

Heart Versus Reason in Condom Use: Implicit Versus Explicit Attitudinal Predictors of Sexual Behavior

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Abstract. We test the hypothesis that explicit and implicit measures of attitudes would differentially predict deliberate versus spontaneous behavior in the domain of condom use. Students completed explicit attitudinal and thought-listing measures about using condoms and implicit measures using attitude priming and Implicit Association Test (IAT) procedures. An attitude IAT measured the association between condom images and affective images; a self-identity IAT measured association of condoms with the self. We predicted and found that condom use with main partners was predicted by explicit measures but not implicit measures; the opposite was true for condom use with casual partners. Although the attitude priming measure was not positively correlated with casual condom use, the IATs were. The patterns of relations, however, were unexpectedly complex, due to a strong decrease in IAT effects over time, and different IATs assessing unique attitudinal dimensions.

Key words: IAT, priming, implicit attitudes, condom use, sexual behavior

Gefühl versus Vernunft bei der Kondombenutzung: Implizite versus explizite Einstellungen als Prädiktoren sexuellen Verhaltens

Zusammenfassung. Die Annahme, daß explizite und implizite Messungen von Einstellungen in unterschiedlichem Maße deliberatives und spontanes Verhalten vorhersagen, wurde im Bereich der Kondombenutzung überprüft. Dazu wurden die Einstellungen von Studenten zu Kondomen mit verschiedenen expliziten und impliziten Maßen erfasst: Einstellungsskala, Gedankenliste, Einstellungs-Priming und zwei IAT-Prozeduren. Ein Einstellungs-IAT hat die Assoziationen zwischen Bildern von Kondomen und affektiven Bildern gemessen; ein Selbst-Identitäts-IAT hat die Assoziationen zwischen dem Selbst und Kondomen gemessen. Vorhergesagt und gefunden wurde, daß die selbstberichtete Kondombenutzung beim Sexualverkehr mit festen Partnern durch explizite Maße vorhergesagt wird, aber nicht durch implizite. Das Gegenteil gilt für die Kondombenutzung beim Sexualverkehr mit gelegentlichen Partnern. Hier korrelierten die impliziten Maße – mit Ausnahme des Einstellungs-Primings – positiv mit der Kondombenutzung. Insgesamt war das Ergebnismuster jedoch unerwartet komplex. Das lag zum einen an einer Abnahme von IAT-Effekten über die Zeit und zum anderen an der Erfassung von jeweils besonderen Einstellungsdimensionen durch die beiden IATs.

Schlüsselwörter: IAT, Wissensaktivierung, implizite Einstellungen, Kondombenutzung, Sexualverhalten

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Le coeur a ses raisons, que la raison ne connaît point. On le sent en mille choses.
(The heart has its reasons, which reason does not know. We feel it in a thousand things.)

Blaise Pascal, *Pensees*

At the current moment, it is difficult to say who has a stronger desire to believe that our heart and our reason have distinctly different causal impact on behavior – the person on the street, or the average social cognitive researcher. There is an explosion of social psychologists' interest in recent years in methodologies for assessing the heart – one's automatic, affectively based responses to stimuli ("implicit" attitudes or evaluations) as opposed to reason – one's more deliberative, belief-based, controlled or "explicit" attitudes and evaluations. The research areas for which implicit research has been especially generative include self-concept (Bosson, Swann, & Pennebaker, 2000; Farnham, Greenwald, & Banaji, 1999; Hetts, Sakuma, & Pelham, 1999), and in particular, prejudice and racial stereotypes (Devine, 1989; Dovidio, Brigham, Johnson, & Gaertner, 1996; Fazio & Dunton, 1997; Wittenbrink, Judd, & Park, 1997) – areas in which strong affect and conflicting motives are likely to occur. Perhaps the best domains for helping understand implicit and explicit distinctions are ones in which the immediate affect versus more deliberative cognitive and affective responses are especially likely to be at odds. An ideal domain involves sexual attitudes and behavior in the era of HIV.

The most fundamental behavior advocated to protect sexually active individuals from risk of sexual exposure to HIV is using condoms every time one has sex. In large part, interventions designed to change condom attitudes have been based on theories that primarily explain deliberative attitudes and thoughtful behavior (for a review, see Fisher & Fisher, 2000). In fact, an approach that focuses on intentional behavior is a reasonable one in that intentions to use condoms have been found to strongly predict condom behavior ($r = .45$, Albarracin, Johnson, Fishbein, & Muellerleile, 2001). Condom use, however, can often occur in situations in which protecting oneself against disease can be in competition with strong, fundamentally hedonic needs that have limited links to thoughts and beliefs. Individuals may have decreased motivation or ability to engage in careful thought about their actions because of sexual arousal, drug use, or reduced cognitive capacity. In contexts when motivation or ability is reduced, dual-process models (Chaiken & Trope, 1999) would imply that belief-based attitudes toward condoms might more poorly predict behavior than implicit attitudes.

In the current study, a key purpose was to examine the relative role of implicit and explicit attitudes toward condoms in predicting condom use. Because people realize that condom use is strongly advocated for HIV and other STD protection, not to mention birth control, explicit attitudes toward condoms should be rather positive. For individuals whose implicit attitudes are consistent with their explicit attitudes, using their explicit attitudes to predict condom use behavior should be adequate for most situations. Recent research on distinctions between implicit and explicit attitudes, however, suggests that implicit and explicit components can often be disassociated (Brauer, Wasel, & Niedenthal, 2000). For many individuals, it seems quite plausible that implicit reactions to condoms might be quite different and relatively unrelated to one's explicit attitudes. An implication of such potential independence is that in more deliberative situations such as having sex with a steady sexual partner, explicit, belief-based attitudes toward condom use should generally predict participants' use of condoms. In contexts in which individuals have less motivation and/or ability to form intentions, however, such as spontaneous sexual behavior occurring with casual sex partners, explicit attitudes will not predict as well. Instead, implicit attitudes – individuals' automatic affective associations with condoms – should predict their behavior. In the current study, we examined the relation between reported condom use and three measures of implicit attitudes toward condoms. The measures and procedures were chosen such that the measures would be of general use in populations at high risk for HIV transmission. One measure used evaluative priming procedures derived from automatic attitude activation research (Bargh, Chaiken, Gendler & Pratto, 1992; Fazio, Sanbonmatsu, Powell & Kardes, 1986), a second attitude measure used the Stroop-like Implicit Association Test (IAT, Greenwald, McGhee, & Schwartz, 1998), and a third measure used the IAT to assess self-identity. Our primary prediction was that implicit measures would predict condom use with casual partners better than will explicit measures.

