacy envelope at the end of the interview. Steps taken to ensure confidentiality were apparently successful, because only 18 T1 respondents refused to answer sexual behavior questions.

The interview protocol was essentially identical at later waves with two exceptions. First, both the interviewer- and self-administered portions of the interview were computerized. Thus, some part of the observed age-related increase in risk taking could reflect this method change given that computerized interviews increase reporting of sensitive behaviors (Rosenfeld, Booth-Kewley, & Edwards, 1993). Second, 4.4% ($n = 86$) and 18.5% ($n = 362$), respectively, of T2 and T3 participants had moved out of the area and were therefore interviewed by phone. However, comparison of key sexual behavior items assessed by the two methods revealed no differences due to method once demographic characteristics of those who moved versus those who stayed in the area were controlled.

Measures

Control variables. Gender (0 = female, 1 = male), race (0 = non-Black, 1 = Black), age at time of intercourse (computed by subtracting how long ago the situation occurred from interview age), and parental SES were used as control variables in the present study. Parental SES, assessed by parent report at T1, was based on a mean of two standardized items—parental occupation status (either parent employed vs. neither) and education (highest year in school completed by either parent). A short version of the Marlowe-Crowne Social Desirability (MCSD) scale (Strahan & Gerbasi, 1972) was also included. However, the MCSD was administered at T2 only, thus reducing the subset of individuals (from 1,946 to 1,757) and event reports (from 7,511 to 7,079) available for analyses including this control variable. For this reason, the MCSD was not controlled in the primary analyses but was included in a series of supplemental analyses to ensure that

results of the primary analyses were not unduly contaminated by socially desirable responding.

Personality traits. Nine measures, each assessed at all three waves, were used to index the five individual difference constructs of interest to the present study. Measures were assessed identically across waves.

Communal orientation. Communal orientation was assessed by a composite of the expressivity subscale from the Personal Attributes Questionnaire (PAQ; Spence, Helmreich, & Stapp, 1974) and a measure of need for intimacy (Bernstein, Hoffmann, Santiago, & Diebolt, 1989). Expressivity assesses individual differences in prototypically feminine traits, including warmth, nurturance, and empathy for others. Eight items were assessed on a 5-point bipolar scale anchored on the low and high end, respectively, by phrases such as *not at all understanding of others* versus *very understanding of others* and *very cold toward others* versus *very warm toward others*. Need for intimacy was assessed by five items (e.g., “having someone who really cares about you” and “being deeply and emotionally involved with one person”) on which respondents rated their importance on a 5-point scale ranging from 1 (*not at all*) to 5 (*extremely*). Internal consistency reliabilities ranged from .73 (T1) to .82 (T3) for expressivity and from .78 (T1) to .84 (T3) for need for intimacy.

Agency. Agency was assessed by the instrumentality subscale from the PAQ (Spence et al., 1974). Instrumentality assesses individual differences in prototypically masculine traits, including independence, self-confidence, and social dominance. The eight items of this subscale were assessed on a 5-point bipolar scale in which the low and high ends, respectively, were anchored by phrases such as *not at all competitive* versus *very competitive* and *not at all self-confident* versus *very self-confident*. Internal consistency reliabilities ranged from .70 (T1 & T2) to .79 (T3).

Negative emotionality. Negative emotionality was assessed by a composite of three subscales from the Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983): Depression, General Anxiety, and Hostility. The BSI has been shown to be sensitive to low levels of symptomatology in normal population samples (Derogatis & Melisaratos, 1983). Respondents reported on the extent to which they had been bothered by each symptom in the past month on a 5-point scale ranging from 1 (*not at all*) to 5 (*extremely*). Although typically used as a state measure, the

present measure had a longer reporting window (past month vs. past week) and thus evidenced stability comparable to that of other trait measures used in the present study (see Table 2). Internal consistency reliabilities ranged from .75 to .83 for anxiety, .81 to .86 for depression, and .80 to .81 for hostility across waves.

Impulsivity. Impulsivity refers to the tendency to act hastily and without thought and the difficulties of resisting urges and cravings. Impulsivity was assessed by seven items from the Conscientiousness scale of the NEO Personality Inventory (Costa & McCrae, 1985), whose internal consistency reliabilities ranged from .63 to .76 across waves.

Venturesomeness. Venturesomeness was assessed by a composite of erotophilia from the Erotophilia–Erotophobia scale (Fisher, Byrne, & White, 1983) and a measure of need for sex (Cooper et al., 1998). Fisher and colleagues (1983) conceptualized erotophilia–erotophobia as a bipolar dimension assessing the valence (from positive to negative) of emotional responses to a wide array of sexual stimuli. However, the scale split into two largely uncorrelated factors when factor-analyzed in our sample ($r < -.16$ across waves). Thus, only the subset of seven items assessing positive emotional (i.e., erotophilic) responses to sex was used. Representative items (which were slightly reworded from the original) included “I like to daydream about sex” and “Watching a nude dancer would be exciting for me.” Items were rated on a 6-point agree–disagree scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). Need for sex was measured by four items assessing the importance of being and feeling sexual (e.g., “In general, how important is sex to you?”). Items were answered on a 5-point scale ranging from 1 (*not at all*) to 5 (*extremely*) scale. Internal consistency reliabilities ranged from .73 (T1) to .79 (T3) for erotophilia and from .84 (T1) to .86 (T3) for need for sex.

Forming composite personality measures. For analytic purposes, both wave-specific and cross-wave composites were created for each of the five traits. The wave-specific and cross-wave measures can be thought of as representing relatively more state- and traitlike components, respectively, of each personality dimension.

Wave-specific composites were formed by taking the mean of relevant measures at each wave for those constructs assessed by more than one measure. For example, the T1 measure of communion was formed by averaging T1 expressivity and T1 need for intimacy. Coefficient alphas for wave-specific composites ranged

from .81 to .85 for the three-scale negative emotionality composite, from .64 to .72 for the two-scale venturesomeness composite, and from .50 to .53 for the two-scale communality composite.

Cross-wave composites were created by taking the mean of relevant measures across all available waves. For example, the cross-wave measure of communal orientation was computed by taking the average of up to six measures: three of expressivity and three of need for intimacy (one for each wave). Cross-wave composites evidenced moderate to high internal consistency reliability (range = .68–.84). Descriptive information, intraclass correlations, and correlations among the cross-wave composites are provided in Table 2. As shown, the intraclass correlations are relatively high, indicating that the majority of variance in the multiple assessments of each personality dimension exists at the between-persons rather than the within-person level. In other words, personality traits are more stable than variable even during this life stage.

Event-level assessments of context variables. Situation type was coded 0 (*subsequent sex occasion with a more established partner*) and 1 (*first sex occasion with a new partner*). Relationship context was assessed by a single item (Zelnick & Kantner, 1979) in which respondents were asked to describe the nature of their relationship with their sex partner at the time of intercourse on a 7-point scale ranging from 1 (*your spouse*) to 7 (*someone you had just met that same day or evening*). Thus, responses were arrayed on a continuum from highly committed on the low end to transient and uncommitted (i.e., casual) on the high end. Accordingly this measure is best thought of as indexing the degree to which the relationship was casual or uncommitted.

Event-level risk measures. Five behaviors were assessed for each sexual situation at all waves, including the previously described measure of (low) relationship commitment. As noted by Perlman and Campbell (2004), relationship variables are commonly used in sex research in multiple ways—including as independent, dependent, control, mediating, and moderating variables. In the present study, (low) relationship commitment is used in two primary ways. On the one hand, this variable describes the nature of the relationship with one’s partner at the time of sex and thus is treated as an indicator of poor or risky partner choice—that is, as an outcome. On the other hand, the degree of relationship commitment (or lack thereof) also provides a meaning structure in which the sexual experience occurs and, as

Table 2
Descriptive Information and Correlations Among Trait Predictors

Variable	1	2	3	4	5
1. Communal orientation	.60	.10*	.02	–.22*	.04
2. Agency	—	.62	–.34*	–.17*	.09
3. Negative emotionality	—	—	.56	.37*	.11*
4. Impulsivity	—	—	—	.57	.13*
5. Sexual venturesomeness	—	—	—	—	.53
<i>M</i>	4.03	3.78	1.89	2.97	3.29
<i>SD</i>	0.45	0.50	0.52	0.68	0.76
Minimum	2.3	1.8	1.0	1.0	1.0
Maximum	5.0	5.0	4.8	5.4	5.4

Note. $N = 1,946$. Intraclass correlations are on the diagonal.

* $p < .01$.

a result, might alter or moderate the expression of one's personality depending on its level. Thus, it is also treated as a moderator in the present study.

Correlations among these five measures were modest ($1.011 \leq r \leq 1.331$), indicating that each measure taps into a distinct behavior and should therefore be treated as independent. The remaining four risk behavior measures were assessed in the following ways.

Alcohol use. Alcohol use was assessed by two items: whether any alcohol was consumed prior to intercourse and, if so, how "drunk or high" (rated on a 1 to 4 scale) the respondent was at the time of intercourse. For analytic purposes, a composite was created in which respondents were scored 0 if they did not drink; 1 if they drank, but were *not at all* intoxicated; 2 if they were *somewhat* intoxicated; and 3 if they were *pretty* or *extremely* intoxicated.

Partner risk. Partner risk was assessed by six items asking the respondent about his or her partner's sexual history at the time of intercourse (e.g., "At the time you first had sex, had [Partner Name] . . ."). Questions included whether the partner had ever (a) had sex for money or with a prostitute, (b) had sex with a homosexual or bisexual partner, (c) had any type of sexually transmitted disease, or (d) shot intravenous drugs. Respondents were also asked whether their partner was currently sexually involved with anyone else, as well as how many total sex partners (not counting the respondent) their partner had had at the time of sex. Response options for all items (except number of partners) were *yes*, *probably yes*, *probably no*, *no*, and *don't know*. For analytic purposes, a count was created that treated *yes* and *probably yes*, as well as values in the upper one third of the distribution for number of partners, as risky responses.

