

Unprotected Anal Intercourse Among Immigrant Latino MSM: The Role of Characteristics of the Person and the Sexual Encounter

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Abstract Theoretical models of sexual risk-taking have traditionally focused on personal characteristics, but conceptual approaches emphasizing the social and situational context have also been proposed. This study examined the impact of characteristics of the person and of the sexual encounter on unprotected anal intercourse (UAI) among 482 immigrant Latino MSM. Analyses included logistic regression and hierarchical linear modeling. The personal characteristic of self-efficacy for safer sex was negatively associated with UAI over the previous three months, at the most recent encounter, and over multiple encounters reported by each participant. In addition, a cross-level interaction of self-efficacy at the person-level and sexual desire at the encounter-level showed that increased sexual desire was associated with greater likelihood of UAI for those with low self-efficacy, but not those with high self-efficacy. Likelihood of UAI was also linked to the situational characteristics of closeness to the partner, seroconcordance, and concern about STIs in the encounter.

Keywords Sexual risk · MSM · Self-efficacy · Seroconcordance · Sexual encounter · HIV

Introduction

Traditional theoretical models proposed by psychologists to explain sexual risk-taking have frequently focused on personal characteristics (Noar 2007). Many theories have stressed the importance of an individual's attitudes,

perceived norms, and self-efficacy (e.g., Theory of Reasoned Action—Fishbein and Ajzen 1975; Social Cognitive Theory—Bandura 1986; Integrated Model—Fishbein 2000). Other theories have emphasized risk perception (e.g., Health Belief Model—Janz and Becker 1984; Protection Motivation Theory—Rogers 1975), motivation (AIDS Risk Reduction Model—Catania et al. 1990; Information-Motivation-Behavioral Skills Model—Fisher and Fisher 1992; Transtheoretical Model—Prochaska and DiClemente 1983), or personality characteristics (e.g., Integrated Model—Fishbein 2000) as determinants of risk-related behavior. Although these theoretical approaches have advanced the field and provided the basis for many prevention efforts, they are limited by their focus on the characteristics of the individual. Sexual risk behavior differs not only between individuals but also within an individual from occasion to occasion, based on circumstances (Bajos and Marquet 2000; Barta et al. 2007). The same person may have protected sex in one situation or with one partner, but engage in unprotected sex in another situation or with another partner.

A theoretical approach that addresses the complexity of sexual risk behavior was proposed by Ewart (1991); Social Action Theory integrates conceptual approaches from psychology and from public health, addressing the impact on self-protective behavior not only of personal characteristics, but also of social interaction and contextual circumstances. Ewart (1991) argued that traditional psychological approaches have tended to neglect the ways in which social and physical situations can modify an individual's behavior. For sexual risk behavior, a crucial aspect of the social context arises from the interface between the partners.

The application of Social Action Theory to HIV prevention would posit that self-regulatory action (e.g., using

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condoms, practicing lower-risk sexual behaviors) is influenced not only by characteristics of the person (e.g., self-efficacy, attitudes), but also by the social, physical, and affective context in which the action occurs (e.g., the nature of the relationship between partners, drug use within the sexual encounter). Moreover, personal and contextual characteristics are seen as potentially altering each other's impact on behavior. For example, the link between self-efficacy for safer sex and unprotected sex might differ in sexual encounters that include drug use versus those that do not.

Ajzen and Fishbein (1977) have addressed the issue of context in another way. They argued that accurate prediction of behavior depends in part on a corresponding level of specificity in the predictors and the outcome. Thus, one would expect that the traditional psychological approaches emphasizing an individual's general characteristics would be most useful in predicting general patterns or aggregated indicators of behavior. In contrast, according to Fishbein and Ajzen, one would expect that the prediction of behavior in specific events would depend on attitudes relevant to those specific circumstances. Expanding this argument beyond attitudes, one would anticipate the prediction of behavior in specific events to be influenced by contextual features, individual characteristics, and their inter-relationships, as posited by Social Action Theory.

The current study explored these conceptual approaches to risk behavior in a U.S. sample of Latino men who have sex with men (MSM). We examined unprotected anal sex in several ways, using multivariate and multi-level methods. To capture a general pattern of risk, we used an aggregate number of times that a person engaged in unprotected anal intercourse (UAI) during the previous three months. To capture more situation-specific conditions, we assessed UAI in the most recent sexual encounter, as well as UAI in additional encounters reported by each person. For the predictors, we chose to focus on two personal characteristics that have theoretical and practical importance: self-efficacy and depression. Similarly, we focused on five features characterizing the context of sexual encounters that have been important in the research literature: intimacy of the relationship between partners, the presence or absence of seroconcordance between partners, the perceived risk of sexually transmitted infections in the encounter, the use of drugs, and the level of sexual desire.

Although Latinos are frequently treated as a single group, cultural attitudes concerning sexuality and HIV can vary in different countries of origin. This study focused on Latino immigrants from Brazil, Colombia, and the Dominican Republic. Brazil has the highest HIV rate in South America, and, as Portuguese speakers, Brazilians are often excluded from studies on Latinos in the U.S.

Colombians and Dominicans are among the fastest growing Latino groups in this country, doubling or nearly doubling in size in the 1990s (Logan 2001). In contrast to the more established Latino groups in the U.S. (Mexicans, Puerto Ricans, Cubans), they have received little research attention.

Characteristics of the Person

Self-efficacy

Self-efficacy for safe sex has been defined as a person's assessment of his or her own ability to use condoms or to avoid unsafe sexual practices in a variety of circumstances (Murphy et al. 2001). Self-efficacy has been associated with the ability to engage in protected sex (Semple et al. 2000), including in studies with Latino samples (e.g., Fernandez-Esquer et al. 2004; Marín et al. 1997).

However, as with many other variables used to predict sex risk behavior, findings concerning the effects of self-efficacy have not been totally consistent (Crepaz and Marks 2002). For example, a study of sexual risk among MSM on vacation in New Orleans during Mardi Gras failed to find an association with unprotected sex (Benotsch et al. 2007). Because self-efficacy for safer sex can vary within a person, depending on circumstances (Barta et al. 2007), the absence of an association in this case could be due to the influence of a social context characterized by a festive atmosphere, anonymity of participants meeting on vacation, recreational use of drugs and alcohol, and situational norms encouraging sexual freedom. This interpretation would be congruent with Social Action Theory, which posits that the ability to perform self-regulatory behaviors is influenced by the situational context, including such characteristics as the person's affective state, degree of intoxication, or sexual desire.

Depression

Although there is theoretical support for a link between depressive mood and greater sexual risk-taking, empirical findings have been inconsistent. A meta-analysis showed not only a large range of effect sizes, but also evidence of both positive and negative correlations (Crepaz and Marks 2001). Crepaz and Marks (2001) suggested that the mixed findings indicate that the relationship between depression and sexual risk may involve moderation or mediation. Again, this explanation would be consistent with Social Action Theory.