A second purpose of this research was to examine how well different implicit measures of attitudes are correlated. Studies differ considerably in the degree to which different kinds of implicit procedures yield related scores. To the degree to which implicit measures all capture a rather unidimensional, global response to attitudes (e.g., Cunningham, Preacher, & Banaji, in press), implicit measures should be highly correlated. However, some research has found rather minimal correlations between scores on attitude priming measures and IAT measures (e.g., Bosson et al., 2000), suggesting that these different tasks might

capture somewhat different phenomena. One way in which these tasks might differ is that priming measures capture the degree to which condoms automatically activate positive and negative responses (Brauer et al., 2001), whereas, we argue, the IAT might also be affected by *ability* to more easily link condoms with positive (or self-relevant) stimuli than negative stimuli. Associations measured with priming presumably reflect a stable response whereas the categorization involved in an IAT might not only reflect automatic associations, but also effortful attempts to develop schemes for quicker categorization. Moreover, the degree to which the attitude and self-identity IATs are related will reflect the degree of consistency in participants' implicit attitudes concerning condoms. Participants who have self-concepts that are easily linked to condoms also might well be expected to more readily associate positive images with condoms. Thus it is quite plausible that correlations between the two kinds of IATs would be strongly positive (e.g., Rudman, Greenwald, Mellott, & Schwartz, 1999). For example, recent research in the area of racism suggests that a variety of different implicit measures may tap a single latent factor (Cunningham et al., in press). Alternatively, condom use differs from domains like prejudice towards an out-group and is similar to domains like smoking (Sherman, Chassin, Presson, Rose, & Koch, 1998) in that participants could both identify condoms with themselves (e.g., as a result of consistent condom use) and yet have rather complex automatic affective associations with condoms (e.g., both negative and positive). In such a case, the different IATs could be relatively uncorrelated.

A third purpose of this study was to examine order effects for IATs. Order effects are of interest because, in contrast to other implicit tasks, the IAT requires individuals first to categorize objects in reference to one category (positive things) and then to *switch* to categorize them in reference to another category (negative things). Because attitude objects can be categorized in multiple ways (Schwarz, 2000; Smith, Fazio, & Cejka, 1996; Zarate & Smith, 1990), the IAT might inform as much about one's cognitive flexibility (for a given object) as about natural associations with an object.

To look at these issues in greater detail, we also examined participants' IAT responses with minimal practice at the task. Individuals' more immediate speeds at performing the dual categorization task may be more informative about the automatic associations that individuals make with an attitude object, whereas with more extensive practice, individuals' latencies on the IAT may be informative about the skill with which they can develop associations. To

that end, we also examined IAT scores calculated on the first and second halves of the key blocks ("split-half IATs"). Participants in the study conducted the key dual-categorization tasks immediately after the single categorization tasks (i.e., there were no dual-categorization practice blocks); thus the split-half IATs should reflect immediate associations with condoms and immediate skill at shifting their associations with condoms.

Method

Overview

In the first half of the study, participants completed computerized implicit measures of both their attitudes and their personal identification with condoms. They were told that the purpose of the first half of the study was to examine how people process information presented in pictures and words. An attitude-priming task based on procedures commonly used to assess automatic attitude activation (e.g., Fazio et al., 1986) was used to assess condom attitudes, followed by two Implicit Association Tests (IAT, Greenwald et al., 1998) presented in counterbalanced order. One IAT examined the degree to which condoms were associated with positive and negative affect (attitude IAT), and one examined the degree to which condoms were associated with one's self (self-identity IAT). Afterwards, participants completed a pen-and-paper questionnaire that assessed explicit attitudes toward using condoms, along with self-reported condom use. Afterwards, participants completed a variety of different individual difference measures for a different study. Participants were (legitimately) informed that the purpose of this latter half of the study was to pilot-test a variety of measures for use in a subsequent study, some of which examined health-related attitudes and behaviors, and some of which examined different dimensions of personality. The session took between 40 minutes to an hour, of which approximately 5 to 10 minutes were for completing the questionnaire, and 10 to 15 minutes for completing the implicit measures.

Participants

Participants were 33 male and 64 female heterosexual undergraduate students who participated in the study in exchange for experimental credit within a psychology course. Of 97 participants, 71 (73%) reported having sex with a main (steady) partner within the last 6 months and 36 (37%) reported having sex with a casual (non-steady) partner within the

last 6 months. Seventeen (17.5%) participants did not report previous sexual experience¹.

Questionnaire Items

The primary measures of interest follow below. All attitude measures were scored such that higher numbers indicate more positive attitudes toward using condoms.

Target-specific attitude measures. Participants were asked to complete all attitude items, regardless of whether they used condoms or not, and regardless of whether they had sex or not. Two items assessed how they felt about always using condoms with a casual partner and with a main partner, with response options of very good, good, neither good nor bad, bad, or very bad².

Affective attitude measures. Two other attitude measures were designed to be more global affective measures of attitudes toward using condoms. A four-item semantic differential measure had participants respond to "USING CONDOMS IS:" on four adjective pairs: nice/awful, ugly/beautiful, bad/good, and pleasant/unpleasant. To indicate their responses, participants marked one of a series of five boxes which were scored as points from 1 to 5; appropriate items were reverse-scored before averaging responses to the four items. Pilot-testing of the measure in a previous sample ($N = 30$) revealed the four items to be strongly intercorrelated (average $r = .49$, coefficient alpha = .99). A thermometer measure (Greenwald et al., 1998) had participants indicate how cold or unfavorable (0°) to warm or favorable (100°) they felt about using condoms using a thermometer with numbers at 10-degree intervals.

¹ The rates of sexual activity in this sample were comparable to national averages for American college students. For instance, in a 1995 national survey of college students, 17.1% of students at 4-year institutions reported never having had sex, and 65.6% reported having sex in the previous 3 months (Centers for Disease Control and Prevention, 1997).

² An additional item had identical wording and responses, except that the kind of sex partner was unspecified to provide a general measure of condom use attitudes per se. Two additional behavior items were included for exploratory purposes (talking about safer sex, and turning down sex because of a partner's refusal of condoms). In addition, after completing all other measures in the study, participants completed a measure in which they indicated the degree to which 16 words were familiar to them as being associated with condoms (e.g., latex, rubbers, spermicide, Trojans, Lifestyles, and other condom brand names). This measure was included to identify familiarity of brand names for use in future studies. These additional measures are not discussed further in the current paper.

Condom use. Participants were asked to report their condom use (during vaginal and/or anal sex) during the last 6 months on two key condom items – one asked about frequency of condom use with their steady sex partners, the other asked about condom use with casual sex partners (someone other than their steady partner). Responses (1 to 5) were never, 25%, 50%, 75%, or all of the time. An additional item assessed whether they used a condom the last time they ever had sex.