Prior risk discussion. Prior risk discussion was assessed by a count (from 0 to 4) of the number of different topics discussed with the partner prior to having intercourse on that occasion. Topics included pregnancy and STD risks, partner's past sexual experiences and IV drug use history, and the use of condoms or birth control.

Condom and birth control use. Condom and birth control use was assessed by a single item in which respondents were presented with a list of birth control options that they or their partner might have used on that occasion and were asked to check all that applied. An open-ended option was provided for other methods. Two dichotomous variables created from these responses indexed whether (0 = no, 1 = yes) a condom or another effective method of birth control (defined by an actual user effectiveness rate $\geq 90\%$; Hatcher et al., 1994) was used. *Don't know* and *don't remember* were scored as 0 on both variables.

Overview of Data Analysis

A series of multilevel random coefficient (MRC) models was estimated with the Hierarchical Linear and Nonlinear Modeling (HLM) program (Version 6; Raudenbush, Bryk, Cheong, & Congdon, 2004). The MRC model is well suited to these data because multiple-event reports can be nested under the individual, thus taking dependencies in a person's reports of multiple events into account. In addition, MRC yields more accurate and reliable estimates than do alternative within-person approaches by using all available data to generate parameter estimates and weighting these estimates according to their reliability (Raudenbush & Bryk, 2002).

The MRC models estimated in the present study included two levels. The Level 1 (L1) model estimated associations between within-person changes in situation type (first sex vs. subsequent sex), relationship context, personality, and age, on the one hand, and within-person changes in risky behaviors, on the other. The following is a representative L1 equation:

$$\begin{aligned} Alc_{is} = & b_{0i} + b_{1i}(\text{sexual occasion})_{is} + b_{2i}(\text{age})_{is} \\ & + b_{3i}(\text{communal orientation})_{iw} + b_{4i}(\text{agency})_{iw} \\ & + b_{5i}(\text{negative emotionality})_{iw} + b_{6i}(\text{impulsivity})_{iw} \\ & + b_{7i}(\text{venturesomeness})_{iw} + e_{is}, \end{aligned}$$

where Alc_{is} is person i 's reported level of alcohol use on a specific sex occasion, s ; b_{0i} represents the intercept, or average level of alcohol use, for person i across all sex occasions; b_{1i} represents the partial relationship (controlling for all other L1 predictors) between sex occasion type and alcohol use for person i ; b_{2i} represents the partial relationship for age at time of intercourse and alcohol use for person i ; b_{3i} through b_{7i} reflect the partial relationships between changes in personality and changes in alcohol use (across waves) for person i ; and e_{is} is the random residual component, or unexplained variance in alcohol use, including random measurement error, for person i .

In the Level 2 (L2) model, between-persons differences in risky behaviors (averaged across event reports) as a function of stable interindividual differences in personality traits were estimated. Finally, in a series of cross-level interactions, key hypotheses regarding the differential predictive validity of personality on risky sexual behaviors across sexual situations and relational contexts were tested. Examples of the first and second types of L2 equations, respectively, follow.

$$\begin{aligned} b_{0i} = & a_0 + a_1(\text{significant demographic control}) \\ & + a_2(\text{communal orientation}) + a_3(\text{agency}) \\ & + a_4(\text{negative emotionality}) + a_5(\text{impulsivity}) \\ & + a_6(\text{venturesomeness}) + d_i, \end{aligned}$$

where b_{0i} is the intercept from the L1 equation, a_0 = average alcohol use for persons scoring 0 on all predictor variables, a_1 through a_6 = partial (controlling for all other L2 predictors) regression coefficients representing the effect of each variable on average alcohol use (collapsed across sex occasions), and d_i = unexplained (between-persons) variation in the intercept.

$$\begin{aligned} b_{1i} = & c_0 + c_1(\text{significant demographic control}) \\ & + c_2(\text{communal orientation}) + c_3(\text{agency}) \\ & + c_4(\text{negative emotionality}) + c_5(\text{impulsivity}) \\ & + c_6(\text{venturesomeness}) + f_i, \end{aligned}$$

where b_{1i} is the partial regression coefficient for sex occasion from the L1 equation, c_0 = the effect of sex occasion type on alcohol use for persons scoring 0 on all predictor variables, c_1 through c_6 = partial (controlling for all other L2 predictors) regression coefficients representing the effect of each variable on the associ-

ation between situation type and alcohol use (in other words, the cross-level interaction), and f_i = unexplained variation in the magnitude of the effect of occasion type on alcohol use.

Several analytic decisions crosscut all analyses and are thus discussed here. First, distributional properties of all risky behaviors, broken down by occasion type, were examined to ensure their normality. All variables had skew ≤ 2.0 and kurtosis ≤ 4.0 . Because these values fall within an acceptable range (Tabachnick & Fidell, 2000), particularly for large samples, no transformations were undertaken. Second, all L1 variables were person-centered, which effectively controls for mean level differences in predictors between persons (Enders & Tofighi, 2007; Nezlek, 2001) and ensures that coefficients are estimated at values that fall within the observed range of values (namely at the mean). Third, L2 variables were grand-mean-centered (i.e., centered around the mean in the sample as a whole; Enders & Tofighi, 2007; Nezlek, 2001). This, too, facilitates interpretation, just as it does in ordinary regression (Aiken & West, 1991). Fourth, to provide more stable estimates of significant effects, trimmed models were developed by dropping nonsignificant effects (Raudenbush & Bryk, 2002). Fifth, expectation-maximization estimation was used for continuous outcomes, whereas Bernoulli estimation with an overdispersion parameter was used for condom use (Raudenbush & Bryk, 2002). Finally, although all effects would be ideally estimated as random (Nezlek, 2001), problems with model convergence precluded this. Thus, as per recommendations by Nezlek (2001), effects were estimated as either fixed or random on the basis of the significance (or lack thereof) of random error terms when estimated individually in a set of preliminary analyses.

Results

Preliminary Analyses: Effects of Background/Demographic Characteristics

In a set of preliminary multilevel analyses, significant covariates for inclusion in the primary analyses were identified. All significant (at $p < .10$) effects were retained as controls. Each risky behavior was predicted (at L1) by age at time of intercourse (controlling for situation type) and (at L2) by gender, race, and parental SES. (Note that although age would normally be treated as causally prior, age and situation type were confounded by design in the present study [i.e., respondents were always younger and less experienced at first than at subsequent sex occasions assessed at the same wave] such that causal priority could not be readily assigned to either variable.)

Results showed that age at time of intercourse was significantly associated with all five risky behaviors, accounting for between 5% and 18% of the within-person variance. The strongest effects were found for partner risk and risk discussion, with older respondents reporting more in-depth risk discussion and riskier partners (presumably partners were also older on average and thus had accumulated experiences that put them at risk). Older individuals also had more committed (less casual) relationship partners, drank more prior to intercourse, and were less likely to use condoms. At L2, gender was the most reliable predictor, with men reporting more alcohol use, more casual relationship contexts, and less risk discussion but also more condom use and less risky partners (a finding in line with epidemiologic data showing that women have

fewer, more committed sex partners; Smith, 1992). Examination of the race coefficients showed that Blacks, relative to Whites, reported more casual relationship contexts and more risky partners but less alcohol use and more condom use. Finally, individuals from higher SES backgrounds reported more alcohol use and more risk discussion. Together the three L2 variables (gender, race, SES) accounted for as little as 2%–3% of the between-persons variance in partner risk and condom use to as much as 14%–17% of the variance in the remaining three risky behaviors.

Even though none of the background/demographic characteristics was associated with a uniform pattern of increased or decreased risk, these results nevertheless accord well with extant epidemiologic data showing, for example, that alcohol use, sexual experience, and the likelihood of moving into a committed relationship increase during late adolescence and emerging adulthood (Arnett, 2000; Schulenberg, Wadsworth, O'Malley, Bachman, & Johnston, 1996); that men have more casual sex partners (Smith, 1992) and higher rates of condom use (Sheeran et al., 1999); that Blacks drink less (Bachman et al., 1991) and use condoms more often (Sheeran et al., 1999); and that higher SES individuals drink more (van Oers, Bongers, van de Goor, & Garretsen, 1999). These preliminary findings thus also reflect positively on the validity of the situational reports.

Parsing Variability in Risk-Taking Behaviors

An important contention of the present study is that past research has focused disproportionately on person-level factors while ignoring influences that vary across situations and relationship contexts. This contention assumes that although people may vary, on average, in their level of risk taking, they vary substantially, perhaps even more so, in their behaviors from situation to situation or from context to context. The extent to which risky behaviors reflect between-persons versus within-person variability was determined by decomposing the total variance in each risky behavior into its between-persons (L2) and within-person (L1) components, which was done by estimating a series of unconditional or null models (i.e., models that have no predictors; Nezlek, 2001).

Results of these analyses revealed that, on average, 25% of the variance in the five risky behaviors was due to between-persons differences, whereas 75% was due to variability within the person across situations, partners, and time. Partner risk showed the smallest proportion of within-person variability (66%), whereas condom use (81%), alcohol use (81%), and degree of relationship commitment (86%) showed the largest proportions. One might argue, however, that because of the design of the present study, within-person variability is overestimated, given the elapsed time over which the data were collected and the profound within-person changes that would be expected from adolescence into young adulthood. However, decomposition of the residual variance after controlling for age at the time of intercourse showed an almost identical pattern of results: An average of 72% of the residual variance was at the within-person level, with the proportions ranging from 61% (for partner risk) to 80% (for relationship commitment status). Although it is true that some unknown portion of the L1 variance is due to error (Raudenbush & Bryk, 2002), these results are nonetheless consistent with the idea that a substantial portion of the variance in risky sexual behaviors exists at

the within-person level, thus underscoring the need to examine within-person variability and factors such as transient situational cues and changing relationship contexts that might account for this variability.

