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The Interplay between Feelings and Beliefs about Condoms as Predictors of Their Use

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Abstract

Objective: Negative feelings about condoms are a key barrier to their use. Using the behavioral affective associations model, we examined the joint effects of affective associations and cognitive beliefs about condoms on condom use.

Design: In Study 1 ($N = 97$), students completed measures of their affective associations and cognitive beliefs about sex and condoms, sexual activity, and condom use. In Study 2 ($N = 171$), a measure of behavioral intentions and condom selection task were added.

Main outcome measures: Condom use measured in Study 1 as 1) current condom use, and 2) willingness to use condoms; in Study 2 as: 1) behavioral intentions, 2) number of condoms selected.

Results: Affective associations with sex and condoms were behavior-specific, were directly associated with the respective behavior, and mediated the relations of cognitive beliefs to behavior, $ps < .05$. In Study 2, affective associations were associated with behavioral intentions and the number of condoms selected, $ps < .05$; cognitive beliefs were indirectly associated with these outcomes through affective associations, *indirect effects*: $ps < .05$.

Conclusions: Affective associations are a behavior-specific and proximal predictor of condom use, mediating the effect of cognitive beliefs, suggesting they may be a particularly viable intervention target.

Keywords

emotions/affect; condom use; health decision making

Condoms prevent both pregnancy and disease transmission, but fewer than half of sexually active young adults consistently use them (Civic, 2000; Reece et al., 2010). This is particularly problematic given that this population accounts for at least half of new HIV infections and the greatest proportion of unintended pregnancies (East, Jackson, O'Brien, & Peters, 2007; Gavin et al., 2009). Many commonly-reported barriers to condom use, such as getting lost in the heat of the moment, feeling safe with one's partner, or believing condoms

ruin sexual pleasure and excitement, have an affective or emotional component. However, few decision-making models and sexual health interventions incorporate affectively-based constructs as unique and important predictors of condom use. Doing so may improve our ability to understand patterns of condom use and how to increase it, and may also extend our broader knowledge of the interplay between affect and cognition as predictors of health behavior. In a series of two studies, we utilized the behavioral affective associations model to examine whether affective associations with condoms are behavior-specific, serve as a proximal predictor of condom use, and mediate the relation of cognitive beliefs about condoms and behavior.

Affective predictors of health behavior

People have both cognitive beliefs about and affective associations with health-related risks and behaviors, such as engaging in unprotected sex (Ferrer, Portnoy, & Klein, 2013; Janssen, van Osch, Lechner, Candel, & de Vries, 2011). Cognitively, people have perceptions about the probability and severity of the negative consequences of unprotected sex, such as disease transmission and unintended pregnancy, as well as beliefs about the effectiveness of condoms at reducing these risks. Affectively, people develop emotional associations with condoms even prior to direct experience with them that shape and predict subsequent condom use behavior (Marsh, Johnson, & Scott-Sheldon, 2001; Norton, Bogart, Cecil, & Pinkerton, 2005; Romer & Stanton, 2003). For instance, condoms elicit feelings of disgust and reduced pleasure for some individuals, but conjure feelings of reassurance and comfort for others (Norton et al., 2005). When cognitive and affective attitudes and beliefs are directly compared, the affectively-based constructs tend to be the stronger predictor of condom use behavior (Lawton, Conner, & McEachan, 2009; Norton et al., 2005). Likewise, the few interventions that have targeted affectively-based barriers to condom use are more successful than those without an emotional component (De Wit, Victoir, & Van den Bergh, 1997; Ferrer, Fisher, Buck, & Amico, 2011).

The importance of affect and emotion in condom use decision making is consistent with several prominent theories that highlight affect/emotion as crucial for accurate and efficient information processing (Schwarz & Clore, 1996), perception and judgment (Damasio, Everitt, & Bishop, 1996; Zajonc, 1980), and risky decision making (Loewenstein, Weber, Hsee, & Welch, 2001; Slovic, Peters, Finucane, & MacGregor, 2005). However, few health decision-making models have integrated stand-alone affective components. For instance, affectively- and cognitively-based attitudes are recognized as distinct, but in practice, tend to be combined into a global measure of attitudes that serves as the predictor of behavior (Ajzen & Driver, 1991; Breckler, 1984; Crites, Fabrigar, & Petty, 1994). Consequently, relatively little empirical attention has been given to the interrelated effects of affective and cognitive predictors of health behaviors.