Condom thoughts. After completing the other explicit measures, participants were asked to list single words that came to mind when they thought of condoms. Two raters independently coded these condom thoughts. Thoughts were coded as positive associations, negative associations and explicit mention of preventative aspects of condom use (excluding words that have negative valence such as "disease"). All other thoughts were coded as neutral. The coders agreed on 94% of the categorizations. Total number of thoughts, and proportion of positive, negative, and preventative thoughts were calculated. In addition, the categorizations of the first listed word and the first three listed words were assessed.

Procedure

Each participant completed the measures anonymously while alone in a small room equipped with a desk and computer. Because the IAT is viewed as relatively impervious to an individual's awareness of what is being measured, the order of completing measures was as follows. The attitude priming measure was completed first, the attitude IAT and self-identity IAT were completed in counterbalanced order, and a questionnaire assessing explicit attitudes, thoughts, and sexual behavior was completed last. All implicit measures were designed to be suitable for subsequent use in contexts in which high-risk populations with limited literacy would be able to complete them under time constraints. Recent research has successfully used brief implicit measures with as few as 20 trials (Hetts, Sakuma, & Pelham, 1999) and has used pictures as well as words (De Houwer & Hermans, 1994; Fazio & Dutton, 1997; Giner-Sorolla, Garcia, & Bargh, 1999; Hermans, De Houwer, & Eelen, 1994). Thus in the current study, we used brief sequences of trials, stimuli that were primarily pictures rather than words, and simplified instructions that emphasized speed. All images were 480×360 pixel color images (19×15 cm) presented against a black background. Details about the pictures are available from the authors.

Attitude priming task. This procedure adapted methodology commonly used to examine automatic

attitude activation (Bargh et al., 1992; Fazio et al., 1986) to assess the positivity of participants' implicit attitudes toward condoms. The evaluative priming procedure involves brief exposure to condom images, followed by a negative or positive target picture. To the extent to which condom images automatically activate positive or negative affect, responses to subsequent positive or negative target images should be speeded.

An initial block of trials provided baseline response-latencies on target pictures. Participants categorized 24 pictures as good or bad using these keys. As on all implicit measures used, the key (Z versus M) associated with a given category was counterbalanced across participants. The first 4 pictures (2 with positive and 2 with negative valence) were used for practice trials. After these practice trials, the 20 target pictures to be used in the subsequent priming task were presented to assess baseline reaction times to these stimuli. Half of the pictures were pastoral, sensory, or social images of positive valence selected from the International Affective Picture System (IAPS; Lang, Bradley & Cuthbert, 1999; # 7330, 7260, 5001, 1750, 1710, 2165, 4533, 8170, 8510, and 8501); half were sad, disturbing, or frightening images of negative valence (IAPS # 9040, 2800, 3301, 1300, 3181, 1050, 6260, 9140, 9140 and 6350). Participants were asked to respond as quickly as possible without making too many errors. Each picture remained on the screen until the participant responded or until 2.5 seconds had passed without a response. If the participant failed to respond or categorized the picture incorrectly, a red "X" appeared on the screen, ending the trial. A blank screen appeared for 1 second between trials.

After this baseline block, participants were told that the task would now become more difficult. Immediately preceding the pleasant and unpleasant pictures, another picture would appear that they were to ignore. They should again categorize the second picture (the target picture) as good or bad, as quickly as possible. Participants saw a prime (a condom or non-condom image) appear for 184 msec, followed by a blank screen for 100 msec, followed immediately by the target picture, a pleasant or unpleasant image, for a stimulus onset asynchrony (SOA) of 284 msec. The target images were the 10 positive and 10 negative images viewed in the baseline trials. The primes were 5 condom or 5 non-condom pictures developed for this study. The non-condom images were of a variety of neutral objects (e.g., markers, antacid package)³.

³ In a pilot study (Marsh et al., 2000), 55 undergraduate students used 9-point scales to rate the condom and non-condom images as to how pleasant or unpleasant each

A 2 (Prime: Condom or Non-condom) \times 2 (Target: Positive or Negative) design was used in the priming block of trials. Each target picture appeared once following a condom picture and once following a non-condom picture. Each condom and non-condom prime appeared once before a positive and once before a negative target for a total of 40 trials⁴. For each trial, the particular prime and target pictures were chosen at random. Four practice trials (using 4 neutral primes, 2 additional pleasant, and 2 additional unpleasant target pictures) preceded the 40 priming trials. The error message and inter-trial interval were identical to the baseline block.

Attitude IAT. The attitude IAT measure involved 5 blocks of trials. Each single-task block had 20 trials; each dual-task block had 40 trials. In Block 1, participants categorized 10 positive and 10 negative scenes as good or bad (IAPS # positive: 5760, 5780, 2080, 5600, 8380, 8200, 8030, 8461, 7570, 7570; negative: 9810, 6570, 6510, 3230, 9250, 9433, 3015, 9911, 3015, 1200) using the z and m keys. In Block 2, participants used these keys to categorize new condom and non-condom images as to whether they were condoms or not⁵. In Block 3, these tasks were combined by randomly intermingling the scenes with condom and non-condom objects, requiring students to use the same key press to indicate both "condom or good" for instance. For Block 4 and 5, the key associated with "condom" was reversed, and the tasks in Block 2 and 3 were repeated.

image made them feel, and how calm/relaxed/bored or excited/nervous/jittery each made them feel. On average, the condom and non-condom pictures had neutral ratings of valence, with slightly more positive ratings for the non-condom pictures ($M = 5.12$, $SD = 0.71$) than for the condom pictures ($M = 4.79$, $SD = 1.37$), paired $t(54) = -1.86$, $p = .07$. Condoms were viewed as neutral in arousal-value ($M = 4.52$, $SD = 1.73$) whereas the other images were viewed as lower in arousal-value ($M = 3.20$, $SD = 1.39$), paired $t(54) = 6.35$, $p < .01$. Rating scales were completed on the computer, allowing response latencies to be assessed. On average, it took pilot participants equally long to make valence ratings of condom and non-condom pictures, $t(54) = -0.40$, and equally long to make arousal ratings of condom versus non-condom pictures, $t(54) = 1.45$, $p = .15$.

⁴ For 21 participants, an additional block of 40 trials was also presented; the data were not used in present analyses.

⁵ The condom and non-condom pictures were also rated by the same participants who provided pilot data on the images used in the attitude priming task. On average, the condom and non-condom pictures each received mean ratings at the neutral midpoint on valence, paired $t(54) = -0.32$. All were rated as relatively low in arousal, though condom pictures were rated as more stimulating ($M = 4.42$ out of 9) than non-condom pictures ($M = 3.20$), paired $t(54) = 5.90$, $p < .001$. Response times did not vary as a function of whether images were condom or non-condom pictures, paired $t(54) = -1.35$, $p = .18$ for valence ratings and paired $t(54) = -.50$ for arousal ratings.