Effects of Situation Type and Relationship Commitment on Situational Risk Taking

In the next series of analyses, hypotheses regarding the effects of changing situational and relational contexts on within-person variability in risk-taking behaviors were tested. First, an MRC model was estimated in which the casualness of the relationship (i.e., low partner relationship commitment) was predicted from situation type (entered at L1). For the remaining four behaviors, the effects of situation type and low relationship commitment (entered at L1) were jointly estimated to determine whether each exerted an independent effect, as expected. Age at time of intercourse was controlled (at L1) in all models. An estimate of the absolute magnitude of effects was determined by calculating proportional reductions in L1 error (PREs) when both effects were simultaneously entered (or for situation type, when casualness of the relationship was the outcome), relative to an age-only model. PREs are analogous to an R^2 statistic in ordinary regression (Raudenbush & Bryk, 2002) and thus indicate the proportion of variance explained in the behavior due to the addition of the predictors of interest. Results are summarized in Table 3.

As shown in Table 3, situation type significantly predicted relationship casualness such that individuals were, as expected, in casual relationships more often on first than on subsequent sex occasions. This effect was large, explaining 20% of L1 variance in (low) relationship commitment. The fact that the majority of L1 variance remained unexplained, however, suggests that the two variables are indeed distinct phenomena, as expected.

Examining results for the remaining outcomes revealed that both situation type and low relationship commitment independently predicted three of the four risky behaviors, as expected. In the only exception to this pattern, low relationship commitment but not situation type independently predicted risk discussion. Examination of the individual effects showed that all effects were in the predicted direction: People drank more, had riskier partners, and were more likely to use a condom on sex occasions with a new (vs. established) or casual (vs. serious) partner. In addition, they dis-

cussed fewer risk topics with casual partners than with serious partners. As shown in the last row of Table 3, these effects were small to moderate in size.

Effects of Personality on Situational Risk Taking

A series of five multilevel models (one for each risk measure) was estimated in which the effects of stable interindividual differences in personality (assessed by cross-wave composites) were estimated, controlling for significant background/demographic factors (at L2). In addition, the effects of within-person changes in personality (assessed by wave-specific measures) were estimated, controlling for age at the time of intercourse and situation type (at L1). Analyses at the between-persons and within-person levels address two distinct but complementary questions: Do people who differ in the level of a trait engage in different levels of risky sexual behavior from one another (L2)? Do changes in the level of a trait predict changes in the level of risk taking within a person (L1)?

Trimmed models in which nonsignificant, trait effects were dropped at both levels were then estimated. Finally, proportional reductions in error were calculated. At L1, the PREs for the set of significant within-person (wave-specific) personality predictors were calculated relative to a base model including age and situation type. At L2, the PREs for the set of significant cross-wave personality composites were calculated relative to a base model including gender, race, and parental SES, as previously discussed, as well as the trimmed L1 model. Results for personality effects at both levels are summarized in Table 4.

A careful examination of the overall pattern of results indicates that between-persons and within-person effects were on the whole quite similar, though between-persons effects were both more numerous and stronger than within-person effects were. As shown, a total of 14 effects were significant and of the same sign at both the between-persons and within-person levels. An additional four personality effects were not significant at either level. Thus, a total of 18 of the 25 personality effects were consistent across the between-persons and within-person levels. Of the remaining seven effects, five were significant at the between-persons but not within-person level, and conversely two were significant at the within-person but not between-persons level. Examination of the PREs showed that between-persons effects were on average nearly

Table 3
Effects of Situation Type (First Sex vs. Subsequent Sex) and Relationship Commitment on Risky Sexual Behaviors

Variable	Sexual risk and protective behaviors				
	Alcohol use	Casual relationship	Partner risk	Risk discussion	Condom use ^a
<i>b</i> situation type	0.06*	1.20**	0.27**	0.00	.61**
First sex ^b	0.38	4.98	0.98	2.52	.56
Subsequent sex ^b	0.32	3.84	0.71	2.52	.41
<i>b</i> (low) relationship commitment	0.14**		0.14**	−0.15**	.15**
PRE	.068	.200	.099	.032	.057

Note. All effects estimated controlling for age at time of intercourse. *b* = unstandardized regression coefficient; PRE = the proportional reduction in Level 1 error variance when situation type and relationship commitment are added to a model containing age only.

^a Values for condom use were estimated with the Bernoulli algorithm (Raudenbush & Bryk, 2002); predicted means are probabilities of use. ^b Predicted mean.

* $p < .01$. ** $p < .001$.

Table 4

Main Effects (Unstandardized Partial Regression Coefficients) and Proportional Reductions in Error (PRE) Variance for Between-Persons and Within-Person Differences in Personality

Variable	Alcohol use		Casual relationship		Partner risk		Risk discussion		Condom use	
	B/n	W/n	B/n	W/n	B/n	W/n	B/n	W/n	B/n	W/n
Communal orientation	-.158***	-.077*	-.544***	-.431***	-.442***	-.190***	.350***	.236***	-.100	-.216*
Agency	.045†	.007	-.054	.025	.026	-.070	.060	.045	.147*	.077
Negative emotionality	.052*	.020	.156***	.076†	.180***	.081*	-.056	-.094*	-.044	-.072
Impulsivity	.038*	.039*	.069*	.051†	.061*	-.009	-.110**	-.069*	-.161**	-.105*
Venturesomeness	.129***	.057**	.211***	.149***	.299***	.059*	-.119***	.015	-.245***	.070
PRE (full model)	.109	.005	.332	.028	.233	.013	.064	.006	.046	.003

Note. PREs indicate the proportional reduction in Level 2 (for the between-persons effect) or Level 1 (for the within-person effect) error variance due to the addition of all significant predictors to a base model containing age and situation type at Level 1 (or age, situation type, and other birth control use when condom use was the dependent variable) and significant demographic covariates (race, gender, and/or parental socioeconomic status) at Level 2. Although regression coefficients for all condom use models were taken from analyses with Bernoulli estimation (Raudenbush & Bryk, 2002), variance decomposition estimates are not provided with Bernoulli estimation. Thus, for the purposes of calculating PREs only, analyses with condom use as the dependent measure were rerun with the EM algorithm. B/n = between-persons effect; W/n = within-person effect.

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

16 times larger than the within-person effects (mean PREs = .157 vs. .011, respectively), suggesting that most of the important main effect variance for traits lies at the between-persons level. Indeed, even if one considers that most of the variance in the risky behaviors themselves exists at the within-person rather than the between-persons level, stable interindividual differences in personality still account for more of the overall variance in risk taking than does within-person changes in personality, at least in the present data.

Examining the direction of personality effects showed that the overwhelming majority of the effects were in the expected direction. At the between-persons level, communal individuals had less casual and less risky partners and discussed more risk topics than did their noncommunal counterparts. They were not, however, any less likely to use a condom. Likewise, at the within-person level, people had less casual and less risky partners and discussed more risk topics at waves when they felt more communal. However, in contrast to findings at the between-persons level, people were also less likely to use a condom at waves when they felt more communal. Finally, communal individuals drank less alcohol than did their less communal counterparts, and likewise people drank less alcohol at waves when they felt more communal. Although not specifically predicted, this association might reflect a tendency for communal individuals, as well as for individuals who are experiencing heightened levels of communality, to avoid settings such as bars and parties where alcohol is freely available but opportunities to meet intimacy needs are constrained.

Agency, the second dimension of the interpersonal circumplex, was related to only two of five risky behaviors at the between-persons level and was unrelated at the within-person level. As shown in the second row of Table 4, highly agentic individuals were more likely to use condoms than were their low-agency counterparts. However, they were also marginally more likely to drink proximal to intercourse. Thus, consistent with prior research, the effects of interindividual differences in agency on risky behaviors were weak and inconsistent.

As shown in the third row of Table 4, negative emotionality was related to higher levels of drinking prior to intercourse and to both

more casual and more risky partners at the between-persons level. In contrast, between-persons differences in negative emotionality were unrelated to protective behaviors, including risk discussion and condom use. As previously argued, this pattern of results suggests that people who are chronically high in negative emotionality may seek comfort, relief, or distraction by drinking or having sex with a desired but risky partner. Effects at the within-person level are at least partially consistent with this interpretation because they show that when people felt more negative affect they were more likely to have sex with a casual or risky partner, perhaps in an effort to alleviate their distress. However, at waves when people experienced more negative affect, they were also less likely to discuss risk topics, a finding that as previously discussed is more consistent with an information-processing interpretation than an emotion-management framework.

As shown in the fourth row of Table 4, between-persons effects indicate that highly impulsive individuals take more risks across all five behaviors than do their less-impulsive counterparts. Likewise, within-person effects suggest that increasing levels of impulsivity lead to increased risk taking, again across all five behaviors. Thus, consistent with past research, dispositionally impulsive people as well as people who are experiencing heightened impulsivity at a particular point in time are more likely to engage in risky sexual behaviors.

Finally, as shown in the fifth row of Table 4, sexually adventurous individuals relative to their less adventurous counterparts engaged in higher levels of risk taking across all five behaviors, as expected. At the within-person level, however, increases in venturesomeness were not uniformly associated with increased risk taking. Rather, people were more likely to drink alcohol proximal to intercourse and to have sex with casual and risky partners at waves when they felt more adventurous, but they were not any more or less likely to discuss risk topics or use a condom.

Moderation of Trait Effects on Sexual Risk Taking

In two series of analyses, the hypothesized moderating effects of situation type and relationship commitment on the links between

personality and risky sexual behaviors were tested. The first series tested cross-level, Person \times Situation interactions, and the second tested cross-level, Person \times Relationship Commitment interactions. Within each series, all possible cross-level interactions were added to a base model that included the five personality variables and significant background/demographic variables as (L2) main effects, along with age and either situation type or low relationship commitment at L1. Trimmed models were then estimated in which nonsignificant interaction terms and associated trait main effects (assuming they also were nonsignificant) were dropped from the model. Results are summarized in Table 5.