The complexity of the effect of depression has also been demonstrated by evidence of links to some risk behaviors, but not others, even within the same study (Bradley et al. 2008; Hutton et al. 2004). For example, a study with Latino

HIV-positive MSM found that men with more depressed mood reported unprotected insertive anal intercourse with a larger number of partners than did men with less depressed mood; however, no relationship was found between depression and number of partners for unprotected receptive anal intercourse (Poppen et al. 2004). The situational context of various sexual encounters could contribute to the differing effects of depression.

Demographic Factors

Other personal characteristics that have been associated with sexual risk or HIV status include factors such as age, education, and income (e.g., Healthy People 2010). Although HIV prevalence is higher among older MSM, due to the greater amount of time for exposure, incidence is typically higher among younger MSM. Much research has found greater risk-taking among younger MSM (e.g., Crepaz et al. 2000; Poppen et al. 2004), who frequently have reported high rates of unprotected anal intercourse (e.g., Hays et al. 1997; Webster et al. 2003). Lower levels of education and income have also been associated with sexual risk (e.g., Crepaz and Marks 2003), which may be due to less access to information about HIV or more experiences of disempowerment (Diaz 1998).

For Latino immigrant men, country of birth and acculturation into the U.S. are two additional personal characteristics that could influence sexual risk. Sexual behavior (Chng et al. 2003; Parker 1994) and risk perception (Bailey and Hutter 2006) are socially constructed; therefore, socialization in the home country and the U.S. can be important determinants of behavior (Bianchi et al. 2007; Díaz and Ayala 1999). Latino MSM who migrate to the U.S. have sometimes been viewed as being at high risk for HIV due to cultural norms that may not support protected sex (Díaz and Ayala 1999), as well as due to poverty, social isolation, limited knowledge of sexually transmitted diseases, and opportunities arising in a freer sexual environment (Carrillo 2004; Chng et al. 2003).

Characteristics of the Sexual Encounter

Partner Characteristics

Examined here are three aspects of sexual encounters related to the partner: *relationship to the partner*, *seroconcordance with the partner*, and *concern about risk of transmission of HIV or other sexually transmitted infections with the partner*. It is evident that the three often covary (e.g., Poppen et al. 2005; Theodore et al. 2004).

The relationship to the partner has received much research attention in efforts to understand risk behavior, and studies with MSM have frequently found lower condom use

in more committed or closer relationships than in less committed ones (e.g., Crepaz et al. 2000; Hays et al. 1997; Poppen et al. 2005; Semple et al. 2003). Explanations offered for this finding include the perception that condoms interfere with intimacy, the belief that UAI is an indication of relationship trust, and the practice of using negotiated agreements between more committed partners as a strategy to achieve safety (Davidovich et al. 2004; Prestage et al. 2006; Theodore et al. 2004). Even among casual partners, a greater degree of familiarity has been associated with a greater likelihood of unprotected sex (Prestage et al. 2001).

In studies employing samples restricted to people living with HIV, however, findings concerning the effect of partner relationship on sexual risk have been mixed (Crepaz and Marks 2002; Van Kesteren et al. 2007). Crepaz and Marks (2002) argued that the issue of seroconcordance may override the effect of the emotional relationship with the partner. Serosorting strategies rely on HIV seroconcordance between partners as a means to reduce the risk of transmission (Parsons et al. 2005), and such strategies could result in HIV-positive individuals having unprotected sex with partners of similar serostatus, regardless of the emotional relationship. When the partner's status is unknown or serodiscordant, Crepaz and Marks argued that HIV-positive individuals would be less likely to have unprotected anal intercourse with partners with whom they have closer relationships.

Another characteristic related to the partner is the level of concern about the risk of HIV or other sexually transmitted infections (STIs) with that partner. Although risk perception has been an important motivational component of traditional psychological theories of health behavior, it has typically been conceptualized as the extent to which a person perceives his or her own vulnerability to HIV or other STIs (e.g., Janz and Becker 1984; Rogers 1975), with mixed findings concerning its associations to sexual risk (Gerrard et al. 1996). Risk perception, however, can change depending on the partner, and two longitudinal studies have shown that greater concern about a partner's STI risk was predictive of subsequent protected sexual practices with that partner (Ellen et al. 2002; Reisen and Poppen 1999).

Drug Use

Research has shown increased likelihood of sexual risk behavior in encounters involving drug use. The use of amphetamines, poppers, and cocaine has been associated with unprotected insertive and receptive anal intercourse among young MSM (Celentano et al. 2006). Other recent studies with MSM have also found a greater probability of unprotected anal intercourse (e.g., Benotsch et al. 2007; Colfax et al. 2004; Hirschfield et al. 2004; Sifakis et al. 2007), as well as increased rates of seroconversion

(Plankey et al. 2007), among those who used drugs in conjunction with sex.

Sexual Desire

The degree of sexual desire experienced in a given sexual encounter can influence sexual risk behavior, and a state of high sexual arousal has been associated with unprotected sex for both HIV-positive and negative MSM (Hays et al. 1997; Strong et al. 2005). Although sexual desire is obviously compelling regardless of culture, beliefs held by many Latinos may be especially relevant to the subsequent behavioral outcomes. Research on Latinos has indicated that they sometimes endorse a cultural belief that Latino men are passionate and unable to control their sexual urges (Calabrese et al. 2006; Díaz et al. 1999).

Current Study

Social action theory posits that self-regulatory behavior is shaped by both an individual's personal characteristics and the social, physical, and affective context for the behavior. We expected that this theoretical model would be most relevant in the prediction of sexual behavior in specific encounters, whereas traditional psychological approaches would be useful in the prediction of an individual's general behavioral patterns, due to the correspondence between the levels of specificity of measurement.

Figure 1 shows the conceptual model for this study. In a model predicting the extent of UAI over a three-month period, we hypothesized that the psychological variables of self-efficacy and depression would contribute to the prediction of UAI beyond the control variables of education, income, age, HIV status, country of birth, and acculturation into the U.S. We hypothesized that lower levels of self-efficacy for safer sex would be associated with unprotected anal intercourse. Due to the strongly conflicting findings relative to depression and our belief that situational factors would alter with the effects of depression, we did not make a specific prediction concerning the direct effect of depression on UAI.

In the model predicting UAI at the most recent encounter, we expected that features of the situation—such as partner characteristics, drug use, and sexual desire—would add to the explanation of UAI beyond the psychological variables of self-efficacy and depression, as well as beyond the demographic and cultural control variables. We anticipated that UAI would be more likely when partners were emotionally closer, seroconcordant, and less concerned about STIs, as well as when there was drug use and greater sexual desire experienced during the encounter.