The primary blocks of interest (Blocks 3 and 5) involve dual categorization tasks. As others have also used brief versions of IATs (e.g., Bosson et al., 2000), we excluded practice blocks for dual categorization tasks (Greenwald et al., 1998). The other blocks were used to prepare participants by having them complete each categorization task separately. Which keys were associated with which categories was counterbalanced across participants. Thus, some participants had "condom + good" pairing in Block 3, whereas others had "condom + good" pairing in Block 5. Within each block, order of stimuli presentation was determined randomly. If an incorrect response was given, an error message "X Try again" printed in red text appeared and participants were required to press the correct key before continuing. Immediately after pressing the correct key, the next stimulus picture appeared.

Self-identity IAT. The procedural details and counterbalancing were identical to the attitude IAT, however pronouns were substituted for pleasant and unpleasant scenes (self: me, I, self, mine, and myself; nonself: they, them, it, and their). The dual categorization tasks thus required participants to categorize pronouns as "me" or "not me" intermingled with categorization of "condom" and "non-condom" images, using one key to distinguish "me + condom" (for instance), and one to indicate "not-me + non-condom."

Results and Discussion

Explicit Attitude Measures

To assess whether the explicit attitude measures (affective and target-specific items) addressed different facets of condom use, the attitude measures were correlated with one another as well as with participants' thoughts and behavior regarding condoms. The measures involved in these analyses have rea-

sonable reliability as analyses based on the semantic differential measure indicate. Internal consistency was adequate in the current sample (coefficient alpha = .80); moreover, the scale demonstrates good test-retest reliability over 5 weeks ($r = .76$, Marsh, Johnson, Scott-Sheldon, & Smith-McLallen, 2001). Other attitude and behavior measures demonstrate similar stability over time ($r_s = .62$ to $.90$), with attitudes and behavior toward condom use with casual partners showing the least stability ($r_s = .34$ and $.41$ respectively).

As Table 1 indicates, the thermometer and semantic differential scales were highly correlated, and correlations of these affective measures with attitudes toward condom use with a main partner also revealed large effect sizes. Attitudes toward condom use with casual partners were no more than moderately linked with attitudes toward using condoms with main partners and global affective measures.

Overall, participants' explicit attitudes were quite positive but somewhat less so on the affective measures. The mean scores on affective measures reflected about 74% of the maximum score possible ($M = 3.71$, $SD = 0.82$, for semantic differential scale; $M = 74.35^\circ$, $SD = 26.65$ on the thermometer item) whereas the other three items had mean scores reflecting 90% of the maximum possible score ($M_s = 4.05$, 4.68 , and 4.85 for main partner, unspecified partner, and casual partner, respectively, $SD_s = 0.99$, 0.65 , and 0.46). Expressed as a proportion of their total scale values, the affective means were significantly lower than the other explicit attitude means, $p_s < .01$. Moreover, attitudes toward condom use with main partner were significantly less positive than responses on the other attitude measures $p_s < .01$. Interestingly, virgins reported particularly positive attitudes. For example, virgins felt extremely warm toward using condoms – an average of 93° in contrast to 61° for individuals below the median in overall condom use and 78° for those above the median in condom use. This pattern suggests that initial,

Table 1. Correlations Between Self-Reported Attitudes Toward Using Condoms

	Thermometer	Condom Attitude Measures		
		Semantic Differential	With Steady Partner	With Casual Partner
Semantic differential	.73	–	–	–
Condoms with steady partner	.62	.61	–	–
Condoms with casual partner	.24	.15	.27	–
Condoms with unspecified partner	.47	.42	.43	.40

Note: Correlations of about .1 can be considered as reflecting small effect sizes, .3 to reflect medium effect sizes, and .5 or above to reflect large effect sizes (Cohen, 1977). $N = 95$ to 97 for all correlations. Correlations smaller than .2 were not statistically significant, $p > .05$.

Table 2. Correlations Between Explicit Attitudes and Thoughts about Condoms

	Thermometer	Condom Attitude Measures		
		Semantic Differential	With Steady Partner	With Casual Partners
Total number of thoughts	.19	.12	.13	.12
% Negative	-.27	-.28	-.35	.10
% Positive	.30	.40	.29	.02
% Prevention	.31	.29	.24	-.00
1 st thought:				
Negative	-.34	-.16	-.06	.06
Positive/Preventative	.31	.32	.21	-.09
First 3 thoughts:				
Negative	-.34	-.27	-.34	.01
Positive/Preventative	.27	.35	.26	-.00

Note: Cohen's categories of effect sizes were .1, .3, and .5 for small, medium, and large effect sizes, respectively. *N*s for the correlations in this table are all 96 to 97; correlations above .2, printed in bold face, were statistically significant, $p < .05$.

Table 3. Results of Regression Analyses Predicting Condom Thoughts from Explicit Attitude Measures

	total R ²	β for steady partner attitude	β for semantic differential
Proportion of total thoughts:			
% Negative	.131*	-.29*	-.10
% Positive	.172*	.07	.37*
% Prevention	.091*	.09	.24
Proportion of initial (3) thoughts:			
Negative	.128*	-.26*	-.14
Positive/Preventative	.127*	.07	.31*

Note: Regression analyses used steady partner and semantic differential items entered simultaneously to predict each category of thought. Substituting the thermometer measure for the semantic differential measure yielded similar though somewhat weaker effects. * $p < .05$

direct experiences with condoms might conflict strongly with prior expectations.

Condom thoughts. As the correlations in Table 2 reveal, the attitude measures were validated by the content of thoughts that participants listed in the thought-listing measure. Individuals who had more positive affective attitudes, and who were more positive about always using condoms with main partners listed significantly more positive and prevention-oriented thoughts and significantly fewer negative thoughts. Consistent with our expectations, attitudes toward condom use with casual partners were not correlated with participants' listed thoughts.

The affective measures and the main-partner attitude measure showed similar patterns except that there was a trend for affective measures (thermometer or semantic differential items) to better predict positive thoughts, and most immediately accessible

thoughts. Results of regression analyses conducted on categories of total thoughts and first three thoughts supported this conclusion. Beta weights appear in Table 3⁶. As responses to the semantic differential items grew more positive across participants, more of their initial thoughts (and total thoughts) tended to be preventative or positive. In contrast, the degree to which participants' initial (and total) thoughts were negative was predicted best by their attitude toward condom use with main partners. As responses to this attitude measure grew more negative, so were thoughts more negative.