Person \times Situation interactions. As shown in the upper half of Table 5, 10 of the 25 Person \times Situation interactions were significant at conventional levels, and one additional interaction approached significance ($p < .10$). Examining the overall pattern of interactions revealed that the effects of all traits, except negative emotionality, were moderated for at least two of the five risky

behaviors. The most robust and consistent patterns of effects were observed for venturesomeness and impulsivity, for which seven of the 10 interactions were significant. Examining the simple slopes for these interactions (see Table 5) revealed that all conformed to expectations—that is, effects for both impulsivity and venturesomeness were stronger on first than subsequent sex occasions. Three of the remaining four interactions also conformed to this pattern, with communal orientation predicting risk discussion—and agency predicting having sex with a more casual partner and risk discussion—more strongly on first than on subsequent sex occasions. Thus, 10 of the 11 interactions conformed to the predicted pattern. In the only exception to this pattern, communal orientation predicted condom use more strongly with established partners than with new partners.

An estimation of the simple slopes with personality rather than situation type as the moderator further illuminated the nature of the interaction effects. That is, simple slopes describing change from

Table 5

Personal \times Situation and Personal \times Relationship Commitment Interaction Tests With Simple Slopes for Significant Interactions

Variable	Alcohol use	Casual relationship	Partner risk	Risk discussion	Condom use
Personal \times Situation interactions					
Communal orientation	.051	.056	.067	.362***	.242*** ^a
First sex	—	—	—	.493***	-.001
Subsequent sex	—	—	—	.131 [†]	-.243***
Agency	-.059	-.145*	.014	.130*	.006
First sex	—	-.114*	—	.109*	—
Subsequent sex	—	.031	—	-.021	—
Negative emotionality	-.043	-.100	-.010	.080	.019
First sex	—	—	—	—	—
Subsequent sex	—	—	—	—	—
Impulsivity	-.017	.095*	.042	-.090*	-.127*** ^b
First sex	—	.111**	—	-.147***	-.232***
Subsequent sex	—	.016	—	-.057	-.105
Venturesomeness	.090*** ^b	.224***	.042 ^{†b}	-.181***	-.033
First sex	.155***	.302***	.314***	-.199***	—
Subsequent sex	.076***	.078*	.272***	-.018	—
Personal \times (Low) Relationship Commitment interactions					
Communal orientation	.031	—	-.010	.179*** ^c	.143 ^{†a}
Stranger/Casual	—	—	—	.649***	.030
Engaged/Married	—	—	—	.112	-.399***
Agency	-.048*	—	-.016	.084	.109
Stranger/Casual	-.021	—	—	—	—
Engaged/Married	.123***	—	—	—	—
Negative emotionality	-.012	—	-.005	.044	.075
Stranger/Casual	—	—	—	—	—
Engaged/Married	—	—	—	—	—
Impulsivity	.023	—	.008	.013	-.119*
Stranger/Casual	—	—	—	—	-.361***
Engaged/Married	—	—	—	—	.004
Venturesomeness	.081***	—	.050*	-.081*** ^c	-.078 [†]
Stranger/Casual	.219***	—	.420***	-.253***	-.386***
Engaged/Married	-.025	—	.270***	-.010	-.153*

Note. Dash indicates that the simple slope was not estimated (interaction was not significant). Stranger/Casual = had sex with a stranger or casual partner; Engaged/Married = had sex with fiancé or spouse.

^a In supplemental analyses including both the Situation \times Communal Orientation and the Relationship Commitment \times Communal Orientation interactions, neither interaction was statistically significant. ^b Interaction not significant when estimated in the presence of the corresponding Personal \times Relationship Commitment interaction. ^c Interaction not significant when estimated in the presence of the corresponding Personal \times Situation interaction.

[†] $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

first to subsequent sex occasions were estimated among subgroups that were low (15th percentile) or high (85th percentile) on the relevant trait variable. Whereas the simple slopes shown in Table 5 emphasize how people with different levels of a trait behaved in the same situation (a between-persons focus), this approach emphasizes how individuals who were high or low on a trait behaved in different situations (a within-person focus).

Examining the form of the plotted interactions revealed that all but one interaction conformed to a common pattern of within-person change in which those with the riskiest trait profile (either high on a risk-promotive trait or low on a risk-protective one) showed the greatest change in behavior across situations. Figure 2 illustrates four of these interactions. As shown, those who were high in venturesomeness or impulsivity, or low in communality or agency, showed the largest changes (in the direction of decreased risk taking) from first to subsequent sex occasions, reflecting the fact that they engaged in unusually risky behaviors on first sex occasions. In contrast, those who were low on a risk-promotive trait (or high on a risk-protective one) showed less change from first to subsequent sex occasions, reflecting the fact that their level of risk taking was not as elevated on first sex occasions.

Figure 3 illustrates the two interactions predicting condom use. Although Panel A conforms to the dominant pattern in that those

who were high on communality (a risk-promotive trait with respect to condom use) showed steeper declines in condom use, this pattern cannot be attributed to the fact that highly communal individuals exhibited the riskiest behaviors on first sex occasions. Rather, the interaction pattern stemmed from the fact that highly communal individuals were substantially more likely to discontinue use with an established partner than were their low-communal-orientation counterparts. Finally, as shown in Panel B, individuals low in impulsivity reported the highest levels of condom use on first sex occasions, coupled with a steeper decline in use across occasions. In contrast, highly impulsive individuals reported consistently lower levels of use across both occasions. Thus, contrary to the predominant within-person pattern of change, low-risk as opposed to high-risk individuals exhibited the greatest change across occasions.

Person \times Relationship Commitment interactions. As shown in the lower half of Table 5, six of the 20 Person \times Relationship Commitment interactions were significant at $p < .05$, and two additional interactions approached significance ($p < .10$). Examining the overall pattern of interactions revealed that four of the five trait effects (all but negative emotionality) were moderated by relationship commitment. Examining simple slopes (see Table 5) for significant interactions showed that six of the eight interac-

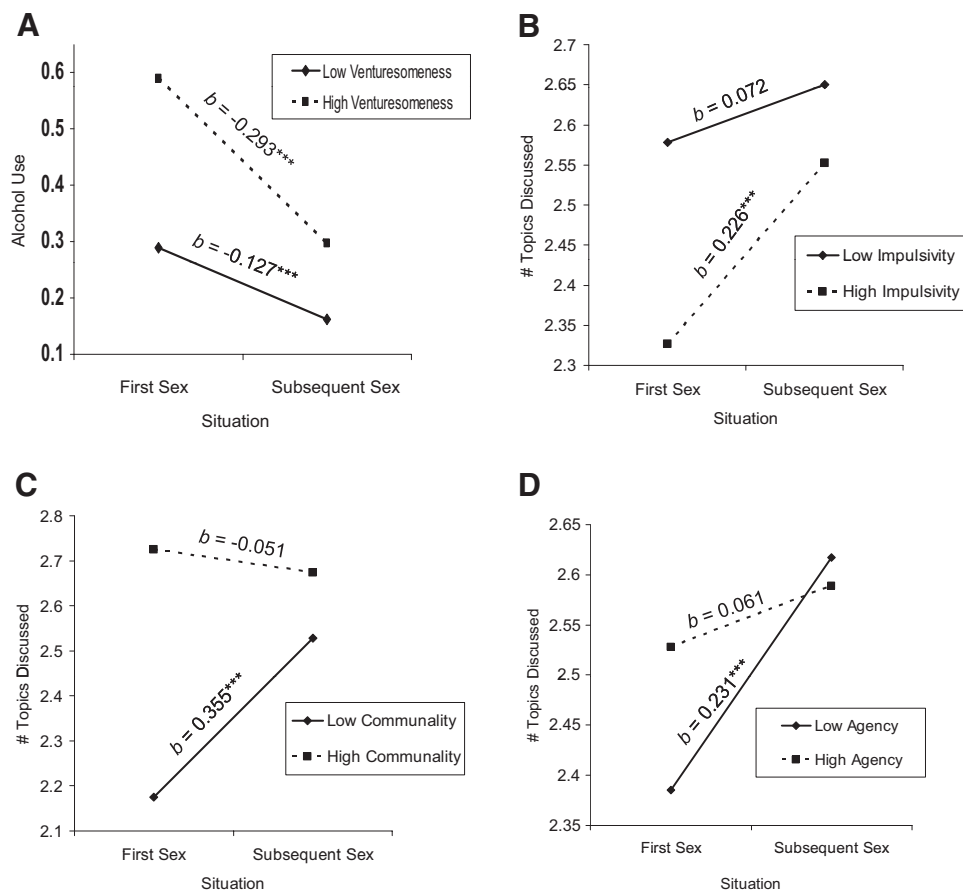


Figure 2. Representative Person \times Situation interactions. A: Venturesomeness \times Situation predicting alcohol use. B: Impulsivity \times Situation predicting risk discussion. C: Communality \times Situation predicting risk discussion. D: Agency \times Situation predicting risk discussion.