Work that has examined the influence of both cognitive and affective constructs has rarely examined their interplay, or how they jointly operate to influence health behaviors (exceptions to this include Ferrer et al., 2013). Instead, most studies have tested for differences in the main effects of cognitive and affective attitudes on behavior (Keer, van den Putte, & Neijens, 2010; Lawton et al., 2009), or examined the relation between cognitively

and affectively-based factors, but not their effect on subsequent behavior (Lipkus, Klein, Skinner, & Rimer, 2005; Shiloh, Wade, Roberts, Alford, & Biesecker, 2012). To address this gap in the literature, the behavioral affective associations model was developed to explicitly articulate the way in which cognitive and affective constructs operate together to influence behavior (Kiviniemi & Bevins, 2007; Kiviniemi, Voss-Humke, & Seifert, 2007).

The behavioral affective associations model

According to the behavioral affective associations model, affective associations, defined as the feelings we associate with our mental representation of a health behavior, have a direct influence on behavioral practices. They also mediate the effect of cognitive beliefs on behavior and serve as the more proximal predictor of behavior (Kiviniemi & Bevins, 2007; Kiviniemi et al., 2007).

Empirical support for the behavioral affective associations model has been demonstrated in other health domains (Kiviniemi & Duangdao, 2009; Kiviniemi & Ellis, 2014; Kiviniemi et al., 2007; Walsh & Kiviniemi, 2014), but its utility as a model for studying condom use has not been examined.

Given the evidence that many predictors of condom use have an affective component (e.g., beliefs that they reduce sexual pleasure; Ferrer et al., 2011; Romer & Stanton, 2003; Scott-Sheldon, Marsh, Johnson, & Glasford, 2006), the behavioral affective associations model may be particularly useful and relevant in this health domain.

In addition to this extension to condom use, the conceptualization of the affective associations construct is, at least implicitly, behavior specific. Affective associations develop around and are reflective of one's feelings about a specific health behavior. While similar behaviors are likely to elicit similarly-valenced affective associations, their effect on future behavior is not generalizable across such behaviors. However, this prediction has not previously been empirically tested. Given these unanswered questions, we conducted two studies to test whether affective associations with condoms were behavior-specific, and whether they mediated the relation of cognitive beliefs to both self-reported and an experimentally-constructed measure of condom use.

Study 1

In Study 1, college students were surveyed to establish preliminary evidence supporting the use of the behavioral affective associations model as a framework for examining the joint effects of cognitive beliefs and affective associations with condoms on condom use behavior. We also tested whether affective associations were behavior-specific by measuring affective associations with both sex and condoms, and examining their relations to the incongruent behavior.

Methods

Participants and Procedure—Undergraduate student participants ($N = 97$) aged 18 – 28 years ($M = 20.0$, $SD = 1.8$ years) completed a sexual health survey in exchange for course

credit. Seventy-two participants (74%) were female, and 87% were White, which reflected the racial/ethnic make-up of the local population.

The anonymous questionnaire examined a variety of sexuality-related topics, took approximately 45 minutes to complete, and was administered in small groups. The university's Institutional Review Board approved the data collection protocol prior to data collection.

Measures

Affective associations. Affective associations about both sex and condoms were each assessed with a 14-item scale modified from Crites et al. (Crites et al., 1994). Items began with the prompt “*When I think about sex [using condoms], it makes me feel*_____” followed by 7 positive words (e.g. *calm, delighted*) and 7 negative words (e.g. *angry, sorrow*). Each item was rated on a 9-point scale from (0) *not at all* to (8) *extremely*. Mean scores were calculated for both sex and condoms using the mean of all 14 items with negative affective association items reverse scored, *sex*: $\alpha = .89$; *condoms*: $\alpha = .89$.

Cognitive beliefs. Cognitive beliefs about sex and condoms were assessed using 14-item scales that included 7 positive (e.g. *beneficial, healthy*) and 7 negative (e.g. *worthless, harmful*) words (Crites et al., 1994). Following the prompt, “*When I think about sex [using condoms], I think of it as*_____”, participants rated each item using a 9-point scale from (0) *not at all* to (8) *extremely*. Mean scores were calculated for both sex and condoms using reverse scored negative items, *sex*: $\alpha = .86$; *condoms*: $\alpha = .80$.