In this study, individuals reported on several sexual encounters, each with its own characteristics and risk

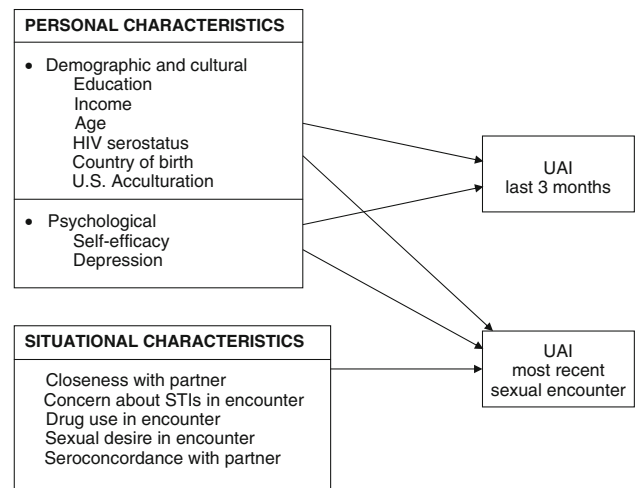


Fig. 1 Model predicting UAI

behavior; thus, we had two levels of data—sexual encounters nested within the person. According to Social Action Theory, qualities of the individual and the sexual encounter can interact to shape a person's self-regulatory behavior. Therefore we used a multi-level approach to explore ways that encounter-level characteristics might interact with person-level characteristics in affecting sexual risk.

We focused on several cross-level interactions that we expected would help explain conflicting findings reported in the literature concerning the effects of self-efficacy and depression on UAI. We expected that states fostering disinhibition, such as greater sexual desire and drug use, would have differing impact on sexual risk depending on the person's self-efficacy for safer sex. Specifically, we hypothesized that such states would be more strongly associated to risk behavior among people with lower self-efficacy. In addition, we hypothesized that encounter characteristics reflecting perceived risk (seroconcordance, STI concern with that partner) and emotional intimacy (closeness with partner) would interact with level of depression in influencing the likelihood of unprotected sex. Due to the inconsistencies in the literature on depression and risk behavior, we did not specify the direction of these cross-level interactions with depression, but we included these tests as a way to help elucidate underlying relationships that have produced varying results.

Method

Participants

In this study, we sampled three growing but understudied groups of Latinos living in the New York City metropolitan area. The sample of 482 participants included 146

Brazilian, 169 Colombian, and 167 Dominican immigrant MSM. Eligibility criteria included having been born in Brazil, Colombia, or the Dominican Republic, residing in the New York City metropolitan area, being at least 18 years of age, having had sex in the last six months, and having had sex with men. Descriptive information for the whole sample, as well as broken down by country of birth, is presented in Table 1.

Procedure

Because Latino gay and bisexual immigrant men represent a partially hidden population, obtaining a representative sample of the entire population is extremely difficult. Therefore, targeted sampling was used. Latino gay male recruiters went to gay venues, community organizations, and Latino cultural events in New York and in Newark, New Jersey (where there is a concentrated population of Brazilian immigrants). Over 1,000 flyers were passed out or placed in these locations. In addition, Latino MSM who

had participated in previous studies were contacted, and a classified advertisement with information about the study was placed on a website (Craig's List). Some participants in the study also referred others. Interested participants called the project coordinator in New York City, who described the study, determined eligibility, and scheduled an appointment, if appropriate. Of those who called the project, 6% were ineligible due to their age, country of origin, or sexual behavior (e.g., no sex with men, no recent sex). Of those who were eligible, 89% participated.

We used computer assisted self-interview technology with audio enhancement (A-CASI) and touch-screen responding to administer the survey in Portuguese, Spanish, or English, depending on the preference of the participant. The audio enhancement enabled participants to listen to questions and responses, thereby providing an accommodation for those with limited reading abilities. A bilingual research assistant initially instructed participants in use of the computers and remained available to answer questions and help with any difficulties encountered. Up to

Table 1 Descriptive characteristics of Brazilian, Colombian, and Dominican participants

Characteristic	Brazilian (N = 146)	Colombian (N = 169)	Dominican (N = 167)	Total sample (N = 482)
Age (mean in years)***	37.5	38.2	33.6	36.4
Age of immigration (mean in years)***	23.3	25.4	15.9	21.5
Education**				
Less than a high school diploma (%)	8.2	17.8	16.8	14.5
Completed trade or high school (%)	24.0	15.4	14.4	17.6
Some college (%)	25.3	21.3	34.7	27.2
Completed college (%)	32.2	27.2	21.0	26.6
Graduate education (%)	10.3	18.3	13.2	14.1
Monthly income**				
Less than \$400 (%)	14.4	17.8	22.2	18.3
\$401 - \$800 (%)	19.2	26.0	26.4	24.1
\$801 - \$1600 (%)	23.3	29.6	25.8	26.4
\$1601 - \$2400 (%)	17.8	17.2	10.8	15.2
\$2401 or more (%)	25.3	9.5	15.0	16.2
Employment (<i>participants could indicate more than one</i>)				
Full-time (%)	48.0	46.8	48.5	47.7
Unemployed (%)	8.2	10.7	15.0	11.4
Self-employed* (%)	20.6	11.2	9.6	13.5
Sexual orientation labels (<i>participants could indicate more than one</i>)				
Gay* (%)	86.3	87.6	77.8	83.8
Bisexual** (%)	11.0	14.8	26.4	17.6
Currently has a main partner (%)	39.7	43.2	41.9	41.7
HIV-status				
Positive (%)	22.6	32.0	25.5	26.8
Negative (%)	65.1	55.6	65.3	61.8
Don't know (%)	12.3	12.4	9.6	11.4

* $P < .05$, ** $P < .01$, *** $P < .0001$

five people could take the survey at one time, and participation occurred in either group or individual sessions, depending on the participant's preference as ascertained in the initial phone conversation. Participants received reimbursement of \$50 and a \$15 stipend to cover transportation costs. Mean time to complete the survey was approximately 60 min.

Measures

All measures were translated from English into Spanish and Portuguese by native speakers, and back-translated into English, either for this study or in our previous research. The survey was reviewed by experts from different Spanish-speaking countries to ensure universality of the Spanish used. Measures included person- and encounter-level questions.

Person-level Measures

Sexual risk was assessed at the person-level with questions concerning behavior over the previous three months. In this paper, we focus on unprotected anal intercourse. Participants were asked, "In the last 3 months, have you had insertive anal sex with a man without a condom? (You were the top; your penis was in his anus; you didn't use a condom)." Follow-up questions concerned the number of times and the number of men with whom the participant had had insertive anal intercourse in the previous three months. Analogous questions addressed receptive anal intercourse. Due to the skewness of the data, we created an ordinal variable reflecting the number of times the participant reported having UAI, either receptive or insertive, in the previous three months. The following values were used: 0 = 0 times (55% of participants), 1 = 1 or 2 times (16% of participants), 2 = 3 to 5 times (13% of participants), 3 = 6 to 15 times (8% of participants), and 4 = more than 15 times (8% of participants).

Other person-level measures consisted of demographic and cultural information, HIV status, and the psychological characteristics of self-efficacy and depression. Demographic questions addressed education, income, and age; cultural characteristics included country of birth and acculturation into the U.S. We asked the highest level of education that participants had completed, with response options ranging from grammar school to a graduate degree. For data analytic purposes, we created a dichotomous variable with 1 reflecting completion of some college or beyond, and 0 reflecting lower levels of education. Monthly income had response options of less than \$400, between \$401 and \$800, and then in additional increments of \$800, up to \$4001 per month and above. We collapsed the two lowest categories of income (under \$400 and \$401

to \$800) of income, so that unit changes in the variable consistently indicated \$800 increments.