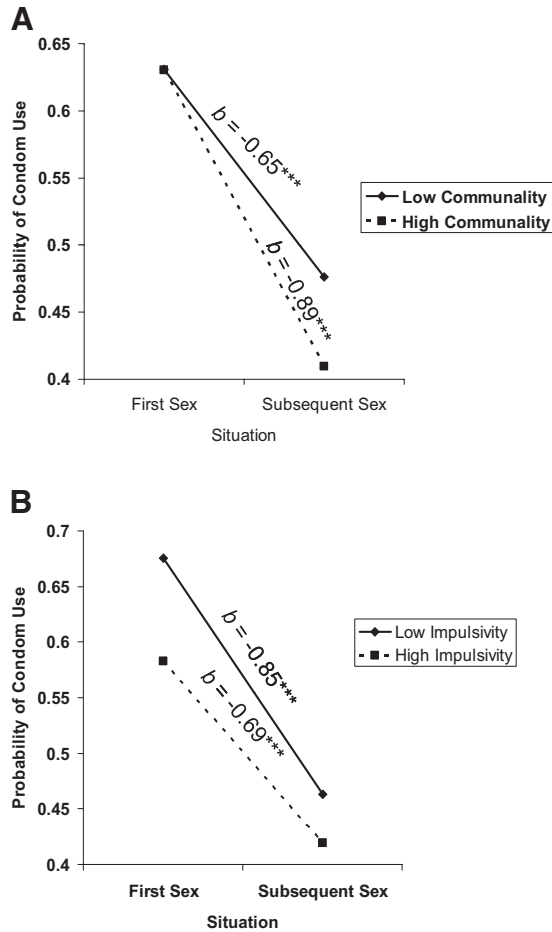


Figure 3. Person \times Situation interactions predicting condom use. A: Community \times Situation predicting condom use. B: Impulsivity \times Situation predicting condom use. *** $p < .001$.

tions conformed to expectations, with stronger personality effects observed with casual than with serious partners. Moreover, the most consistent pattern was observed for venturesomeness, where all four interactions were significant (or approached significance) and conformed to the predicted pattern.

Significant interactions were again plotted to illustrate within-person change among individuals who were low (15th percentile) or high (85th percentile) on the trait moderator. Examining the plotted interactions revealed that all but one of the interactions conformed to the previously observed dominant pattern of within-person change. Figure 4 illustrates three of these interactions. As shown, individuals who were low in communality or in agency, or high in venturesomeness, showed the greatest change in behavior across the relationship commitment spectrum. As shown in Panels A and B, the steeper change observed among those with riskier trait profiles was primarily due to the high levels of risky behavior exhibited with casual partners. In Panel C, however, the steeper change found among individuals low in agency reflected their unusually low levels of alcohol use with serious partners.

Finally, the communality and impulsivity interactions predicting condom use are shown in Figure 5. As shown in Panel A, those

who were high on the risk-promotive (with respect to condom use) trait of communality showed steeper declines in condom use across the relationship commitment spectrum than did their low-communality counterparts and thus conformed to the predominant within-person change pattern. However, individuals high in communality did not exhibit the highest level of risky behavior with casual partners but rather revealed the lowest rates of condom use (i.e., the riskiest behavior) with serious partners. Finally, in con-

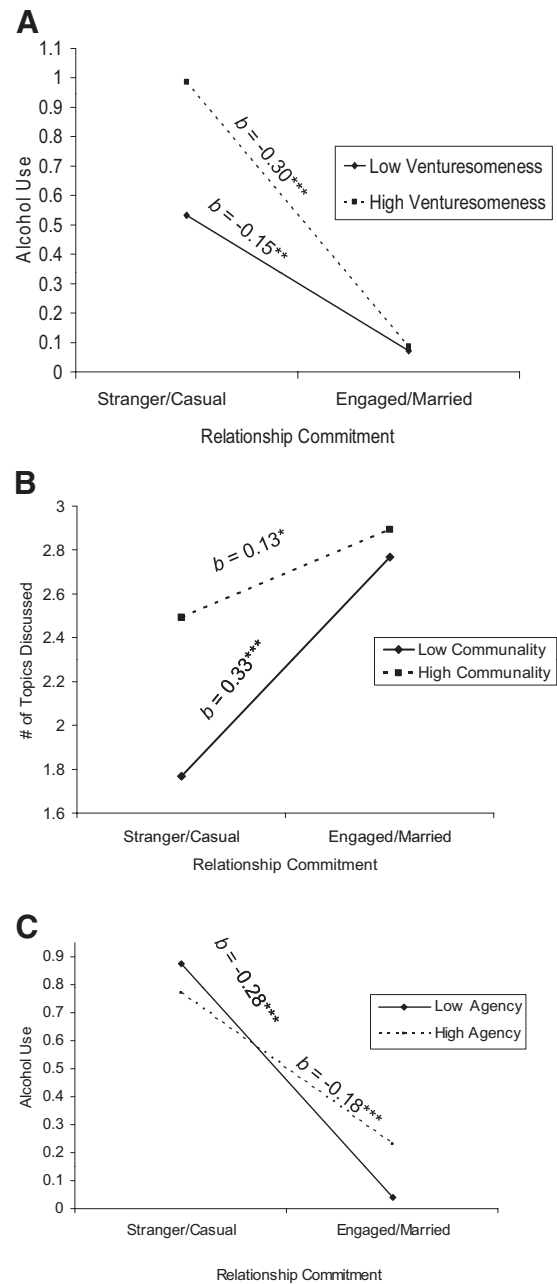


Figure 4. Representative Person \times Relationship Commitment interactions. A: Venturesomeness \times Relationship Commitment predicting alcohol use. B: Community \times Relationship Commitment predicting risk discussion. C: Agency \times Relationship Commitment predicting alcohol use. * $p < .05$. ** $p < .01$. *** $p < .001$.

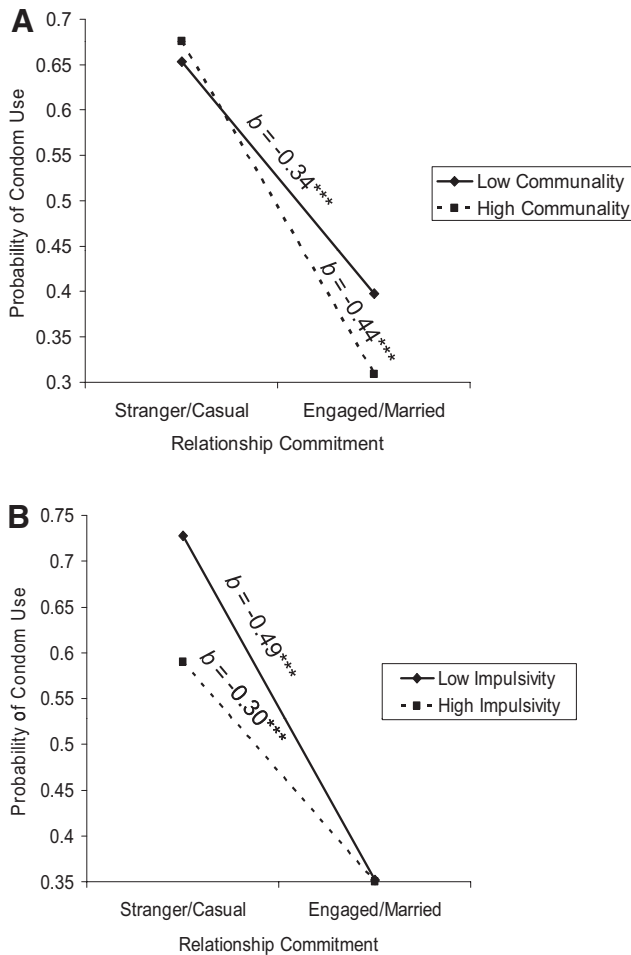


Figure 5. Person \times Relationship Commitment interactions predicting condom use. A: Communality \times Relationship Commitment predicting condom use. B: Impulsivity \times Relationship Commitment predicting condom use. *** $p < .001$.

trast to the situation for all remaining Person \times Relationship Commitment interactions, individuals who were low in impulsivity relative to their highly impulsive counterparts showed steeper declines in condom use over the relationship commitment spectrum, owing entirely to the higher rates of condom use reported with casual partners (see Figure 5, Panel B).

Magnitude of moderation effects. The PREs for the addition of significant situation type and relationship commitment interaction terms relative to the main effects only models were also calculated. Interactions accounted for 1% or less of the unexplained variance in all cases. However, as McClelland and Judd (1993) have argued, even substantively important interactions may account for only trivial amounts of variance, especially in field studies. Thus, two additional sets of effect size measures were calculated for all significant ($p < .10$) interactions in an effort to provide an alternate perspective on the importance of these effects.

Specifically, four predicted values (Y') were calculated on the basis of the final trimmed model for each interaction. These values represent the expected level of risky behavior for individuals who were low or high (operationalized as the 15th and 85th percentiles,

respectively) on the relevant trait moderator with new versus established partners or with casual versus serious ones. These four values were then used to calculate two sets of effect size indices: (a) a pair of within-person effect size indices to represent the magnitude of within-person change across contexts for those who were low versus high on the trait and (b) a pair of between-persons effect size indices to represent the magnitude of between-persons differences on sex occasions with new versus established partners or with casual versus serious ones.¹ The resulting effect size indices can be interpreted as d s (Kline, 2004). More important for the present application, the relative size of the corresponding d s (e.g., for those who were low vs. high on the trait moderator) can be directly compared by computing a ratio of the two standardized effect sizes. This ratio, similar in logic to an odds ratio, can be used to provide an alternate perspective on the strength of the moderation effects.

As an example, consider the interaction shown in Panel A of Figure 2. Calculating within-person effect size indices showed that the average decrease in alcohol use from first to subsequent sex occasions was $-.67$ standard deviations (SD s) among those who were high in venturesomeness compared with an average decrease of $-.29$ SD s among those low in venturesomeness. Thus, the amount of within-person change in alcohol use across situation types was more than twice as great (d s = $-.67$ vs. $-.29$) among those who were high versus low in venturesomeness. Examining the between-persons effect size indices for the same interaction showed that the average difference in alcohol use between high and low venturesomeness individuals was $.68$ SD s at first sex, compared with $.31$ SD s on subsequent sex occasions. Thus, the effect of venturesomeness on alcohol use was more than twice as large (d s = $.68$ vs. $.31$) on first than on subsequent sex occasions. Note that although the within versus between comparisons were similar in this case, they need not be. Consider the communal interaction shown in Panel C of Figure 2. Here the within-person change in number of topics discussed was 6.8 times as large among individuals low in communality compared with those high in communality (d s = $.34$ vs. 1.05). In contrast, the between-persons difference for individuals low versus high in communality was 3.7 times as large on first versus subsequent sex occasions (d s = $.52$ vs. $.14$).