Sexual activity. A series of items assessed current and past sexual activity, including dichotomous questions that asked whether participants ever had penetrative vaginal sex and whether they were currently sexually active. The latter served as the dependent measure of whether participants were currently sexually active.

Condom use. Participants indicated all forms of contraception that they or their partner ever used and currently used from lists that included: *birth control pills, condoms, withdrawal, none*, and an “*other*” category. Dichotomous items were created to represent whether participants ever and currently used condoms.

Willingness to use condoms. Participants responded to 4 items that assessed their willingness to use condoms in the future (e.g. “*I would be willing to try a condom, even if I have never used one before.*”) using a 5-point scale from (1) *strongly disagree* to (5) *strongly agree*, $\alpha = .69$.

Other measures. Participants indicated whether they were single (*single, dating, divorced*) or in a relationship (*married, committed*), used hormonal contraceptives, and how many sexual partners they had in their lifetime. These constructs were examined as covariates.

Data Analysis Strategy—All analyses were conducted in Stata version 13 (Stata Corp., College Station, TX). Generalized linear models (GLM) specifying robust standard errors were used to estimate the relations of affective associations and cognitive beliefs to the

likelihood that participants were currently sexually active and currently used condoms, as well as how willing they were to use condoms. A Poisson distribution with a log link was specified for the two dichotomous outcome variables (currently sexually active and use of condoms) because it produces relative risk estimates that are less likely than logistic regression to overstate effect sizes in the case of highly prevalent outcomes (Fox, 2008; McNutt, Wu, Xue, & Hafner, 2003).

The mediational pathway and behavioral specificity proposed by the BAAM model was tested using path analysis specifying Poisson or linear distributions and robust standard errors. This approach permits the simultaneous testing of direct, indirect, and total effects. Because indirect effects are calculated as the product of two regression coefficients, they are not normally distributed and statistical estimations that require such assumptions tend to be biased (Mallinckrodt, Abraham, Wei, & Russell, 2006). Therefore, we used a Monte Carlo method to directly generate sample statistics and confidence intervals based on the asymptotic sampling distribution of the indirect effect (Preacher & Selig, 2012; Selig & Preacher, 2008).

Results

Preliminary analyses

Sexual activity.: Most participants (87.5%) reported having had oral (80.4%), anal (20.6%), and/or vaginal (78.4%) sex in their lifetime; slightly fewer (64.9%) reported being sexually active currently. One-quarter of ever sexually active participants (26.2%) had six or more lifetime partners, but most (85.7%) had three or fewer in the past year. Older age, use of birth control pills, and being in a committed relationship (compared to being single) were all associated with greater likelihood of being sexually active currently, $ps < .05$. Age, contraceptive use, and relationship status were included as covariates in subsequent analyses that examined predictors of current sexual activity, but there were no significant differences between these results and those from unadjusted models (Jaccard, Guilamo-Ramos, Johansson, & Bouris, 2006).

Condom use.: Nearly all (95.2%) sexually active participants had used a condom in their lifetime, but only 57.1% currently used them. One-third (37%) of participants used both condoms and birth control pills currently, whereas 20% used birth control pills only. No participant characteristics were associated with the likelihood of currently using condoms or willingness to use them, $ps > .05$.

Main effects of affective associations and cognitive beliefs

Sexual activity.: More positive affective associations about sex were associated with a greater likelihood of being sexually active currently, $RR = 1.17$, $p = .019$, 95% CI (1.04, 1.31) (see Table 1). Cognitive beliefs about sex were not associated with the likelihood of currently being sexually active, $RR = 1.06$, $p = .45$, 95% CI (0.95, 1.15).

Condom use.: More positive affective associations about condoms were associated with a greater likelihood of currently using them, $RR = 1.30$, $p < .001$, 95% CI (1.16, 1.45), and greater willingness to use them in the future, $b = 0.33$, $p < .001$, 95% CI (0.23, 0.42) (see

Table 1). Cognitive beliefs about condoms were also positively associated with both the likelihood of currently using them, $RR = 1.28, p = .022, 95\% \text{ CI } (1.04, 1.59)$, and willingness to use them in the future, $b = 0.37, p < .001, 95\% \text{ CI } (0.16, 0.57)$.