We also asked participants, "What is your HIV status?" Possible response options were positive, negative, or I don't know. Other questions included year of birth, country of birth, age of migration to the U.S., and native language. Dummy coding was applied to the country of birth to create dichotomous variables: Brazilian (1) vs. not (0), Dominican (1) vs. not (0), and Colombian (1) vs. not (0). For descriptive purposes, all three dummy variables were included in Table 2; however, only the two former were used in the analyses. Acculturation into the U.S. was measured with ten items from the U.S. subscale of the Abbreviated Multidimensional Acculturation Scale (Zea et al. 2003). This scale assesses identity, language and cultural competence. A sample item was "How well do you understand English in general?" (with response options ranging from *not at all* to *extremely well*). Cronbach's Alpha was .88 for this scale.

Self-efficacy for safe sex was adapted from previous measures (Brafford and Beck 1991; Brien et al. 1994; Marín et al. 1998) and reflected the principles of situation specificity (Forsyth and Carey 1998) and graded difficulty (Murphy et al. 2001). The measure consisted of five items and included questions such as "I am sure that I could insist that my partner or I use a condom for anal intercourse, even if my partner did not want to". Response options ranged from *strongly disagree* to *strongly agree*. Cronbach's Alpha was .84 for this scale.

Depression was measured with seven items from the CES-D (Radloff 1977). We excluded vegetative symptoms of depression, which can be confounded with physical symptoms associated with HIV. The measure referred to feelings experienced during the previous week, such as "I was bothered by things that usually don't bother me." Response options ranged from *Rarely or none of the time—less than one day*; *Some or little of the time, 1–2 days*; *Occasionally or a moderate amount of time, 3–4 days*; and *Most or all of the time, 5–7 days*. Cronbach's Alpha was .87 for this scale.

Encounter-level Measures

Sexual encounters were sampled in the following manner. All participants were asked about the most recent and the penultimate sexual encounters. Succeeding questions depended on the responses concerning these two encounters. If neither sexual encounter involved unprotected anal intercourse, the participant was asked about the most recent time he had had anal intercourse without a condom. Similarly, if both sexual encounters involved unprotected anal intercourse, he was asked about the most recent time he had had anal intercourse with a condom. Individuals who

Table 2 Correlations among predictors and outcome variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
1. Ed	-	0.31 ^b	0.09 ^a	-0.14 ^b	0.02	-0.10 ^a	0.07	0.07	0.03	-0.13 ^b	0.14 ^b	-0.02	-0.08	0.02	0.09	0.03	0.02	
2. Income		-	0.02	-0.20 ^b	0.18 ^b	-0.09 ^a	-0.08	0.23 ^b	0.01	-0.09 ^a	0.11 ^a	0.00	-0.21 ^b	0.07	0.10	0.11 ^a	0.11 ^a	
3. Age			-	0.36 ^b	0.08	-0.21 ^b	0.14 ^b	-0.10 ^a	-0.17 ^b	-0.03	0.03	0.13 ^b	0.08	-0.04	-0.04	-0.09	-0.01	
4. HIV positive				-	-0.06	-0.03	0.09	0.01	-0.18 ^b	0.12 ^b	-0.12 ^a	0.23 ^b	0.18 ^b	0.01	-0.19 ^b	0.05	-0.04	
5. Brazilian					-	-0.48 ^b	-0.48 ^b	0.06	-0.01	0.05	-0.02	-0.00	0.08	0.02	-0.00	-0.12 ^b	-0.03	
6. Dominican						-	-0.54 ^b	0.18 ^b	0.04	-0.02	0.01	-0.01	-0.10 ^a	-0.02	-0.01	0.10 ^a	0.07	
7. Colombian							-	-0.24 ^b	-0.04	-0.03	0.01	0.01	0.02	-0.00	0.02	0.02	-0.04	
8. Acculturation								-	0.04	-0.11 ^a	0.01	0.05	-0.08	0.11 ^a	0.08	-0.04	0.02	
<i>Psychological characteristics</i>																		
9. Self-efficacy for safe sex									-	-0.18 ^b	0.04	-0.09	-0.02	0.08	0.15 ^b	-0.29 ^b	-0.16 ^b	
10. Depression										-	-0.11 ^a	0.10	0.09	-0.05	-0.12 ^a	0.07	0.01	
<i>Sexual encounter characteristics</i>																		
11. Closeness											-	-0.06	-0.17 ^b	0.12 ^a	0.34 ^b	0.12 ^a	0.19 ^b	
12. Drug use												-	0.00	0.03	-0.14 ^b	0.08	0.07	
13. STI concern													-	-0.17 ^b	-0.16 ^b	-0.15 ^b	-0.17 ^b	
14. Sexual desire														-	0.12 ^a	0.08	0.09	
15. Seroconcordance															-	0.09	0.15 ^b	
<i>Outcomes: UAI</i>																		
16. Number of times in past 3 months (ordinal)																		
17. At most recent encounter																		
Mean	0.41	2.97	36.4	0.27	0.30	0.35	0.35	1.72	3.08	0.68	1.56	0.19	0.46	1.96	0.41	0.99	0.20	
Min	0	1	20	0	0	0	0	0.2	0	0	0	0	0	0	0	0	0	
Max	1	7	70	1	1	1	1	3	4	3	3	1	1	3	1	4	1	
N	482	482	482	482	482	482	482	482	482	482	413	413	413	413	413	482	413	

^a $P < .05$ ^b $P < .01$

did not report any anal intercourse in the two most recent encounters were also asked about their most recent encounters involving anal intercourse, with and without a condom.

Subsequent questions concerning other encounters also depended on the responses given up to that point. Participants whose reported encounters had occurred exclusively either in a public setting (e.g., park, bar) or in a private setting (e.g., home, partner's home) were asked about the most recent encounter in the other type of setting. Finally, participants who had reported only encounters involving some drug use were asked about the most recent time when they had sex without using drugs. Similarly, the converse was asked of participants who had exclusively reported encounters without drugs. In all cases, participants could reply that they had never experienced that type of encounter (e.g., involving unprotected or protected anal intercourse; in a private or public setting; including or not including drug use). All participants were also queried about their most memorable sexual encounter.

In this paper, we included data on encounters in which the participant had only one male partner, which was by far the most common situation reported. (Over 86% of encounters involved the participant and one partner; of these, over 96% of partners were male). Described below are measures assessing sexual behavior in the encounter; characteristics relevant to the sexual partner for the encounter (e.g., closeness of relationship with partner, seroconcordance, concern about sexually transmitted infections); and characteristics of the situation (use of drugs during the encounter, sexual desire in the encounter).