Comparing between-persons effect size indices collapsed across the 11 Person \times Situation interactions showed that trait effects on

¹ Within-person change scores were calculated by subtracting the predicted value for first sex occasions from the predicted value for subsequent sex occasions (or by subtracting the predicted value for sex with casual partners from the predicted value with serious partners) for individuals who were low or high on the trait. For example, the within-person effect size index for individuals low or high on a given trait was calculated as follows: $Y'_{LS} - Y'_{LC}$, where Y'_{LS} equals the predicted value of Y for individuals low on the trait with a serious partner and Y'_{LC} equals the predicted value of Y for individuals low on the trait with a casual partner. Separate between-persons change scores were also calculated by subtracting the predicted value for those who were low on the trait from the predicted value for those who were high on the trait within each level of situation type (i.e., first sex, subsequent sex) or relationship context (viz., just met/casual, engaged/married). The resulting difference scores were then divided by the average within-person standard deviation for the behavior to yield two pairs of standardized effect size indices for each interaction.

risky behaviors varied across first and subsequent sex occasions, on average, by a factor of 4.2:1. That is, personality effects were on average a little more than four times as great in one type of sexual situation (in all but one instance, first sex situations) than in the other type of sexual situation. Similarly, comparing between-persons effect size indices collapsed across the eight relationship commitment interactions revealed that, on average, trait effects on risky behaviors varied across the relationship commitment spectrum by a factor of 4.7:1, with effects being larger for casual partners in six of eight cases. Parallel comparisons of the within-person effect size indices (again collapsed across the 11 situation-type interactions) showed that, on average, the effects of situation type on risk taking were 2.8 times as large among individuals who anchored one end of the personality distribution (typically the risk-promotive end) as among those anchoring the other end. Collapsing across the eight Person \times Relationship Commitment interactions revealed that the effects of relationship commitment on within-person change in risk-taking behaviors were 1.8 times as large, on average, among individuals anchoring one end of the personality distribution (again typically the risk-promotive end) as among those anchoring the other end.

In short, although the observed interactions accounted for only small amounts of variance in risk-taking behaviors, these interactions translated into four- to fivefold increases in the magnitude of between-persons differences across situational and relationship contexts and into two- to threefold increases in the magnitude of within-person change among individuals who were high versus low on the relevant trait constructs. These effects seem consequential by any yardstick.

Testing the Independence and Generalizability of Personality Main Effects and Interactions

Four sets of analyses were conducted to assess the independence and robustness of the primary findings reported in Tables 4 and 5. Two sets of analyses evaluated the independence of the interaction effects from each other and from age. A third set examined confounding of both the main and interaction effects by social desirability bias, and the final set examined generalizability of both the main and interaction effects across men and women.

Confounding of interaction effects with one another. As shown in Table 5, six instances occurred in which significant situation type and relationship commitment interactions were obtained for the same trait \rightarrow risky behavior pair. Determination of whether the two interactions were statistically independent versus overlapping in these cases was made by estimating a series of six models in which both significant interactions were simultaneously estimated. Results of these analyses showed that in three cases (denoted by superscript *b* in the top half of Table 5) the situation type interaction was no longer significant after controlling for the corresponding relationship commitment interaction, whereas the relationship commitment interaction remained significant. The reverse was true in two cases (denoted by superscript *c* in the bottom half of Table 5)—that is, the relationship commitment interaction was no longer significant after controlling for the corresponding situation type interaction, whereas the situation type interaction remained significant. In the model predicting condom use, neither communal orientation interaction was significant in the combined model (denoted by superscript *a* in Table 5), suggesting that the

two moderation effects are sufficiently overlapping that they cannot be unambiguously disentangled. Thus, with this one exception, all trait \rightarrow risky behavior links were uniquely moderated by one of the two contextual variables.

Confounding of interaction effects with age. Because respondents were younger on first than subsequent sex occasions and younger respondents had less committed partners on average, significant moderation effects for situation type and relationship commitment might be due instead to age. This possibility was examined by conducting a series of analyses, parallel to those reported in Table 5, in which Trait \times Age interactions were tested in lieu of the situation type or relationship commitment interactions. Results of these analyses revealed that 12 of the 25 Trait \times Age interactions tested were significant ($p < .05$; data not shown) and that eight of these interactions overlapped a significant situation type or relationship commitment interaction. Despite this overlap, joint analyses in which corresponding Trait \times Age and Trait \times Situation, or Trait \times Age and Trait \times Relationship Commitment, interactions were simultaneously estimated revealed that all situation and relationship commitment interactions remained significant even after controlling for the corresponding Trait \times Age interaction. In contrast, six of the eight previously significant Trait \times Age interactions were no longer significant when estimated in the presence of the corresponding situation or relationship commitment interaction.² These analyses thus indicate that the moderation effects of situation and relationship commitment cannot be explained by underlying differences in age, though some of the age interactions can be explained by differences in the types of situations or relationship contexts that younger versus older individuals typically seek out or find themselves in.

Confounding by socially desirable responding. A series of supplemental analyses was conducted to ensure that the primary results in the present study were not spurious owing to the uncontrolled effects of socially desirable responding. Preliminary analyses showed that socially desirable responding (assessed by the MCSD scale) significantly predicted four of the five risky behaviors such that high scorers relative to their low scoring counterparts reported significantly less drinking, less casual and less risky partners, and more risk discussion (all $ps < .01$). They did not, however, differ in reported levels of condom use. Accordingly, both the main and interactive effects of personality on these four behaviors (all but condom use) were reestimated controlling for the MCSD scale.

Results showed that all personality main effects (see Table 4) were replicated in both sign and significance even after controlling for the MCSD scale. In addition, all Person \times Relationship Commitment interactions (see Table 5, bottom half) were replicated in both sign and significance after controlling for MCSD, as were seven of the nine reestimated Person \times Situation interactions (see

² Examination of the form of the significant interactions showed that the effects of communal orientation, negative emotionality, and impulsivity differed in magnitude only, with effects being consistently stronger among older than younger respondents. In contrast, agency was significantly positively related to condom use among younger respondents but was unrelated among older ones. Finally, venturesomeness was significantly negatively related to risk discussion among younger respondents but significantly positively related among older respondents.

Table 5, top half). The remaining two interaction terms (Agency \times Situation predicting casual relationship; Impulsivity \times Situation predicting risk discussion) were replicated in terms of sign but not significance (both $ps < .12$), presumably owing to the smaller subset available for these analyses and the corresponding reduction in power. Together these analyses indicate that the main and interactive effects of personality on risky behaviors reported in Tables 4 and 5 cannot be attributed to the shared bias of social desirability on self-reports of personality and risky behavior.

Generalizability across men and women. Although a comprehensive treatment of the role of gender is beyond the scope of the present study, ensuring that the primary conclusions apply to both genders seems imperative given that the meaning and hence phenomenological experience of sexual behavior is thought to differ fundamentally for men and women in society (Canary, Emmers-Sommer, & Faulkner, 1997). Accordingly, two additional series of analyses tested the invariance of the primary effects across gender groups.

In the first series, Gender \times Trait interactions were added to the previously described main effects models reported in Table 4, thus yielding a total of 25 interaction tests (5 Trait \times Gender interactions for each of five risky behaviors). Of the 25 interactions tested, only two were significant. Both involved communal orientation and followed a similar form. Specifically, the risk-protective effects of communal orientation on relationship commitment and risk discussion were significant in both genders but were significantly stronger among men than women.

In the second series, Gender \times Trait \times Situation or Gender \times Trait \times Relationship Commitment interactions were added to the relevant interaction models summarized in Table 5. Of the 45 three-way interactions tested (25 Gender \times Person \times Situation interactions; 20 Gender \times Person \times Relationship Commitment interactions), only three were significant. Interestingly, however, all three involved agency: Gender \times Agency \times Relationship Commitment predicted alcohol use ($b = 0.13, p < .05$) and partner risk ($b = -0.14, p < .05$), and Gender \times Agency \times Situation predicted risk discussion ($b = -0.22, p < .05$).

Probing the interactions revealed that in two of the three cases the two-way agency interaction was significant among women ($bs = -0.10$ and $0.19, ps < .01$, for alcohol use and risk discussion, respectively) but not among men ($bs = 0.03$ and $-0.03, ps > .45$, for alcohol use and risk discussion, respectively). Examining simple slope associations for the corresponding two-way interactions revealed that among men agency was unrelated to either drinking or risk discussion across all levels of each moderator. Among women, however, the patterns were more complex: Agency was associated with higher levels of risk discussion with new sex partners ($b = 0.19, p < .01$) and higher levels of alcohol use with serious partners ($b = 0.18, p < .001$), whereas it was unrelated to risk discussion with established partners ($b = 0.00, ns$) and unrelated to drinking with casual ones ($b = -0.11, p = .11$). Importantly these findings indicate that two of the three agency interactions shown in Table 5 hold only among women.

Finally, the third interaction (predicting partner risk) followed a similar pattern to that in the three-way interaction just described, with one exception: The relevant two-way Agency \times Relationship Commitment interactions were not significant among either women ($b = 0.07, p < .14$) or men ($b = -0.07, p < .16$). Nevertheless, as with the previously described pattern of simple

slopes, agency was unrelated to partner risk across all levels of partner relationship commitment among men, whereas it was positively related to having a riskier casual sex partner ($b = 0.20, p < .06$) though not a riskier serious partner ($b = -0.01, ns$) among women.

Thus, agency effects were fewer in number but uniformly risk-protective among men (viz., agentic men were more likely to use condoms; see Table 4). In contrast, agency effects were more numerous and more variable among women, with highly agentic women exhibiting both more and less risky behavior than did their low-agency counterparts depending on the context and the specific risky behavior under scrutiny.

In summary, trait effects examined in the present study were on the whole quite similar across men and women. Indeed, effects were completely invariant for negative affectivity, impulsivity, and venturesomeness. Interestingly, however, effects for the gender-linked traits of agency and communion varied such that communion (a prototypically feminine trait) was more strongly risk-protective among men, whereas agency (a prototypically masculine trait) exerted stronger and more varied effects on risky behaviors among women.