Behavioral specificity: Affective associations and cognitive beliefs about sex were not associated with condom use, nor were affective associations and cognitive beliefs about condoms associated with the likelihood of currently being sexually active, $ps > .05$ (see Table 1).

Behavioral affective associations model

Sexual activity: Path analysis specifying a Poisson distribution and robust standard errors was used to test whether affective associations with sex mediated the relation of cognitive beliefs about sex to the likelihood of being sexually active currently, as proposed by the behavioral affective associations model. Affective associations were directly associated with the likelihood of being sexually active, $b = 0.14, p = .028, 95\% \text{ CI } (0.015, 0.27)$, and also mediated the relation of cognitive beliefs to sexual activity, as evidenced by a bias-corrected confidence interval for the indirect effect that did not include zero, $b = 0.083, 95\% \text{ CI } (0.01, 0.17)$. The direct relation of cognitive beliefs to sexual activity was not significant, $b = -0.050, p = .38, 95\% \text{ CI } (-0.16, 0.061)$ (see Figure 1a and Table 2).

Condom use: Using the same analytic approach, affective associations about condoms were directly associated with the likelihood of currently using them, $b = 0.22, p = .004, 95\% \text{ CI } (0.068, 0.37)$, and also mediated the relation between cognitive beliefs and current condom use, *indirect effect of cognitive beliefs*: $b = 0.15, 95\% \text{ CI } (0.043, 0.28)$. There was no direct association between cognitive beliefs and current condom use, $b = 0.077, p = .54, 95\% \text{ CI } (-0.17, 0.32)$, suggesting that affective associations with condoms mediated the relation between cognitive beliefs and current condom use (see Figure 1b and Table 2). Using willingness to use condoms in the future as the outcome variable instead, affective associations with condoms were directly associated with willingness to use them, $b = 0.26, p < .001, 95\% \text{ CI } (0.13, 0.39)$, and also mediated the relation of cognitive beliefs to willingness, *indirect effect*: $b = 0.18, 95\% \text{ CI } (0.077, 0.29)$, again supporting the behavioral affective associations model (see Figure 1c and Table 2).

Alternative models

Behavioral specificity of affective associations: We examined the specificity of affective associations by estimating three additional models. In the first two, affective associations and cognitive beliefs about sex were entered as predictors of current condom use, as well as willingness to use condoms. In the third model, affective associations and cognitive beliefs about condoms were entered as predictors of current sexual activity. Neither affective associations nor cognitive beliefs produced direct effects in any model, $ps > .10$, nor was there a significant indirect effect of cognitive beliefs through affective associations, $ps > .10$, suggesting that affective associations are indeed behavior-specific (see Table 2). They are elicited by and associated with engagement in specific behaviors, rather than representing a set of feelings that can be generalized to related behaviors.

Cognitive beliefs as mediator. We also tested an alternative model in which cognitive beliefs served as a mediator between affective associations and behavior. Cognitive beliefs about sex did not mediate the relation of affective associations to current sexual activity, *indirect effect*: $b = 0.062$, 95% CI $(-0.070, 0.19)$. Similarly, cognitive beliefs about condoms did not mediate the relation of affective associations to current condom use, *indirect effect*: $b = 0.025$, 95% CI $(-0.058, 0.11)$, nor to willingness, *indirect effect*: $b = 0.063$, 95% CI $(-0.025, 0.15)$. These results further support the behavioral affective associations model and the role of affective associations as a mediator between cognitive beliefs and behavior.

Discussion

In this first study, we used a cross-sectional survey to establish preliminary support for the behavioral affective associations model and the mediational pathway it proposes. Affective associations with sex mediated the relation between cognitive beliefs about sex and the likelihood of being sexually active. Affective associations about condoms mediated the relation between cognitive beliefs about condoms and the likelihood of currently using them, as well as willingness to use them in the future. Moreover, affective associations were found to be behavior-specific. In other words, affective associations with condoms were uniquely associated with condom use and did not generalize to predicting current sexual activity. Likewise, affective associations with sex were not associated with current condom use.

While lending preliminary support for the proximal relation of affective associations to behavior in the realm of sexual health, this was an observational study with two key limitations: the predictor and dependent variables were assessed concurrently and the survey relied on self-reported behavior. As such, reverse causality and bidirectional associations could not be ruled out, nor could the possibility that social desirability and recall bias may have influenced self-reported condom use. To partially address these limitations and strengthen support for the behavioral affective associations model, we conducted a second study with a larger sample and an experimentally constructed outcome measure that was assessed at a follow-up time point.