Sexual Behaviors

A list of sexual behaviors was presented for each encounter and participants were asked whether the behavior was performed during the encounter. Possible responses were *yes*, *no*, or *I don't recall*. For the analyses in this paper, we focused on anal intercourse and created a dichotomous outcome variable for each encounter indicating whether anal intercourse without a condom occurred.

Closeness of relationship with partner was assessed for every encounter with the following question: "How would you describe your relationship with this person at the time of the sexual encounter? Response options ranged from *There was no relationship* to *There was a very close relationship*.

Seroconcordance was determined with questions concerning the participants' serostatus and the specific partner's serostatus. Using the responses that suggested definite knowledge (i.e., *I know he was positive*; *I know he was negative*), we coded seroconcordance as *yes* (1) versus *no* or *unknown* as (0).

Concern about sexually transmitted infections was assessed with the following question: "On this occasion, were the sexual activities influenced by concerns about sexually transmitted diseases?" Participants could answer *Yes* (coded as 1) or *No* (coded as 0).

Use of drugs during encounter was assessed with the following question: "On this occasion or in the 2–3 h preceding the sexual encounter, did you use any recreational drugs?" Participants could respond *Yes* (coded as 1) or *No* (coded as 0). Follow-up questions for those who reported drug use assessed the types of drugs. *Sexual Desire* was asked the following way: "On this occasion, prior to any physical contact, how much did you want to have sex?" Response options ranged from *Not at all* to *A great deal*.

Data Analytic Plan

Analyses for this paper involved UAI measured in three ways. Hierarchical set logistic regression was used to examine the contribution of the sets of demographic variables and psychological variables to the prediction of an ordinal outcome reflecting the number of times the participant had UAI during the previous three months. This analysis enabled us to explore how personal characteristics affect the person's risk behavior aggregated over time. We hypothesized that the psychological set would provide additional explanation of UAI during the previous three months, beyond the demographic and cultural control variable set. The final model containing both sets allowed examination of the contribution of the individual variables. We hypothesized that younger age, less education, and lower income would be associated with unprotected anal sex. We included country-of-birth, acculturation, and HIV status as control variables, but did not make formal hypotheses concerning their association to UAI. Similarly, due to conflicting findings in the literature, we did not make a specific hypothesis concerning the direct effect of depression. We hypothesized, however, that greater self-efficacy for safer sex would be associated with lower likelihood of UAI. The entire sample of 482 was used in this analysis.

A similar approach of hierarchical set logistic regression was taken to investigate the contribution of the demographic, psychological, and sexual-encounter sets to the prediction of the dichotomous outcome of UAI at the most recent encounter. In keeping with Social Action Theory, we hypothesized that the addition of situational characteristics of the encounter would play an important role in the prediction of UAI at the most recent encounter, providing a significant explanation beyond that attained by the demographic and psychological characteristics. We also examined the unique contributions of individual variables

in the final, full model. In addition to the predictions for the demographic and psychological variables described above, we hypothesized that unprotected anal intercourse would be more likely in encounters between partners who are seroconcordant and have closer relationships, as well as in encounters in which desire is higher, drugs are used, and there is less concern about STIs. The sample for this analysis included those participants for whom the most recent encounter involved one partner who was a male ($N = 413$). Those participants who had sex with a female ($N = 5$), a transgendered person ($N = 4$), or multiple partners ($N = 60$) at the most recent encounter were excluded.

Multi-level analyses were conducted with Hierarchical Generalized Linear Modeling (HGLM; Raudenbush and Bryk 2002) in order to investigate cross-level interactions of encounter-level and person-level influences on the likelihood of UAI. Each person reported on several sexual encounters; thus, encounters were nested within people. Because of the computational demands of HGLM, the small number of sexual encounters per person (3–7), and the substantial inter-relationships among encounter-level variables, we limited the models to one predictor variable at each level and tested for moderation. The sample was restricted to participants who reported at least three encounters involving a male partner ($N = 413$).

Results

Descriptive Statistics

Table 2 shows the correlations for predictor and outcome variables. Correlations shown are phi coefficients for pairs of dichotomous variables, Pearson product moment for pairs of continuous variables, point-biserial correlations for pairs containing a dichotomous and a continuous variable, and Spearman correlations for pairs including an ordinal variable.

Model Predicting UAI in the Previous Three Months

Hierarchical set logistic regression was performed examining the contributions of sets of variables to the prediction of the ordinal outcome reflecting the number of times the participant had UAI during the previous three months (see Table 3). Set 1 addressed demographic and cultural characteristics, and Set 2 addressed psychological characteristics. In the first step, the variables reflecting education, income, age, HIV status, country of birth, and acculturation were entered. The overall model predicting UAI in Set 1 was significant ($X^2(7) = 32.21$, $P < .01$). In the second step, the variables of self-efficacy for safer sex and depression were added. As indicated in Table 3 by the

Table 3 Logistic set regression: UAI in the previous three months ($N = 482$)

Model	–2 log L	Overall model	Change in – 2 log L	
Set 1: demographic and cultural set	1217.19 $X^b(7) = 32.21^{**}$			
Set 2: psychological set	1182.06	$X^2(9) = 67.34^{**}$	35.13 ^{**}	
Final model	Coefficient	Wald X^2	Odds ratio	95% CI
<i>Set 1: demographic and cultural characteristics</i>				
Intercept 4	0.16	0.06		
Intercept 3	0.98	2.35		
Intercept 2	1.81	7.94 ^{**}		
Intercept 1	2.61	16.24 ^{**}		
Education level	0.14	0.50	1.15	0.78–1.68
Income	0.23	12.77 ^{**}	1.26	1.11–1.44
Age	–0.04	10.77 ^{**}	0.97	0.94–0.99
HIV positive status	0.44	3.78	1.56	1.00–2.43
Brazilian	–0.42	3.24	0.66	0.41–1.04
Dominican	0.32	2.14	1.38	0.90–2.13
U.S. Acculturation	–0.30	4.50 [*]	0.74	0.56–0.98
<i>Set 2: psychological characteristics</i>				
Self-efficacy for safer sex	–0.61	32.05 ^{**}	0.55	0.44–0.67
Depression	0.06	0.18	1.06	0.81–1.40

* $P < .05$; ** $P < .01$

significant change in the $-2 \log$ likelihood ($G = 1217.19 - 1182.06 = 35.13$, distributed as a Chi square with $9 - 7 = 2$ degrees of freedom, $P < .01$), the psychological characteristics provided significant additional explanatory power to the model predicting unprotected intercourse, beyond the demographic and cultural variable set. This test for change in the $-2 \log$ likelihood is comparable to the change-in- R^2 approach taken with multiple regression (Hosmer and Lemeshow 1989).

The bottom portion of Table 3 shows the final model that includes the variables from both sets. Among the demographic characteristics, the variables of income, age, and acculturation were significant. Older age, lower income, and greater acculturation into the U.S. were associated with decreased likelihood of UAI. Self-efficacy for safer sex was a significant predictor from the psychological set, with higher levels of self-efficacy associated with decreased likelihood of UAI.