Discussion

The present study examined the individual and joint contributions of personality, situational, and relational factors as they shape risky sexual behaviors, including condom use. Results of multi-level analyses nesting sexual events under persons support the following conclusions. First, risky sexual behaviors exhibit reliable variability between persons, as well as reliable variability within a person over time and across situational and relationship contexts. Importantly, however, these behaviors vary approximately three times as much within a person as they do between persons, and this was true even after controlling for the effects of age, an important source of within-person variability in the present study. Second, both differences between people in levels of sexual risk taking and differences within a person over time and context can be reliably explained. Specifically, more than one fourth of the variance in between-person differences in sexual risk taking was explained by a relatively small number of personality traits, in particular (low) communality, (high) negative emotionality, (high) impulsivity, and (high) sexual venturesomeness. Similarly, up to 20% of the within-person variability in risky sexual behaviors was explained by situation type and relationship commitment, independent of within-person changes in age, which accounted for up to an additional 20% of the within-person variability in risky behaviors. In contrast, although within-person changes in personality provided theoretically meaningful explanation of within-person changes in risky sexual behaviors, these effects were quite modest in magnitude. Finally, approximately half of all trait \rightarrow risky behavior associations were moderated by situational or relational context, thus lending clear support to an interactionist perspective on risky sexual behaviors. These findings are elaborated below.

Situation and Relationship Context Effects on Risky Sexual Behaviors

Results of the present study showed that sex occasions with new and casual partners are riskier on average than are sex occasions

with established or serious ones, a fact that people appear to understand, because they are much more likely to use a condom on such occasions. Moreover, features of the situation type and of the relationship commitment accounted for up to 20% of the within-person variability in risk-taking behaviors, though in no case were these effects uniform across levels of all traits.

Despite the robust associations observed between these contextual factors and risk taking, the majority of within-person, across-situation-type variability nevertheless remained unexplained, even after taking age effects into account. Although some unknown part of this variability reflects random error and thus cannot be explained, it is likely that a more in-depth assessment of partner and relationship commitment characteristics would lead to substantially improved prediction. In addition, Kelly and Kalichman (1995) identified a number of situational factors that are thought to trigger sexual risk taking—factors that include alcohol and drug use (which was included as an outcome in the present study but was not examined as a predictor of other risky behaviors), sexual arousal, affectionate feelings for the partner, and mood states, among others. Thus, the present study could be usefully extended by incorporating additional features of situation types and relationship commitment into a more comprehensive model aimed at more fully explicating the contextual and situational sources of variability in sexual risk taking.

Trait Effects on Risky Sexual Behaviors

Fewer than half of all trait effects (12 of 25) were completely invariant across both situational and relationship commitment contexts. Specifically, highly agentic individuals were more likely to use a condom than were their low-agency counterparts; and highly impulsive individuals drank more prior to intercourse and had riskier sex partners than did their less-impulsive counterparts. Similarly, individuals with high levels of negative affectivity drank more and had both more casual and more risky partners. Highly communal individuals, however, exhibited the opposite profile of behaviors—they drank less prior to intercourse and had both less casual and less risky partners. If the invariance criterion is relaxed to include effects that differed in magnitude but were nevertheless significant across all levels of the moderators examined, three additional effects can be added to the list: Highly venturesome individuals also had less intimate, more risky partners and were less likely to use condoms. In short, these data suggest that low levels of communality—and high levels of negative emotionality, impulsivity, and venturesomeness—predispose individuals in a global or average way to engage in a range of risky sexual behaviors.

Importantly, most of these effects were also replicated at the within-person level. Although the direction of causality cannot be ascertained from these data, the data are nevertheless consistent with a dynamic or process interpretation of traits—specifically, that traits set processes into motion that cause people to take sexual risks and conversely that taking risks may set into motion processes that alter one's personality. Exploring the mechanisms that underlie this dynamic process to determine whether causality does indeed run in both directions represents an important direction for future research.

Although the between-persons analyses suggest that some traits do indeed predispose people to sexual risk taking in a global or

typical way, the absence of moderation of these particular effects does not rule out the possibility that they are conditioned upon other contextual cues or even on other intraindividual factors. For example, research has shown that individuals who experience high levels of distress are more likely to drink to cope with their distress if they also believe that drinking provides an effective antidote to that distress (Cooper, Frone, Russell, & Mudar, 1995). By extension, it seems likely that distressed individuals who seek solace in a casual or risky sexual encounter also believe that doing so will provide comfort or a needed diversion, though this possibility has not to my knowledge been directly tested. A more careful examination of these and other possible conditioning effects provides one important direction for future research on how personality shapes involvement in risky sexual behaviors.

Person \times Situation Effects on Sexual Risk-Taking Behaviors

In the present study, more than half (13 of 25) of all trait \rightarrow risky behavior associations examined were moderated by situation type or relationship commitment level. Conversely, every situation type and relationship commitment effect was moderated by one or more traits. Thus, most traits do not predispose to increased risk taking in a global or typical way, just as specific sexual situations and relationship commitment contexts do not invariably lead to greater risk taking. Rather, in most cases, it is the unique combination of the person and the situation that confers maximal risk.

For example, individuals low in communality discussed significantly fewer risk topics than did their high communal counterparts with new or casual partners, whereas no differences in risk discussion were observed with established or serious partners. Conversely, individuals low in communality were significantly more likely to use a condom with a serious partner, whereas no differences were found with casual partners. Thus, neither low nor high communality was uniformly associated across situations and relationship commitment contexts with precaution adoption. Rather, risk was conferred by a unique combination of standing on the trait, the nature of situational demands or contingencies, and the specific dynamics or meaning of the behavior.

Particularly striking was the consistent pattern of moderation observed for impulsivity and venturesomeness, traits widely thought to serve as generalized predisposing factors for risk-taking behavior. Not only were eight out of 10 associations moderated by situation type or relationship commitment context, but the majority of these cases (five of eight) distinguished contexts in which a significant, positive association existed between trait and risky behavior versus no association whatsoever.

Finally, consistent with mixed results reported in past research, effects for the sex-linked trait of agency proved conditional on a complex combination of gender, situational, and relationship commitment contexts. Specifically, among both men and women, agency was associated with having a more intimate sex partner—but only on first sex occasions. In addition, highly agentic women (but not men) discussed significantly more risk topics with new sex partners (but not with serious ones), a situation in which high levels of confidence and skill are presumably required to negotiate or insist on safe sex discussions. Thus, agency served as a risk-protective factor in all of these cases. However, among women, agency also promoted riskier behavior in two circumstances:

Agency was related to greater alcohol use with serious (but not casual) partners and to more risky casual (but not more risky serious) sex partners. Together these findings indicate that the increased self-confidence, assertiveness, and dominance characteristic of highly agentic individuals may have both risk-protective and risk-promotive consequences among women, whereas these attributes—in situations in which they have an effect at all—function in a risk-protective manner among men.

Although it is not clear how best to interpret these patterns, several possibilities can be entertained. For example, differences might stem from ambiguity in what is measured by the agency subscale used in the present study (*viz.*, whether it assesses primarily masculinity or instrumentality, or some combination of the two) or might stem from underlying differences in what being highly agentic means for men and women, in the one case representing gender-role-conforming behavior and in the other nonconforming behavior (Lippa, 2002). Alternatively, highly agentic individuals may simply be better equipped to achieve their goals in a given situation, thus suggesting that agency serves primarily to moderate the link between goal setting and goal pursuit, on the one hand, and goal attainment, on the other. To the extent that this is true, confident prediction of how agency shapes involvement in risky sexual behaviors will require a more thorough understanding of the common and unique goals that highly agentic men and women hope to achieve in specific sexual situations. Although these interpretations are highly speculative, they nevertheless represent fruitful paths for future inquiry.

Implications for Theory and Research on Risky Sexual Behaviors

Considered together, results of the present study have a number of potentially important theoretical and methodological implications for research on risky sexual behaviors. First, these results lend strong support to the view that meaningful within-person and between-persons differences in risky sexual behavior can and do coexist (*cf.* Fleenor, 2001). Accordingly, strategies that seek to understand within-person variability in risky sexual behaviors across situations, partners, and time, as well as those that seek to understand typical or average differences between persons, appear to have merit. At the same time, the fact that risky behaviors vary substantially more within a person than they do, on average, between persons underscores the limitations of predominant strategies used in past research, which have focused on relatively static properties of the person and used global measures of risk and protective behaviors aggregated across situations and partners. Such strategies not only are incapable of explaining the majority of variance in risky sexual behaviors but also obscure the most informative aspect of these behaviors—their variability. As Mischel and colleagues (*e.g.*, Mischel & Shoda, 1995) have argued, identifying and understanding reliable patterns of cross-situational variability in behavior must lie at the core of any successful effort to explain human behavior. Indeed, it is through the study of this variability, of the unique patterns of behavior exhibited across situations or contexts, that the true meaning of trait differences is most likely to be revealed (Mischel, 1999; Shoda, 1999). Future research on the role of personality in sexual risk taking must therefore develop more complex, contextualized models that explicitly account for variability in behavior across situations and

relationships, as well as measurement tools that more faithfully capture this variability. Toward this end, studies involving diary methods should prove particularly informative.

Second, although the primary findings in the present study make clear the need to adopt a more contextualized, interactionist perspective on risky sexual behaviors, they fail to converge on a single, cohesive explanatory model of sexual risk-taking behaviors. Indeed, no single overarching pattern or profile of trait and Trait \times Context interactions emerged across risky behaviors. Nevertheless, a dominant pattern of interaction effects was found that characterized more than three fourths of all significant interactions. When viewed from a between-persons perspective, this pattern was consistent with the *a priori* hypothesis that an individual's behavior is more strongly determined by his or her own personality on sex occasions with new or casual partners—situations in which behavioral guides are presumably weak or absent. An alternative and equally compatible interpretation of this pattern is that an individual's sexual behavior is more interdependent with established or serious partners and is thus less predictable by his or her own personality.