Study 2

Methods

Participants—Sexually active college students ($N = 171$) aged 18 to 25 participated in a study about sexual health. The racial/ethnic distribution of participants was consistent with the campus community, with 64.5% self-identifying as White, 20.6% as Asian/Pacific Islander, 9.2% as Hispanic, and 8.2% as Black (more than one response was permitted). Participants had a mean age of 20.5 years ($SD = 1.9$ years) and 68.4% were female.

Procedure—Participants were recruited using flyers and email listservs distributed throughout the campus community. Interested students received an email with a unique web link to an online survey. Within the survey, they provided informed consent, completed an eligibility screener that ensured they had penetrative anal or vaginal sex in the past year, and reported their affective associations and cognitive beliefs about condoms. Given the

eligibility criteria, women who only had sex with women were not eligible to participate in this study.

Participants then completed a follow-up laboratory session that included a measure of behavioral intentions and a condom selection task (see *Measures*). Participants were remunerated with a cash payment during the follow-up session. The institutional review board approved all procedures prior to beginning recruitment.

Measures

Sexual history. As part of the online survey, a modified version of Cupitt's (2011) Sexual History Questionnaire assessed participants' relationship status, which was dichotomized as single (*single, non-exclusively dating*) or committed (*committed relationship, cohabitating, married*); use of non-barrier contraceptives (e.g., birth control pills, IUDs, other hormonal methods); number of lifetime and recent sexual partners; and with whom they have sex (*only men, mostly men, equally men and women, mostly women, or only women*) (Cupitt, 2011).

Affective associations and cognitive beliefs. Affective associations and cognitive beliefs about condoms were assessed as part of the online survey using the same scales that were used in Study 1 (Crites et al., 1994). Separate positive and negative scales were computed for both affective associations and cognitive beliefs, $\alpha s > .75$.

Behavioral intentions. In the follow-up laboratory session, four items assessed participants' intentions to 1) carry, 2) buy, 3) discuss with their partner, and 4) use condoms in the next month using a 5-point scaled that ranged from *very unlikely* to *very likely*, $\alpha = .81$.

Condom selection task. At the end of the follow-up laboratory session, participants were offered condoms and other health-related items (e.g., hand sanitizer, wellness center pamphlets) that were on display ostensibly as part of a campus-wide health promotion campaign. They made their selections in private while the experimenter waited in another room and the number of condoms selected by each participant was determined by counting the remaining condoms and subtracting from a standard initial amount of 40 (Stone, Aronson, Crain, Winslow, & Fried, 1994). The number of condoms selected served as a proxy measure of condom use. Most participants (92%) selected six or fewer condoms, so selections exceeding six were recoded to a maximum of six condoms in order to reduce the undue influence of outliers.

Analysis Strategy—All analyses were conducted in Stata version 13 (Stata Corp., College Station, TX). Generalized linear models (GLM) with robust standard errors were used to estimate the main effects of participant characteristics, affective associations, and cognitive beliefs about condoms on intentions to use condoms (continuous variable; linear distribution specified), and number of condoms selected (count variable; negative binomial distribution specified).

As in Study 1, the mediational pathway proposed by the behavioral affective associations model was tested using path analysis specifying the appropriate distribution for each

dependent variable. A Monte Carlo method was used to generate bias-corrected standard errors around the indirect effect (Preacher & Selig, 2012; Selig & Preacher, 2008).

Results

Participant characteristics—Most participants reported having sex in the past month (86.2%) and most had exclusively opposite sex partners (95.4%). The majority (62.1%) were in a committed relationship, with relationship duration ranging from 2 weeks to 7 years and averaging 1.82 years. Half of participants (53%) used a non-barrier contraceptive method (e.g., birth control pills) the last time they had sex, whereas 16.0% reported using no contraceptive method.

Condom use. Intentions to use a condom in the next month were lower among those using non-barrier contraceptive methods, $b = -0.66$, $p = .001$, 95% CI $(-1.01, -0.31)$, and in committed relationships, $b = -0.82$, $p < .001$, 95% CI $(-1.14, -0.49)$. In the condom selection task, single participants selected more condoms than those in relationships, $RR = 1.34$, $p = .015$, 95% CI $(1.06, 1.69)$. Models in which these participant characteristics were included as covariates produced nearly identical results to unadjusted models. Thus, we report results from the more parsimonious unadjusted models.