Model Predicting UAI at the Most Recent Sexual Encounter

Hierarchical set logistic regression was then performed examining the contributions of the sets of variables

described above, as well as an additional set, to the prediction of a dichotomous outcome reflecting whether the participant had had UAI at the most recent sexual encounter (see Table 4). Set 1 again included the demographic and cultural variables; Set 2 included psychological characteristics; and Set 3 included characteristics of the most recent sexual encounter.

As indicated in Table 4, the overall model for Set 1 predicting UAI at the most recent encounter was not significant, but the overall model including Set 2 was ($X^2(9) = 18.26$, $P < .05$), as was the change in the $-2 \log$ likelihood ($X^2(9 - 7 = 2) = (400.28 - 390.60 = 9.68$, $P < .05$). Thus, the addition of the psychological variables provided additional explanatory power. In the third step, variables describing characteristics specific to the most recent sexual encounter were added. The overall model was significant ($X^2(14) = 49.62$, $P < .01$), as was the change in $-2 \log$ likelihood ($X^2(14 - 9 = 5) = (390.60 - 359.24 = 31.36$, $P < .01$). The inclusion of the situational characteristics in the model greatly improved prediction of UAI at the most recent sexual encounter, above and beyond both the demographic and psychological characteristics.

The bottom portion of Table 4 shows the final model including all variables. From the demographic

Table 4 Logistic set regression: UAI at the most recent encounter ($N = 413$)

Model	$-2 \log L$	Overall model	Change in $-2 \log L$	
Set 1: demographic and cultural set	400.28	$X^2(7) = 8.57$		
Set 2: psychological set	390.60	$X^2(9) = 18.26^*$	9.68*	
Set 3: situational set	359.24	$X^2(14) = 49.62^{**}$	31.36**	
Final model	Coefficient	Wald X^2	Odds ratio	95% CI
<i>Set 1: demographic and cultural characteristics</i>				
Intercept	-1.13	1.28		
Education level	-0.15	.26	0.86	0.48–1.54
Income	0.14	2.04	1.15	0.95–1.39
Age	-0.00	0.01	1.00	0.97–1.03
HIV positive status	-0.01	0.00	0.99	0.48–2.05
Brazilian	0.01	0.00	1.01	0.50–2.03
Dominican	0.47	1.98	1.60	0.83–3.08
U.S. acculturation	-0.15	0.47	0.86	0.56–1.32
<i>Set 2: psychological characteristics</i>				
Self-efficacy for condom use	-0.57	14.05**	0.57	0.42–0.76
Depression	0.03	0.02	1.03	0.67–1.59
<i>Set 3: situational characteristics</i>				
Closeness with partner	0.31	6.17*	1.37	1.07–1.75
Concern about STIs	-0.62	4.30*	0.54	0.30–0.97
Drug use in encounter	0.55	2.77	1.74	0.91–3.33
Sexual desire in encounter	0.21	1.57	1.23	0.89–1.70
Seroconcordance	0.70	5.58*	2.02	1.13–3.63

* $P < .05$; ** $P < .01$

characteristic set, no variables were significant. Of the psychological characteristics, only self-efficacy for safer sex was significant, with lower likelihood of UAI at the most recent encounter among those with greater self-efficacy. Three of the situational characteristics were significant. Both seroconcordance and a closer relationship with the partner in the encounter were associated with greater likelihood of UAI, whereas concern about STIs in the encounter was associated with lower likelihood. Inter-correlations among predictors within sets imply that caution is necessary in interpreting the unique contribution of the individual variables.

Multi-Level Models Predicting UAI: Repeated Encounters Per Person

HGLM was used to examine hypotheses concerning cross-level interactions of encounter-level and person-level characteristics associated with UAI. At Level 1 the unit of analysis was the sexual encounter ($N = 1777$); at Level 2 the unit of analysis was the person ($N = 413$); thus, Level 1 was nested within Level 2. The dependent variable was whether UAI occurred in the encounter (Level 1). Because this dependent variable was dichotomous, the model was based on a Bernoulli sampling distribution and a logit link function (Raudenbush and Bryk 2002). Variables were all recoded so that zero was a meaningful value, and therefore centering was not performed. The HGLM analysis was structured in the following manner, with one predictor at each of the two levels, as well as a cross-level interaction. A Level-1 model predicted the log of the odds of UAI from the Level-1 predictor with an N of 1777, which was the number of encounters. In the Level-1 analysis, the unit of analysis was the encounter, and encounters were treated as if they were independent of each other. The model was $\log [P/(1-P)] = P_0 + P_1 * (\text{var}_{\text{encounter}})$. Thus, there was an intercept (P_0) and a slope (P_1). A Level-2 model then involved two equations: one predicted P_0 from a Level-2 predictor, while the other predicted P_1 from the Level-2 predictor, each with an error term. The error terms were the random effects components of the model. In the Level-2 models, the unit of analysis was the person ($N = 413$), and the models were $P_0 = B_{00} + B_{01} * (\text{var}_{\text{person}}) + R_0$ and $P_1 = B_{10} + B_{11} * (\text{var}_{\text{person}}) + R_1$. Substituting the Level-2 equations for P_0 and P_1 into the original Level-1 model provided the final model that included the influences from both levels: $\log [P/(1 - P)] = [B_{00} + B_{01} * (\text{var}_{\text{person}}) + R_0] + [B_{10} + B_{11} * (\text{var}_{\text{person}}) + R_1.] * (\text{var}_{\text{encounter}})$.

The first step was to examine the empty (intercept-only) model, which provided information about the overall probability of UAI across all individuals. This model enabled the estimation of the Intra-Class Correlation (ICC), an indicator of the proportion of the variance in the

probability of UAI that was between people. Because the Level-1 errors were assumed to be heteroscedastic with a standard logistic distribution and a mean of 0 and variance of $(\pi^2/3)$ (O'Connell et al. 2008), the ICC was calculated as the variance between people (.367) over the sum of the variance between people and the error variance of $(.367 + (\pi^2/3))$, which equals .10. This estimate implies that 10% of the variance in UAI is between people and that 90% is within person. The estimated probability of UAI in an encounter was .27, which was calculated as the odds ratio (O.R. = .371) divided by 1 plus the odds ratio $(1 + .371)$.

We formulated hypotheses concerning cross-level interactions based on the research literature and themes we encountered in a previous phase of the current study. We hypothesized two cross-level interactions involving the effect of self-efficacy for safer sex on UAI: one with desire for sex, and the other with drug use. For the first hypothesis, we found a significant interaction of self-efficacy with desire (see Table 5). As can be seen in Fig. 2, the impact of desire on the likelihood of unprotected anal intercourse is much greater among those with low self-efficacy than among those with high self-efficacy for condom use. The final model containing the main effects and interaction is shown in Table 5.

For the second hypothesis, we failed to find a significant interaction between self-efficacy and drug use, and therefore this hypothesis was not supported. The final model derived through the model-building process thus contained only the main effects of self-efficacy and drug use, both of which were significant (OR for self-efficacy = 0.828, 95% CI = 0.72 to 0.96; OR for drug use = 1.39, 95% CI = 1.04 to 1.86). Lower levels of self-efficacy and use of drugs in the sexual encounter were associated with greater likelihood of UAI. The random effects components were not significant, thus indicating that there was not substantial residual variance left to be explained.