Condom use. On average, half of the participants used a condom the last time they had sex. Partici-

⁶ Results were comparable when we analyzed total number of thoughts rather than total proportions of thoughts in each category.

Table 4. Correlations Between Explicit & Implicit Attitude Measures and Reported Condom Use

Reported Behavior	Explicit Condom Attitude Measures				Implicit Condom Attitude Measures			
	Thermometer	Semantic Differential	Steady Partner	Casual Partner	Attitude Priming	Attitude IAT	Self-Identity IAT	Complexity of Self-Id ^a
Condom use: casual partner ($N = 36$)	.17	.18	.11	.04	-.25	.23 (.36; .07) ^b	-.02 (-.03; .00) ^b	.42 (.42; .42) ^b
Condom use: steady partner ($N = 71$)	.38	.42	.57	.08	-.04	-.09	-.08	-.01
Used condom last time had sex ($N = 80$)	.32	.36	.45	.12	-.02	-.06	-.04	-.05

Note: Cohen's categories of effect sizes (for r s) are .1, .3, and .5 for small, medium, and large effect sizes, respectively. Effect sizes above .30, printed in bold face, were statistically significant, $p < .05$.

^a Ability to switch categorization of condoms more quickly in the self-identity IAT (latencies in Block 3 – Block 5).

^b Number in parentheses reflect IAT scores calculated separately for the first and second halves of the IAT blocks.

pants reported higher rates of condom use with casual partners ($N = 36$, $M = 3.75$, $SD = 1.71$) than with steady partners ($N = 71$, $M = 3.18$, $SD = 1.61$). (Rates were comparable – 3.68 and 3.21, respectively – for the subsample that had both types of partners.) Consistent with the principle of compatibility (Ajzen & Fishbein, 1977) and the literature on condom use (Albarracin et al., 2001), condom use with main partner was best predicted by the attitude measure specifying a main partner ($r = .57$). The strength of this effect was consistent with our expectations based on previous literature (Albarracin et al., 2001). As the correlations in the left columns of Table 4 reveal, however, condom use with casual partners was not correlated with attitude toward condom use with casual partners, $r = .04$, nor with any other attitude measures. Condom use on the last occasion of sex was moderately associated with all attitude measures except the casual partner attitude measure. Simultaneous regression analyses revealed that condom use with main partner was uniquely predicted only by steady partner condom attitudes ($\beta = .53$, $p < .001$; for thermometer: $\beta = .05$, ns) whereas last condom use was uniquely predicted by an affective measure (thermometer item: $\beta = .34$, $p < .01$, steady partner attitudes: $\beta = .13$, ns).

Attitude Priming Task

We followed standard data reduction practices used for automatic attitude activation tasks (Bargh, Chaiken, Raymond, & Hynes, 1996; Fazio, 1990; Glaser & Banaji, 1999; Ratcliff, 1993). A log transformation was performed on response latencies to normalize the distribution, but for descriptive purposes, untransformed latencies are presented throughout. Attitude priming data from five participants were excluded because more than 20% of their responses were incorrect. In addition, data on all implicit measures were deleted for one participant who was wearing a cast and who had to respond using only one hand. For the remaining participants, each individual's average response latency was calculated, and a response latency was excluded if it involved an incorrect response (3.8% of total responses) or a response more extreme than 3 standard deviations above or below (Glaser & Banaji, 1999) their average response speed (0.9% of total responses). Facilitation scores for each of the priming trials that used a condom prime were determined by calculating how much an individual's categorization of the particular target picture was speeded relative to their latency of categorizing that picture in the baseline trial. Attitudes were calculated as the average facilitation of positive targets minus the average facilitation of negative targets.

To estimate the reliability of the priming measure, the relations were assessed between scores calculated from the first and second halves of the measure. Split-half reliability was .46 for priming⁷. Next we validated the priming procedure for assessing condom attitudes. In most uses of attitude priming, one attitude object is designed a priori to elicit more positive attitudes across the group of participants as a whole (e.g., in affective congruency research, or research on racial prejudice). As a result, it is possible to validate the priming procedure by analyzing the sample's facilitation patterns as a function of prime (e.g., White versus Black faces, Fazio et al., 1995). In the case of condoms, however, individual participants should have more *polarized* (i.e., more negative or positive) responses to condoms relative to non-condom objects, not necessarily just attitudes that are on average more positive (or negative). Our results indicated that after a condom target, participants' responses to pleasant pictures was speeded 86 msec and 108 msec to unpleasant relative to baseline, yielding attitudes that were slightly negative on average ($M = -22.11$, $SD = 135.60$). In contrast, average facilitation scores for non-condom primes were comparable for pleasant (118 msec, $SD = 159$) and unpleasant (112 msec, $SD = 143$) targets. A 2 (prime: condom, non-condom) \times 2 (target: pleasant, unpleasant) within-subjects ANOVA on facilitation scores found only that facilitation scores were higher for non-condom primes, $F(1, 90) = 5.89$, $p < .05$.

Because there is no a priori reason to suspect that, as a group, participants will have overall positive (or negative) attitudes toward condoms, validation of the priming procedure requires examining the individual *extremity* of facilitation in response to condoms (versus non-condoms). Individuals with positive attitudes should show more facilitation (for positive over negative images) after a condom target than after a non-condom target, whereas the pattern should be the opposite for individuals with negative condom attitudes (more facilitation of negative over positive images after a condom target relative to a non-condom target). To examine this expectation, we took the difference between the positive versus negative facilitation for condom pictures versus that on non-condom trials. A test on the absolute value of this difference indicated that there was significantly greater extremity of facilitation for condoms than for non-condom trials, $t(90) = 11.86$, $p < .001$ ($d = 1.24$), validating that our calculation of condom attitudes

was not merely reflecting speeded response to one target category over the other *regardless* of prime.

The primary hypothesis tested was that attitudes should be correlated with reported condom use with casual partners though relatively uncorrelated with condom use with main partners. Attitudes were not correlated with condom use with steady partners, $r(66) = -.04$ nor with using condoms on the last occasion of sex $r(75) = -.02$. Contrary to predictions, however, attitudes were not significantly correlated with condom use with casual partners; the effect size was moderately small and in the opposite direction, $r(31) = -.25$, $p = .18$ ⁸. We neither expected nor found implicit attitudes to be correlated with explicit measures of participants' thoughts and target-specific attitudes, $r_s = -.10$ to $.13$. The affective explicit attitude measures were similarly uncorrelated with implicit attitudes, $r_s = -.03$ to $.03$. The only exception to these findings was a moderately small effect size reflecting a trend for more positive attitudes toward main partner condom use to be associated with more *negative* implicit attitudes, paralleling the correlation with condom use with casual partners, $r(89) = -.19$, $p = .08$.