When viewed from a within-person perspective, the dominant pattern portrays a process in which individuals with risk-prone trait profiles (*viz.*, high on a risk-promotive, or low on a risk-protective, trait) reported the greatest change in risky behavior across situational and relational contexts and typically also the riskiest behavior on occasions with new or casual sex partners. Although this pattern was not explicitly hypothesized, it is compatible with the traits as situational sensitivities (TASS) model advanced by Marshall and Brown (2006). According to this model, individuals with a risk-prone trait profile should be more sensitive to risk-relevant cues in a situation and, as a result, exhibit riskier behavior at lower levels of these cues. Trait-linked sensitivities to risk-relevant cues present on occasions with new and casual sex partners would account for not only the unusually high levels of risky behavior observed among those with risk-prone trait profiles but also the steeper change observed across contexts that presumably varied in the strength of these cues.

Interestingly, Marshall and Brown (2006) argued that differences in the predictive validity of traits should be strongest at moderate levels of situation strength. As applied to the present case, little risk taking would be expected at low levels of risk-relevant cues regardless of one's trait profile, whereas at high levels of these cues, even those with a low-risk trait profile should behave in a risky manner. In essence, Marshall and Brown's model posits a Trait \times Curvilinear-Situation-Strength interaction in which the largest differences between individuals low and high in a trait should be found at moderate rather than low or high levels of situation strength. Although this possibility could not be examined for situation type, which had only two levels, supplementary analyses were conducted to determine whether traits interacted with curvilinear relationship commitment, as specified by the theory. Results showed that three of the 20 Trait \times Curvilinear Relationship Commitment interactions were significant. However, only one of these interactions conformed to the predicted pattern: Differences between low- and high-communality individuals in the number of risk topics discussed were greater at moderate levels of relationship commitment than at extremely casual or highly committed levels of relationships. Thus, although the more precise form of the Person \times Situation interaction predicted by the TASS

model was for the most part not found, future research should nevertheless attempt more definitive tests of this model by identifying and developing reliable ways to assess risk cues present in different sexual situations and relationship commitment contexts.

Finally, results of the present study underscore the limitations of overly broad models that fail to discriminate among distinct risky behaviors. Although each behavior examined in the present study clearly entails risk of negative outcomes and thus can be appropriately labeled a risky behavior, these behaviors nevertheless do not comprise a psychologically homogeneous category of behaviors. With the exception of the two relational outcomes, not a single risky behavior was associated with the same profile of trait effects. Moreover, if one extends this analysis to include interactions, no two behaviors were characterized by the same pattern of effects, thus strongly suggesting that the underlying mechanisms linking personality to these behaviors differs across the five behaviors examined. This is not surprising in light of the fact that the largest correlation among the five risky behaviors was .33. Thus, although general models such as the framework portrayed in Figure 1 may be useful for organizing one's thinking at a broad, abstract level, they cannot provide an adequate explanation of specific risky behaviors. As Catania, Kegeles, and Coates (1990) have argued, each behavior has its own set of dynamics or factors that encourage its continuation, and that creates pressures for its discontinuation. Ultimately, therefore, a cluster of models loosely organized under the Person \times Situation metatheoretical perspective will be required to adequately explain involvement in diverse forms of risky sexual behaviors.

Strengths and Limitations of the Present Study

The present study builds on and extends past research in several important ways. First, the present study provides the most comprehensive test of the Person \times Situation interactionist perspective on risky sexual behavior conducted to date, by considering how multiple aspects of the person and of the context combine to influence a range of risky sexual behaviors. Second, by including up to six events with up to three different partners, the present study enabled a stronger test of Person \times Situation effects than earlier studies, which relied on data from two situations (e.g., one with a serious partner, one with a casual partner) or on data aggregated (by the respondent) across partners or partner types (e.g., casual vs. serious). Whereas the former approach can yield nongeneralizable results to the extent that the two events are atypical (Weinhardt & Carey, 2000), the latter is vulnerable to the biasing effects of existing schemas about how one usually behaves, for example, with casual versus serious partners. Third, the present study included a sufficient number of units at both the between-persons and within-person levels to provide statistically powerful tests of the key interaction hypotheses, which in past research have been severely underpowered (McClelland & Judd, 1993). Finally, the use of a large, representative, and diverse community sample also enables more broadly generalizable conclusions than have been presented in past research.

At the same time, several limitations of this research must be acknowledged. First, a number of concerns can be raised about the validity of retrospective, self-reports of behavior in specific sexual events. Such reports are subject to a host of well-documented random and systematic errors of reporting (Schwarz, 1999), par-

ticularly when reports of sensitive behaviors are involved (Schaeffer, 2000). Although such concerns cannot be eliminated, they can be minimized by following recommended protocols, as was done in the present study. For example, specific steps were taken to enhance the privacy of responding—widely considered the single most important determinant of the validity of self-reported sensitive behaviors (Schaeffer, 2000)—as well as the accuracy of recall of targeted events (see Bradburn, Rips, & Shevell, 1987).

The fact that first sexual experiences occurred longer ago than did last sexual experiences raises the possibility that last events were more reliably reported than were first events. This concern is mitigated to at least some extent, however, by the fact that first sexual experiences are highly memorable (Harvey, Flanary, & Morgan, 1986) and memorable events are more accurately reported (Shiffman, 2000). This point notwithstanding, research has also shown that as the length of time increases between an event and its report, people rely increasingly on semantic rather than episodic memory (Robinson & Clore, 2002). Thus, it is plausible that associations among variables on first sex occasions were generally stronger than were associations on last sex occasions, not because first sex occasions are weak situations, as hypothesized, but rather because reports of experience on first sex occasions were more strongly based in semantic than episodic memory—that is, on trait-consistent beliefs about experiences rather than on recall of actual experiences. Arguing against this interpretation, however, is the fact that similar results were found for sex occasions with casual partners, and these occasions did not uniformly occur longer ago than occasions with serious partners.³ Finally, the possibility that some form of response bias (e.g., mood congruent memory) contributed to the observed covariation among measures also cannot be ruled out, although the possibility that socially desirable responding was responsible for this covariation was effectively ruled out in the previously reported supplemental analyses.

Results of the present study could be usefully extended to consider the contributions of a broader and more comprehensive set of personality variables. Although individual differences examined in the present study were carefully chosen to represent dimensions of personality thought to be particularly relevant to an understanding of risky sexual behaviors, the present constellation of factors nevertheless fails to provide complete coverage of the major dimensions of personality as identified by contemporary models such as the Big Five (Costa & McCrae, 1985). Many of the measures used in the present study also were not standard measures of personality. Thus, future research with standardized measures of a more comprehensive set of personality dimensions would help to establish the generalizability of the present findings to the trait constructs of interest, ensure that potentially important determinants of risky sexual behaviors were not overlooked, and

³ Although on average, across all waves of data collection, sex occasions with more casual partners occurred longer ago than did sex occasions with more serious partners ($r = .15, p < .001$, between number of months since the interview and the casualness of the relationship on that occasion), this association varied by wave and did not hold at Wave 1 ($r = -.01, ns$). Despite this, the identical pattern of effects was observed for relationship commitment and risk taking at each wave. Thus, a memory bias explanation cannot account for the observed effects for relationship commitment across all waves.

better situate the study of risky sexual behaviors within the mainstream of personality research.

Interpretation of the context effects observed in the present study was of necessity highly inferential because theoretically important features of the contexts were not assessed. Although this criticism is not unique to this study—indeed, difficulties conceptualizing and assessing features of the situation have long been recognized as a core issue in personality and social psychology (Kelley et al., 2003)—it is nevertheless the case that definitive tests of the core ideas put forth in this study cannot be conducted without a more careful, thoughtful delineation of salient situational features and the development of psychometrically sound tools for assessing them.

Finally, it is important to acknowledge limitations on causal inference. Compositing trait measures across waves rendered the temporal order between measures of personality and situational risk taking uncertain. Although use of T1 personality measures along with the exclusion of T1 event reports would have imposed a clear temporal order on predictors and outcomes, it would have come at considerable cost—less reliable measures of personality; a greatly reduced sample of events; and an older, less representative, and less risky sample of individuals. Likewise, although examining associations between within-person changes in personality and within-person changes in behavior provided an important conceptual replication of trait effects and additional weight to a process interpretation of these effects, the direction of causal flow is equally ambiguous here. Nevertheless, the validity of the presumed causal order is supported by major theoretical models, which view personality as causally antecedent to behavior (e.g., McCrae & Costa, 1999), as well as by the principle that more stable variables (in this case, personality) typically cause less stable ones (in this case, situational behavior; Davis, 1985). Thus, although caution is always warranted when drawing causal inferences, the postulated causal flow from global personality to measures of situated risk taking is supported by both theoretical and epistemological considerations.

Conclusions

The present study provides strong support for a Person \times Situation interactionist perspective on sexual risk-taking behavior. Although people do differ in average levels of sexual risk taking as a function of their standing on relevant traits, they differ much more across situations in response to changing situational contingencies, and they differ in unique ways depending on their personalities. These findings strongly suggest that standard methods of studying sexual risk taking that focus on global between-persons differences in background and demographic characteristics, traits, attitudes, and behaviors are fundamentally flawed. Such approaches can at best account for only a small portion of the total variance in risk-taking behaviors, because only a minority of the total variability exists at the between-persons level. More important, the variability that this approach misses is the variance best suited to illuminate the psychological dynamics underpinning risky sexual behaviors and thus is the level of analysis most likely to yield findings that can be translated into meaningful social policy and change efforts.

In conclusion, the present study indicates that stable individual differences in personality play an important role in shaping risky

sexual behaviors but that the ways in which they do so differ, sometimes dramatically, as a function of the constraints and demands of situations and relational contexts. Future progress toward understanding and changing these behaviors rests on developing models and methods that capture this complexity.

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