We examined three different cross-level interactions involving the effects of depression on UAI, with seroconcordance, closeness to the partner, and concern about STIs. We failed to find a significant interaction with any of these variables. Results suggested that depression had little effect on UAI when partner's serostatus was unknown or discordant, but that more depressed individuals tended to show a greater likelihood of UAI than non-depressed individuals when their partners were seroconcordant.

Because the interactions with depression were not significant, the final models derived through a model-building process contained only main effects. In the analysis containing depression and seroconcordance, there was a significant effect of seroconcordance (OR = 1.74, 95% CI = 1.33 to 2.27), but not depression. Seroconcordance was associated with greater likelihood of UAI. The random

Table 5 Multi-level analysis of UAI: sexual encounters ($N = 1,777$) nested within people ($N = 413$)

Final model for self-efficacy and sexual desire			
Fixed effects	Coefficient (SE)	Odds ratio	95% CI
<i>Model for intercept (P_0)</i>			
Intercept (B_{00})	-3.24 (0.74)	0.04**	0.01–0.17
Self-efficacy (B_{01})	0.46 (0.23)	1.59*	1.01–2.51
<i>Model for slope of desire (P_1)</i>			
Intercept (β_{10} : desire)	1.39 (0.32)	4.00**	2.12–7.57
Self-Efficacy (β_{11} : interaction with desire)	-0.33 (0.10)	0.72**	0.59–0.88
Random effects	Variance		
For P_0 (R_0)	1.30		
For P_1 (R_1)	0.20		
Final model for age and closeness to partner			
Fixed effects	Coefficient (SE)	Odds ratio	95% CI
<i>Model for intercept (P_0)</i>			
Intercept (B_{00})	-3.50 (0.50)	0.03**	0.01–0.08
Age (B_{01})	0.05 (0.01)	1.05**	1.02–1.08
<i>Model for slope of closeness to partner (P_1)</i>			
Intercept (β_{10} : closeness)	1.27 (0.24)	3.57**	2.24–5.68
Age (β_{11} : interaction with closeness)	-0.02 (0.01)	0.98**	0.97–0.99
Random effects	Variance		
For P_0 (R_0)	1.07		
For P_1 (R_1)	0.56		

* $P < .05$; ** $P < .01$

effects were not significant. A second analysis examined depression and closeness to the partner and found a significant effect of the latter variable. UAI was more likely to occur in closer relationships (OR = 1.57, 95% CI = 1.40 to 1.76). Again, the random effects were not significant. In the third analysis, which tested a model containing main effects of depression and concern about STIs, both variables were significant (OR for depression = 1.24, 95% CI = 1.02 to 1.50; OR for STI concern = 0.30, 95% CI = 0.22 to 0.40). Higher levels of depression and lower levels of concern about STIs were associated with greater likelihood of UAI. The analysis of the random effects for this model revealed a significant variance component for the person-level probability of UAI (the intercept), indicating substantial remaining residual variance to be explained.

Because the multi-level models included only two variables each, we were concerned that the absence of control variables could have affected the results. Therefore, as a check on this concern, we also examined the hypothesized interactions in multivariate logistic regressions predicting UAI in the most recent sexual encounter.

The models were identical to that shown in Table 4, except for the addition of an interaction term (e.g., self-efficacy \times desire; depression \times seroconcordance). The pattern of results in the multivariate models was similar to that found with HGLM: a significant interaction between self-efficacy and desire and a trend toward an interaction between depression and seroconcordance, but non-significant results for the other three hypothesized interactions.

Finally, we performed exploratory HGLM analyses testing for interactions between demographic characteristics (education, income, age, country of birth, acculturation) and encounter-level variables (relationship closeness, concern about STIs, drug use, desire, seroconcordance). We used a Bonferroni adjustment to limit the possibility of Type I error arising from multiple tests, and accordingly set the criterion alpha at .002. In only one case did we find a significant interaction: age by relationship closeness (see Table 5). As shown in Fig. 2, among younger men the likelihood of unprotected sex was greater in encounters characterized by closer relationships between partners, whereas for older men, the effect of relationship closeness was minimal.

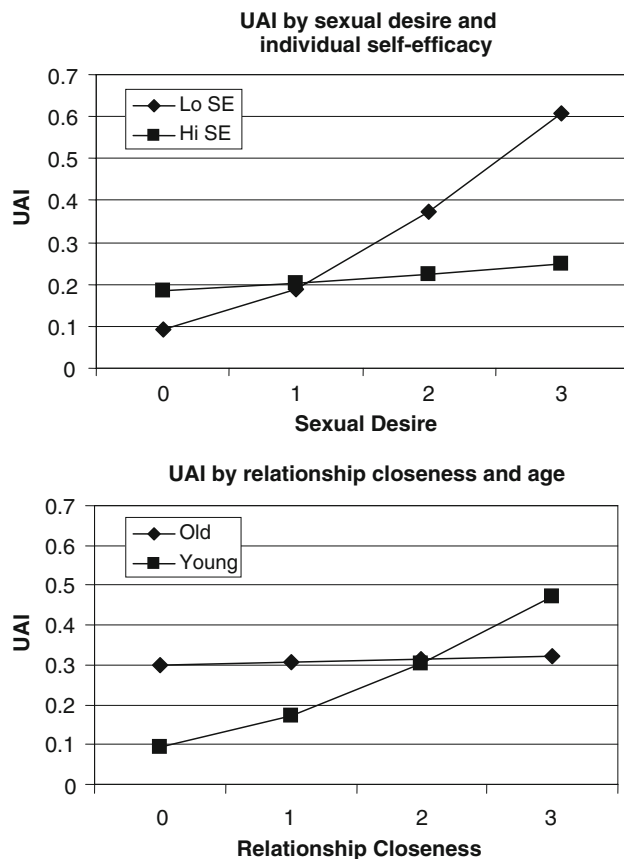


Fig. 2 Cross-level interactions predicting the probability of UAI

Discussion

Findings of this study supported Social Action Theory in several ways. First of all, in the multi-level analyses, only one tenth of the variation in the likelihood of UAI in specific sexual encounters was due to differences among people. Thus, the vast majority of the variation was driven by features that changed from one sexual encounter to the next, such as the contextual circumstances emphasized in Social Action Theory. The procedures used to sample encounters in this study probably maximized reporting of diverse encounters, because participants were asked to report on types of encounters (e.g., protected or unprotected; with or without drugs) on which they had not yet reported. Findings were not simply an artifact of the procedure, however, because participants could and did report that they had not engaged in specific types of encounter (e.g., “I have never had anal intercourse without a condom”).