Main effects of affective associations and cognitive beliefs—Positive affective associations were associated with greater intentions to use condoms in the next month, $b = 0.26$, $p < .001$, 95% CI $(0.15, 0.37)$, and with the number of condoms selected, $RR = 1.11$, $p = .008$, 95% CI $(1.03, 1.20)$. Negatively-valenced affective associations were not associated with the measures of condom use, $ps > .10$ (see Table 3).

Positively-valenced cognitive beliefs were similarly associated with greater intentions to use condoms in the future, $b = 0.27$, $p < .001$, 95% CI $(0.14, 0.39)$, and with the number of condoms selected, $RR = 1.18$, $p = .022$, 95% CI $(1.002, 1.24)$. Negatively-valenced cognitive beliefs were associated with lower intentions to use condoms, $b = -0.30$, $p < .001$, 95% CI $(-0.47, 0.16)$, but were not associated with the number of condoms selected, $p > .05$ (see Table 3).

Behavioral affective associations model—Given the non-significant relations between negative affective associations and condom use, the behavioral affective associations model was tested using the positively-valenced scales. Affective associations were directly associated with intentions to use condoms in the next month, $b = 0.21$, $p = .014$, 95% CI $(0.043, 0.37)$, and also mediated the association between cognitive beliefs and intentions, as evidenced by a confidence interval for the indirect effect that did not include zero, $b = 0.096$, 95% CI $(0.021, 0.18)$. Cognitive beliefs were also directly associated with intentions, $b = 0.14$, $p = .006$, 95% CI $(0.066, 0.39)$, suggesting that affective associations partially mediated their effect (see Figure 2a).

Using the number of condoms selected as our outcome measure produced a very similar pattern of results. Affective associations were directly associated with the number of condoms selected, $b = 0.090$, $p = .031$, 95% CI $(0.014, 0.29)$, and also mediated the effect of cognitive beliefs, *indirect effect*: $b = 0.071$, 95% CI $(0.01, 0.14)$. The direct effect of

cognitive beliefs on condom selection was not significant, $b = 0.12$, $p = .064$, 95% CI $(-.01, 0.32)$ (see Figure 2b).

Alternative model—We again tested an alternative model in which cognitive beliefs served as the mediator between affective associations and condom use. Cognitive beliefs did not mediate the relation between affective associations and intentions to use condoms, *indirect effect*: $b = 0.051$, 95% CI $(-0.0016, 0.10)$, nor did they mediate the relation between affective associations and the number of condoms selected, *indirect effect*: $b = 0.033$, 95% CI $(-0.0096, 0.075)$. Together, these findings lend further support for the behavioral affective associations model using both behavioral intentions to use condoms, as well as an experimentally constructed condom selection measure as outcome variables.

General Discussion

In a series of two studies, we found support for the behavioral affective associations model and the mediational pathway it proposes using two independent participant samples and four unique measures of condom use. In Study 1, affective associations with condoms mediated the relations of cognitive beliefs to condom use at last sex and willingness to use them. Study 2 replicated and extended support for the behavioral affective associations model by including a larger sample size, two new measures of condom use, including an experimentally constructed selection task, and assessing affective associations and cognitive beliefs prior to the measures of condom use. Moreover, findings from Study 1 suggest that affective associations are behavior-specific; affective associations with condoms were not associated with the likelihood of being sexually active, nor were affective associations with sex associated with condom use. Together, these two studies lend support for the behavioral affective associations model as a framework for understanding the ways in which affect and cognition jointly operate to influence condom use. In particular, the proximal role that affective associations play in the decision-making process has implications for the affective sciences, as well as interventions aimed at increasing condom use.