IATs

The primary focus of the current paper was to test several hypotheses regarding IATs. The primary content-based hypothesis was that implicit attitudes as assessed by the IAT would be correlated with condom use with casual partners. In addition, our primary process-based question involved examining automaticity issues surrounding the IAT. Two kinds of data are especially relevant to addressing immediacy of condom categorizations and ability to quickly shift such categorizations: order effects, and IAT effects based on more immediate sets of trials (e.g., IAT based on first halves of the key blocks). To this end, in addition to testing the primary hypotheses regarding associations with condom use, we also tested whether results differed when briefer IATs were used, and whether order in which the combined blocks were presented moderated the outcomes. A final purpose was to examine whether attitudinal and self-identity versions of the IATs would assess unique or overlapping constructs.

Attitude IAT. Data reduction procedures were consistent with prior research using the IAT (Brendl,

⁷ Adding more trials for the priming trial, however, would have improved reliability considerably. Twenty-one participants had an additional priming block, allowing us to assess split-half reliability using all of the trials from the first priming block in relation to those on the additional block; in this case Cronbach's alpha was .75.

⁸ In fact, subtracting the facilitation scores for non-condom items (i.e., amount that non-condom primes facilitated responding to positive minus negative targets) from attitude scores furthered strengthened this unexpectedly negative correlation, $r = -.51$.

Markman & Messner, in press; Greenwald et al., 1998; Rudman, Greenwald, Mellott, & Schwartz, 1999). Consistent with Greenwald et al. (1998), we excluded the first two responses in the blocks to reduce variability due to lack of practice with the task, and we excluded latencies associated with incorrect responses (8% of total responses on the combined-tasks trials). Responses that were slower than 3000 msec or faster than 300 msec were excluded (0.6% of combined-task trials). All analyses are based on log transformations of response latencies.

To estimate the reliability of the IAT, the relations were assessed between scores calculated from the first and second halves of the measure. The split-half reliability was .57 for attitude IAT. Next, to describe the overall IAT effect (ability to categorize condoms with bad pictures versus good) across participants, we calculated the average response latency for the two combined-task blocks and conducted an analysis of variance (ANOVA) examining the effects of block-type (2 levels: condom+good<non-condom+bad>; condom+bad<non-condom+good>) X order of IAT (attitude or self-identity 1st) X order of blocks (2 levels: condom+good block 1st or 2nd). The first independent variable (IV) was a within-subjects factor; the other two IVs were between-subjects factors.

Unlike IATs conducted for objects for which there is expected to be vast agreement (e.g., insects versus flowers) or strong consensual evidence of racism (i.e., quicker responding to white + positive than to black + positive), we had no a priori expectations that speed on one block should generally be faster for participants than the other block. No consensual pattern of greater speed for one block over the other was found, $F = 1$, nor did block type interact with block order or task order. Only a significant block order X IAT order interaction was found, $F(1, 91) = 6.36$, $p < .05$. The pattern of means indicated merely that participants completed the blocks uniformly fast when they had prior practice with the other IAT; when the attitude IAT was first, participants completed both blocks more slowly when the condom+bad block came last.

Consistent with other IAT research (Greenwald et al., 1998), IAT effects were calculated as the difference between the average latency for trials in the dual categorization blocks ("condom+bad/non-condom+good" minus "condom+good/non-condom+bad"). More positive numbers indicated more positive condom attitudes-quicker response when condom was keyed with good than when it was keyed with bad. In addition, split-half IATs for the first and second halves of each block were calculated similarly (i.e., IAT_{first half} compared the first 20 trials in

the 2 blocks, and IAT_{second half} compared the last 20 trials).

As implied by the lack of main and interactive effects with block type, the average IAT effect did not differ from zero, $p = .30$, indicating that there was no consistent pattern of positive or negative attitudes toward condoms across participants. The overall IAT effect (Greenwald et al., 1998) slightly favored the condom+good pairing by 15 msec per trial, where mean latency per trial was 811 msec. Even when the slightly favored block occurred first, the effect size of the IAT effect was quite small ($d = 0.11$). Thus, examining the distribution of scores revealed that the sample was nearly equally divided between positive and negative scorers on this dimension.

As Table 4 indicates, attitude IAT was not correlated with condom use with steady partner, nor with condom use at last occasion of sex. As predicted, however, having more positive implicit attitudes was associated with condom use with casual partners. However, the effect size was moderately small, $r(35) = .23$; a moderate effect that was statistically reliable was found only for IAT_{first half}, $r(35) = .36$, $p < .05$.

As with the attitude priming task, we had neither expectations of substantial relations between implicit measures and explicit attitude and thought measures nor any such findings, $|r| < .09$. Patterns were the same with IAT_{first half} and IAT_{second half}. The only correlation larger than .10 was the correlation between IAT and attitudes toward condom use with casual partner, $r = .12$, ns ($rs = .11$ for each split-half IAT). (Note that statistical power was reduced for detecting reliable effects with casual partner-condom use because only a third of the sample reported casual sex with a casual partner.)

Order of blocks did not generally moderate the relations between IAT attitudes and other measures. Regression analyses on condom use with casual partners, for instance, indicated that including order (and interactions with order) in the equations did not improve prediction of this variable ($p > .18$). Nor were other relations moderated by order, with the exception of the small overall correlation between implicit attitudes and attitude toward use with casual partner⁹.

Self-identity IAT. The same exclusion criteria – excluding extreme responses (> 3000 msec or < 300 msec), incorrect responses, and the first two re-

⁹ Order of blocks interacted with the effects of the implicit attitude measure, $p < .05$ such that the explicit-implicit attitude correlation was positive when the condom + good block was first, $r = .47$, $p < .05$, but not when it was last, $r = -.09$.

sponses per block – were used for the self-identity IAT. Overall, 5.9% of trials in the combined blocks were excluded because of incorrect responses, and 0.5% because of extremely slow (0.4%) or extremely fast (0.1%) responses. One participant accidentally completed this IAT twice and omitted the attitude IAT measure; the data from the repeated IAT were deleted. Another participant failed to complete the self-identity IAT. All analyses are based on log transformations of the remaining response latencies.

Internal consistency was somewhat better for this measure than for the other implicit measures; split-half reliability was .75. To describe the overall IAT effect (identification of self with condoms versus identification of not-me with condoms) across participants, we next calculated the average response latency for the two combined-task blocks and conducted a mixed 2 (block-type: condom+me, condom+not-me) X 2 (IAT task order: attitude or self-identity 1st) X 2 (order of blocks: condom+me 1st or 2nd) ANOVA. The first IV was a within-subjects factor; the others were between-subjects factors.