Support for Social Action Theory was also evident in findings concerning UAI at the most recent encounter. Features that changed from one sexual encounter to the next were more influential than individuals’ demographic, cognitive, and personality characteristics, which have been

emphasized in traditional psychological models of risk (Noar 2007). Two features related to the partner at the most recent sexual encounter were associated with sexual risk behavior in the encounter. Consistent with some previous research (e.g., Crepaz et al. 2000; Poppen et al. 2005; Semple et al. 2003), sexual risk behavior was more likely in encounters in which partners were seroconcordant or had a more intimate relationship. These results pointed to the importance of the social context created by the two people involved. In addition, UAI was more common in encounters where there was less concern about the risk of STIs. Although risk perception has been emphasized in traditional psychological theories, it has often been conceptualized as a characteristic reflecting a person’s global assessment of risk (e.g., Janz and Becker 1984; Rogers 1975). In contrast, these findings show the importance of the perception of risk posed in a given sexual encounter—with a specific person, at a specific time and place.

It is interesting to note that drug use in the sexual encounter was not associated with unprotected sex. This finding is inconsistent with studies reported in the literature that find a link between drug use and increased likelihood of unprotected anal intercourse (e.g., Hirschfield et al. 2004; Sifakis et al. 2007). It is possible that drug choice was partially responsible for these findings, as the most commonly reported drugs used by the Latino MSM in this study were marijuana and poppers (amyl nitrates). Unlike drugs like methamphetamines, the use of which was very limited in this sample, marijuana has not shown strong links to sexual risk behavior (e.g., Benetsch et al. 2007; Colfax et al. 2004). In contrast, popper use was reported in this sample, and poppers have previously been associated with unprotected anal intercourse (e.g., Benetsch et al. 2007; Colfax et al. 2004).

Findings of this study also supported another tenet of Social Action Theory—that self-regulatory behavior is affected not only by individual and contextual characteristics, but also by their interactions (Ewart 1991). We found differing effects on UAI of sexual desire associated with a specific encounter depending the person’s self-efficacy for safer sex. For those individuals with low self-efficacy, increased sexual desire was associated with a greater likelihood of unprotected sex; whereas for those with high self-efficacy, the effect of sexual desire was negligible. These findings suggest that interventions not only should address the importance of sexual desire and arousal as real-life triggers for UAI, but also should aim to develop individuals’ self-efficacy for safer sex across varying contexts, including such states.

Results of this study revealed the interplay between the characteristics of the person and the characteristics of the sexual encounter in another way as well. Age moderated

the effect of relationship closeness on UAI, with older men showing very little association, but younger men showing increased likelihood of unprotected sex in closer relationships. This finding suggests that intervention efforts promoting condom use should address the different patterns of behavior seen in different age groups. Although younger men were less likely than older men to have UAI with partners with whom they had little or no emotional relationship, they were more likely than older men to do so with partners to whom they felt close.

Self-efficacy for safer sex was negatively associated with sexual risk behavior measured in all three ways: over the previous three months, at the most recent sexual encounter, and over multiple encounters reported by each participant. Thus, this personal characteristic was an important influence on sexual risk, whether that risk was aggregated or assessed for specific encounters. This finding lends support to traditional psychological theories that have emphasized self-efficacy (e.g., Bandura 1986; Fishbein and Ajzen 1975). Moreover, it is consistent with previous research showing the importance of self-efficacy for safer sex among Latino samples (e.g., Fernandez-Esquer et al. 2004; Marín et al. 1997).

We had expected that cross-level interactions would be useful in elucidating the mixed findings that have been reported concerning the effects of the personal characteristic of depression on sexual risk behavior, but we did not find compelling evidence. It is possible that the relationships are more complex than we hypothesized, and that higher order interactions are involved. In addition, a major limitation of the multi-level analyses involving depression arose from the fact that depression was conceived as a personality characteristic and was assessed for the previous seven days, whereas some of reported sexual encounters reported occurred in the past (e.g., within the last year). Although a person may indeed have a general tendency toward depressed mood, we believe that a measure of the mood associated with the specific encounters would be more useful. Indeed, we included such a measure in the survey, but found insufficient variation in responses to merit inclusion in an analysis.

Moreover, the vast majority of participants in this study were not clinically depressed; therefore, the assessment of depression was actually an indicator of a negative or depressed mood. Mixed findings in the literature on depression and sexual risk may be due to differences in how depression is conceptualized, operationalized, and assessed. In addition, the association between depressed mood and self-efficacy in this study and in others (e.g., Barta et al. 2007) may lead to conflicting findings depending on whether self-efficacy is included in the model tested.

Another issue addressed in this study concerned appropriate predictors for aggregated and specific measures of

behavior. In a classic article, Ajzen and Fishbein (1977) argued that behavior is best explained when there is a corresponding level of specificity in the predictors and the outcomes. According to this argument, one would anticipate that the enduring traits or personal characteristics emphasized in traditional psychological models of risk would be predictive of general or aggregated patterns of behavior, but less useful relative to behavior in distinct circumstances. For behavior on particular occasions, one would need to assess characteristics that were specific to the occasion. We found some support for these ideas. The personal characteristics income, age, acculturation into the U.S., and self-efficacy were influential in the model predicting the number of times a person had UAI over the previous three months. However, in the model addressing the most recent sexual encounter, the demographic and cultural variables no longer made an important contribution. Although there was still a strong association between the psychological variable of self-efficacy and sexual risk behavior in the most recent encounter, the multi-level analysis also showed that the relationship could be influenced by a feature of the situation (sexual desire).

The sample for this study consisted of Latino immigrant MSM from Brazil, Colombia, and the Dominican Republic, currently living in the New York metropolitan area. Although there were some differences in demographic characteristics of the three national origin groups, we failed to find main effects or cross-level interactions associating country-of-birth with sexual risk behavior. Although this argument may be correct concerning some behaviors, it is possible that the influence of gay culture encountered in the U.S. is more important to sexual risk behavior. Findings suggest that interventions to reduce sexual risk among Latino MSM could be applicable across subgroups of Latinos.

A limitation of this study was the use of a non-representative sample. As with other studies on hidden populations, many Latino immigrant MSM would be motivated to remain unidentified due to their sexual orientation, HIV status, or immigration status. Thus, traditional methods of deriving a representative sample are extremely difficult.

Other limitations were related to data collection on multiple sexual encounters. Participants in this study were surveyed once and reported on their two most recent sexual encounters, as well as other encounters that they had experienced. Encounters that occurred in the past may not be remembered accurately. In addition, a limited number of encounters were reported by each person, thus necessitating the use of fairly simple models in the multi-level analysis. Future research could follow individuals longitudinally and collect data on events as they happened. Such an approach would address limitations associated with memory, the sampling of encounters, and the small number of encounters reported in this study.

Despite these limitations, this study furthers thinking about conceptual approaches to sexual risk-taking. Moreover, it provides important information for the design of future interventions by identifying contextual factors that influence risk behavior and by deepening understanding of how such factors interact with personal characteristics. This study also contributes to knowledge about specific groups of Latino MSM in the U.S. who have received scant research attention despite their growing numbers: those from Brazil, Colombia, and the Dominican Republic.

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