Behavioral scientists are increasingly recognizing the many ways in which affect and emotion contribute to the adoption and maintenance of health behaviors, perceptions of risk, and information processing (e.g., DeSteno, Gross, & Kubzansky, 2013; Lerner, Li, Valdesolo, & Kassam, 2015). However, affective factors remain underrepresented in most models of health decision making, and little work has examined how affect and cognition jointly operate to influence health behaviors. The current findings lend support for the behavioral affective associations model as a framework for studying the joint influences of affect and cognition on condom use. The role of affective associations as a mediator between cognitive beliefs and behavior is consistent with evidence supporting the behavioral affective associations model in the realm of physical activity (Kiviniemi et al., 2007), sunscreen use (Kiviniemi & Ellis, 2014), and fruit and vegetable consumption (Kiviniemi & Duangdao, 2009; Walsh & Kiviniemi, 2014). It is also consistent with evidence that affect mediates the relations of attitudes and perceived behavioral control to health-related intentions (Keer, Bas, & Neijens, 2012). Moreover, Study 2 extends prior work that has relied on survey measures of condom use as outcomes by including an experimentally constructed measure of condom use intentions (condom selection). Given that the correlation between behavioral intentions

(and related scales) and affective associations may in part reflect a similar measurement approach (e.g., Payne, Burkley, & Stokes, 2008), extending these findings to an alternative way of capturing intentions to use condoms is an important advancement.

Prior work has identified affective factors as key predictors of condom use (Lawton et al., 2009; Lawton, Conner, & Parker, 2007; Norton et al., 2005), which may reflect the tendency for condom use decisions to be made while sexually aroused (Ditto, Pizarro, Epstein, Jacobson, & MacDonald, 2006; Loewenstein, 1996; Yang et al., 2012). Many prominent theories of affect and emotions conceptualize affective reactions as immediate gut responses that exert the greatest influence on behavior when cognitive reasoning abilities are compromised (Damasio et al., 1996; Loewenstein et al., 2001; Slovic et al., 2005; Zajonc, 1980). To the extent that condom use decision making is made in aroused states, affective associations may be a particularly important decision making input in this health domain.

Developmental differences in decision-making processes suggest that affective associations may have an exceptionally strong influence on condom use decisions among adolescents and young adults (Albarracín, Johnson, Fishbein, & Muellerleile, 2001; Glasman & Albarracín, 2006; Reyna & Farley, 2006; Romer & Stanton, 2003). Societal beliefs and norms shape people's feelings about condoms prior to any direct experience with them (Romer & Stanton, 2003). These feelings tend to become increasingly negative with age and sexual experience (Glasman & Albarracín, 2006; Marsh et al., 2001; Romer & Stanton, 2003). Thus, negative affective associations may be a key barrier to condom use among young adults and strategically targeting affective associations by countering beliefs about their negative effects on sexual pleasure and insinuations of mistrust may be an important intervention approach (East et al., 2007; Woolf & Maisto, 2008).

Few sexual health interventions have targeted affective or emotional components directly (Logan, Cole, & Leukefeld, 2002), but those that have report greater success compared to their counterparts without them (De Wit et al., 1997; Ferrer et al., 2011; Philpott, Knerr, & Maher, 2006; Scott-Sheldon et al., 2006). For instance, an intervention designed to associate condoms with feelings of love, security, and eroticism was more effective than an intervention without this affective component (Ferrer et al., 2011). Likewise, interventions highlighting the sensory, sexual, affective, and pleasure-related aspects of condom use have been more effective in producing attitudinal changes and increased intentions to use condoms in the future compared to those utilizing prevention or risk-reduction messages (De Wit et al., 1997; Philpott et al., 2006; Scott-Sheldon et al., 2006).

Several limitations should be considered when interpreting the current findings. Both studies utilized an observational design with no (Study 1) or little (Study 2) delay between the assessment of affective associations and condom use. These design characteristics limit the ability to draw causal conclusions about the associations between cognitive beliefs, affective associations, and condom use. Additionally, all but one measure of condom use was a self-report and susceptible to demand characteristics (i.e., over-reporting condom use) and recall bias. Our experimentally constructed condom selection task was designed to address some of the limitations of survey measures of condom use, such as shared measurement variance

and recall bias, but remains a proxy for actual condom use and may have been susceptible to demand characteristics.

Lastly, decisions to use condoms are often made “in the heat of the moment,” which may shift decision-making processes to be more reliant on implicit or automatic processes (e.g., Sheeran et al., 2013). The current study did not examine whether the behavioral affective associations model predicts behavior equally well in these conditions. Indeed, prior studies suggest sexual arousal changes individuals’ willingness to engage in various sexual activities (Ariely & Loewenstein, 2006), and strengthens the effect of implicit affect, relative to explicit affect, on condom use (Ellis et al., 2016). Future work ought to examine whether the behavioral affective associations model predicts condom use decisions in the heat of the moment, and whether the mediational pathway operates at both an implicit and explicit level.