In contrast to lack of effect for block-type in the attitude IAT, participants were able to complete the me+condom trials much more quickly than the not-me+condom pairings, $F(1,91) = 190.51$, $p < .001$; this effect of block was not moderated by which block occurred first or which IAT occurred first. In fact, examination of individuals' IAT effects (latencies for not-me+condom minus me+condom blocks) revealed that the IAT effects were surprisingly positive considering that part of the sample had never had sex, and that the typical rate of condom use for those having sex was only about 50%. The average IAT effect was significantly greater than zero, $t = 13.81$, $p < .001$ and only four participants out of 95 had scores favoring the not-me+condom pairing. Calculation of effect sizes for the IAT effect revealed very large effects, $d = 1.33$. On average, a trial in the not-me+condom block took 900 msec whereas a trial took 650 msec in the me+condom block, translating to an IAT effect of 350 msec. These large effects were found when the me+condom block was second ($d = 1.20$) as well as when it was first ($d = 1.45$).

As Table 4 indicates, self-identity IAT was not correlated with condom use with steady partner, or with condom use at last occasion of sex; these correlations did not differ for split-half self-identity IATs. More relevantly, self-identity IAT was not correlated with condom use with casual partners, $r(35) = .05$. As with the other implicit measures, self-identity IAT was unassociated with explicit attitude and thought measures | r 's $< .15$; patterns were the same with calculation of IATs based on the first and second halves of the IAT. Order of blocks did not moderate these correlations.

In contrast, however, order had an unusual effect on the key relation of interest, the correlation between IAT self-identity and condom use with casual partners. When participants had the more difficult block (me+non-condom/not-me + condom) first, condom use was moderately correlated in the predicted direction with self-identity IAT scores, $r = .35$. The direction of the relation reversed when participants had the easier block (i.e., me+condom) first, $r = -.47$. Because self-identity IAT scores were calculated as the latency on the difficult block minus the easier block, when the difficult block was first, a more positive score meant that participants did not have as much difficulty switching categorization tasks when they got to the easier block. They were able to switch to the second task more quickly than people with lower scores. Positive self-identity IAT scores, however, meant the *opposite* was true when the order was reversed. Individuals first had the easier block, and then switched to the slower task (me+non-condom). To calculate their IAT scores, one takes their latency on the later block and subtracts the latency from the earlier block. So *less* positive IAT scores will result for people who did not have as much difficulty switching categorization tasks.

If one simply considers how quickly participants could switch to a new categorization scheme (i.e., latency for Block 3 minus Block 5), the correlations with casual partner condom use inform us about ease of switching categorization. The significant correlation involved (see Table 4) indicates that casual-partner condom use was associated with flexibility in categorizing condoms in multiple ways, whether making the easier switch (from associating condoms with others to associating condoms with self), or the switch from the easier to the harder task.

Intercorrelations of Implicit Measures

The way in which the different IATs were associated with casual condom use implies that these IATs capture different aspects of condom categorization. In fact, these IATs were only minimally correlated, $r = .12$. Neither IAT was correlated with attitudes as assessed by the attitude priming measure. See Table 5. The split-half IATs were similarly uncorrelated with the exception that self-identity IAT_{second half} had small nonsignificant correlations with the attitude IAT.

Table 5. Intercorrelations of Implicit Attitude and Self-Identity Measures

	Attitude Priming	Attitude IAT	Self-Id IAT	Flexibility
Attitude Priming	—	-.06	.24	-.10
Attitude IAT	-.02	—	.05	.34*
Self-Identity IAT	.03	.12	—	.09
Flexibility of Identification ^a	-.15	-.00	-.06	—

Note: The correlations above the diagonal are for the subsample of participants who had sex with both steady and casual partners ($N = 34$). Correlations for the remainder of the sample were similar to those of the full sample whose correlations are indicated below the diagonal. ^a Ability to switch categorization of condoms more quickly in the self-identity IAT (latencies in Block 3 – Block 5). * $p < .05$

Accessibility Effects

Condom attitudes might not be highly accessible for participants who have not had sexual experience. This is a concern because some researchers would only expect effects of implicit measures for highly accessible attitudes (Fazio et al., 1986). Dropping the 17 participants without sexual experience, however, did not change the results of any analyses. Perhaps the sample for whom issues surrounding condom use (e.g., with casual and main partner) should have the most salience is participants who reported having had sex with both casual and main partners during the last 6 months ($N = 34$). These participants' responses were comparable to the full sample on attitudes and behavior. Most analyses showed the same pattern of effects with this restricted sample – for example, the relations between condom use and implicit measures were the same, and the relations between condom use and explicit attitude measures were slightly stronger (though the relations did not differ significantly from the rest of the sample). Regressions including subsample (in this group vs. not in this group) as a moderator variable did indicate some significant differences, however. The pattern of some correlations involving the relations among implicit measures and between implicit and explicit measures was stronger for participants who reported sexual experience with both casual and steady partners, $ps < .05$. For example, the relations between explicit attitude toward condom use with casual partner and implicit attitudes were significantly stronger with both priming: $r(29) = .30$, $p = .10$, and IAT measures: $r(33) = .46$, $p < .01$ than for participants outside of this group, $rs(59) = -.14$ and $-.16$, ns . Moreover, attitude IAT was positively correlated with explicit attitude toward condom use with main partner, $r(33) = .28$, $p = .11$ and with the cognitive flexibility IAT (see Table 5) for participants with sexual experience with both casual and steady partners. For other participants, each of these relations was negligible, $rs(59) = -.17$ and $-.16$, respectively, $ps > .19$.

Size of IAT Effects over Time

To explore how the IAT effects changed in size over the course of the dual-categorization blocks, we wanted to examine the differences between the dual-categorization blocks for each trial. However, unlike the split-half IATs, a single trial would likely have considerable noise because of individual stimulus differences and the fact that which stimulus came up on a given trial was determined randomly. Therefore, we first smoothed the data by calculating a moving average of three subsequent trials averaged together (e.g., trials 3 to 5, trials 3 to 6, trials 5 to 7, etc.) in the two key blocks. Then these smoothed average latencies were used to calculate IAT effects – differences between the 36 resulting pairs of latencies. These IAT effects were correlated with the serial position of the effect (i.e., using 36 "observations" for calculating correlations).

IAT effects decreased substantially over the course of 38 trials. Serial position was significantly correlated with summary IAT attitude effect, $r(35) = -.59$, $p < .001$; the same was true for the IAT self-identity effects, $r(35) = -.57$, $p < .001$.

Conclusions

Our results supported the notion that explicit and implicit measures of attitudes reflect different phenomena. As such the results are more compatible with the view that implicit and explicit measures often reflect dual attitudes that can be somewhat dissociated (Brauer et al., 2000; Cunningham et al., in press; Rudman & Kilianski, 2000; Wilson, Lindsey, & Schooler, 2000) rather than reflecting a single underlying construct (Banse, Seise, & Zerbes, 2001).

The explicit measures were strongly intercorrelated, but among these measures, there appeared to be important distinctions between the global affective measures and the more specific items. For example, attitude toward condom use with casual partners

showed the least relation with the various thought and attitude measures. Attitude toward condom use with main partners better predicted amount of negative thought, whereas the affective measures better predicted amount of positive and prevention-related thought. In contrast, implicit measures were uncorrelated overall with explicit attitude and thought measures. However, for individuals for whom attitudes toward condoms are presumably more accessible – those who have sex with both casual and steady partners – attitudes toward condom use with both main and casual partners showed some positive relations with implicit measures.

The most important findings were that the predictors of condom use with casual and main partners were, as expected, quite different. Condom use with main partners was predicted by the appropriate target-specific attitude measure, whereas condom use with casual partners was uncorrelated with all explicit attitude and thought variables. The *only* predictors of casual-partner condom use were implicit measures. The fact that these were predictive is especially interesting given that implicit measures, by their nature, do not match the behavior measures in terms of the compatibility principle (Ajzen & Fishbein, 1977). In fact, the only self-report attitude measures that were significantly correlated with the spontaneous or implicit measures for some subsample of the students were those that were even *lower* in compatibility, in that they specified targets (steady or main partner) whereas the implicit measures did not. The explicit measures that did not specify target were not correlated even in a subsample of students with presumably more accessible attitudes. The relations between implicit measures and casual condom use were considerably more complicated than expected, however. The attitude IAT measure had the predicted effect, but this effect was strongest for most immediate responses. The self-identity IAT measure was positively correlated with casual condom use when reconfigured in terms of ease of recategorizing condoms – ability to more quickly switch categorization scheme on the later block. Moreover, the attitude priming measure was unexpectedly negatively correlated with casual condom use, though this effect was not reliable. These contradictory relations suggest that our implicit measures may tap different constructs.

Given the nature of our study, we cannot make conclusions about causal relations between condom use and explicit and implicit attitudes. In fact, our obtained trend toward more negative attitudes on the attitude priming measure seems explicable in terms of condom use *preceding* development of such attitudes. In general, our expectations in a longitudinal study would be that implicit attitudes would predict

subsequent condom use with casual partners. In particular, such data would be particularly interesting to examine in individuals who are not yet sexually active. Such data would be most informative about the pure initial impact of implicit versus explicit attitudes prior to any experience, and would also be especially informative about how experience changes implicit versus explicit attitudes over time.

Our study examined implicit attitudes in a domain not previously examined, attitude toward condoms. Measurement of implicit constructs in this study differed in ways other than just domain of focus. For example, our IAT measures differed from previous measures in that our non-condom category was not a single, unified category. Usually, attitudes are assessed using two categories such as Black versus White, or insects versus flowers. Other recent studies, however, have used alternative categories that were not a coherent category (Brendl et al., in press; Rothermund & Wentura, 2001). In one study for instance (Brendl et al., in press), insects and non-words were the two categories paired with positive and negative words. When assessed against a nonsense category, participants' attitudes toward insects were positive – participants were better able to pair insect and positive relative to nonword and positive. If their results are merely due to the nonwords being unfamiliar, their results have little implication for our study. Yet if their results are due to pitting a single coherent category against a category that does not have a coherent conceptual meaning, or serves as "figure" that garners more attention (as would unpleasant images), in a figure/ground asymmetry (Rothermund & Wentura, 2001) it may have implications for ours. The "non-condom" category included several related objects (e.g., different images of markers, several different battery pictures), but no single overriding concept label that connected them. Like the Brendl et al. (in press) study, we found our coherent category (condoms) was more readily associated with the positive category (me) in the self-identity IAT. These findings, however, held only for one of the IATs. Thus it seems unlikely that our results involving the IATs could be explained merely by the fact that the alternative category was not a single coherent category.

Our study raises several questions that remain unanswered. First, it is not clear why the attitude-priming task would be related so differently with condom use behavior. The trends for this measure were in the opposite direction of that of the attitude IAT and the complexity of self-identification IAT as reconceptualized. One possibility is that there were insufficient trials to get a stable assessment of attitude priming, especially since reliability was lowest on this measure. The IAT measure generally yields much larger

effect sizes than automatic attitude activation measures, thus the brevity of the measure for measuring such an apparently complex attitude was likely problematic. Another reason we might not have found reliable effects with this measure is because attitudes toward condoms might not be highly accessible for participants. Some researchers strongly believe that priming would not be apparent if the association between condoms and participants' evaluations of them were only weakly linked in memory (Fazio, 1993; Fazio et al., 1986). A second question was why the two IATs would seem to measure such different aspects of ability to associate condoms with affective categories. Anecdotal responses from participants suggested that they found the self-identity IAT more difficult than the attitude IAT. Regardless of why it was a more difficult task, when an IAT task becomes more challenging and participants are not engaging in extensive practice of the dual categorization task, the measure might better capture more spontaneous ability to shift categorization. There may be a continuum of difficulty in responding to the IAT, such that IATs that are relatively easy to complete are capturing more automatically associated valence whereas more difficult IATs capture something structural about attitudes relating to their flexibility or complexity. Interpretations based on our reconfigured self-identity IAT must be considered with caution given the exploratory nature of those analyses. Our reasoning, however, is consistent with Banse's suggestion (Banse et al., 2001), that IATs that yield distributions of effects centered around 0 (as in the case of our attitude IAT) may be more sensitive at assessing evaluation than ones with extreme shifts such as the self-identity IAT.

Our speculations, however, need to be considered in light of the procedural differences we had in our IATs relative to original procedures. Unlike the original IAT procedures, our IATs had no practice blocks on the dual categorization tasks prior to assessing the IAT effect. Ensuring that these changes did not affect our results would require comparing long and short versions of the IATs directly, or examining the effectiveness of the brief IAT at capturing known IAT effects (e.g., associations of flowers and insects with pleasant and unpleasant words). Given the strong effect of time on the IAT effect, it would be interesting to examine how IATs change in their assessment of attitudes and cognitive flexibility of categorization when one compares relatively easier and more difficult IATs, performed with minimal practice and more extensive practice.

In conclusion, along with many recent studies, our study gives both pause and hope to the notion that we are nearer to understanding the reasons of the heart and how these differ from reason.

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