It is now technologically possible to assess privately-performed behaviors and related decisional processes temporally close to their actual occurrence. Such approaches, combined with experimental manipulations of affective associations, could establish stronger causal evidence of the relation between affective associations with condoms and condom use behavior. This approach could also provide important preliminary evidence for the development of more effective affectively-based condom use interventions, and for elucidating the decisional mechanisms underlying the success of existing social marketing and emotion education interventions (Ferrer et al., 2011; Philpott, Knerr, & Maher, 2006).

These limitations are offset by a number of strengths, including the utilization of well-validated measures of affective associations and cognitive beliefs, and four unique measures of condom use. We also tested alternative models that lent further support for the mediational pathway proposed by the behavioral affective associations model. Together, these two studies suggest that affective associations with condoms may be a key proximal predictor of condom use, mediating the relation between cognitively-based beliefs and behavior.

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Figure 1.

Study 1: Affective associations mediate relation of cognitive beliefs and (a) current sexual activity; (b) current condom use; and (c) willingness to use condoms

* $p < .05$, ** $p < .01$, *** $p < .001$

* $p < .05$, ** $p < .01$, *** $p < .001$

Figure 2.

Study 2: Affective associations mediate relation of cognitive beliefs to (a) intentions to use condoms; and (b) number of condoms selected as proposed by the behavioral affective associations model

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 1

Study 1: Associations between affective associations, cognitive beliefs, sexual activity, and condom use

	Current sexual activity	Current condom use	Willingness to use condoms
<i>Affective associations and cognitive beliefs about sex</i>			
Affective associations	1.17* (1.04, 1.31)	1.14 (0.95, 1.38)	-0.097 (-0.25, 0.054)
Cognitive beliefs	1.06 (0.95, 1.17)	1.08 (0.92, 1.28)	0.012 (-0.15, 0.17)
<i>Affective associations and cognitive beliefs about condoms</i>			
Affective associations	1.06 (0.96, 1.16)	1.30*** (1.16, 1.45)	0.33*** (0.23, 0.42)
Cognitive beliefs	1.02 (0.88, 1.18)	1.28* (1.04, 1.59)	0.37*** (0.16, 0.57)

Note. Age, birth control pill use, and relationship status were included as covariates in analyses that examined predictors of current sexual activity. RR = risk ratio.

*
 $p < .05$,

**
 $p < .01$

 $p < .001$

Table 2

Study 1: Indirect relations of cognitive beliefs through affective associations on sexual activity or condom use

	b (bias-corrected 95% CI)
Cognitive beliefs about sex → Current sexual activity	0.083 [*] (0.0095, 0.16)
Cognitive beliefs about condoms → Condom use	0.15 [*] (0.32, 0.26)
Cognitive beliefs about condoms → Willingness to use condoms	0.18 ^{***} (0.076, 0.27)
<i>Tests of behavioral specificity of affective associations</i>	
Cognitive beliefs about condoms → Current sexual activity	0.038 (−0.031, 0.11)
Cognitive beliefs about sex → Current condom use	0.062 (−0.70, 0.19)
Cognitive beliefs about sex → Willingness to use condoms	−0.12 (−0.30, 0.035)

^{*}
 $p < .05$
^{**}
 $p < .01$
^{***}
 $p < .001$

Table 3

Study 2: Affective associations and cognitive beliefs as predictors of condom use

	<u>Behavioral intentions</u>		<u>Number of condoms selected</u>	
	b	95% CI	RR	95% CI
Affective associations	0.10	(−0.045, 0.24)	1.03	(0.94, 1.13)
Positive	0.26 ***	(0.15, 0.37)	1.11 **	(1.03, 1.20)
Negative	−0.091	(−0.22, 0.035)	1.02	(0.94, 1.10)
Cognitive beliefs	0.27 ***	(0.14, 0.39)	1.18 *	(1.002, 1.39)
Positive	0.26 ***	(0.14, 0.39)	1.13 *	(1.03, 1.24)
Negative	−0.30 ***	(−0.47, −0.13)	1.01	(0.88, 1.16)

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