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## Comparing Implicit and Explicit Measures of Sex Guilt in Predicting Sexual Behavior

Delaram Asadzadeh Totonchi  
*Old Dominion University, [dasad001@odu.edu](mailto:dasad001@odu.edu)*

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**COMPARING IMPLICIT AND EXPLICIT MEASURES OF SEX  
GUILT IN PREDICTING SEXUAL BEHAVIOR**

by

Delaram Asadzadeh Totonchi

B.Sc. January 2012, Allameh Tabataba'i University, Iran

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Approved by:

Louis H. Janda (Director)

Valerian Derlega (Member)

Kristin Heron (Member)

## **ABSTRACT**

### **COMPARING IMPLICIT AND EXPLICIT MEASURES OF SEX GUILT IN PREDICTING SEXUAL BEHAVIOR**

Delaram Asadzadeh Totonchi

Old Dominion University, 2015

Director: Dr. Louis H. Janda

Sex guilt is a generalized expectancy for self-mediated punishment for violating or anticipating violating standards of proper sexual conduct. Our current knowledge about sex guilt is primarily achieved through using explicit measures, particularly the widely used Mosher Sex Guilt Inventory. Research has shown that explicit sex guilt can predict many sexual behaviors such as sexual activity, number of sexual partners, and condom use. Responses on explicit measures, however, are influenced by dissimulation and social desirability, especially when assessing socially sensitive domains such as sexual attitudes. The present study hypothesized that adding implicit sex guilt as a second predictor to the Mosher Sex Guilt Inventory would significantly improve the prediction of sexual behaviors. An Implicit Association Test (IAT) was created for the purposes of this study. The IAT consisted of two dimensions: pictorial and lexical. For the pictorial section, the study contrasted the target category of sex with the more neutral category of exercise. The lexical dimensions were guilt-innocent. Two hundred and twenty five female and 48 male undergraduate students participated in the study. IAT and Mosher Sex Guilt scales were correlated ( $r = .25$ ) which provided some support for the convergent validity of IAT sex guilt. Regression and correlation analyses indicated that IAT sex guilt was associated with whether or not participants were sexually active, the

extent to which participants were satisfied with their first sexual intercourse, frequency of engaging in sexual intercourse, and contraceptive use. However, results on multiple regression and correlation indicated that when IAT was added to the model as a second predictor, it only improved the prediction of whether or not participants were sexually active. Overall, Mosher sex guilt demonstrated better convergent validity compared to IAT sex guilt and the results did not support the idea of IAT sex guilt increasing the amount of variance accounted for in sexual behaviors compared to the Mosher scale alone. The implementation of explicit measures for assessing outcome variables could be a reason for the stronger association between Mosher sex guilt, compared to IAT sex guilt, and outcome variables.

This thesis is dedicated to my parents, Nicki and Majid Asadzadeh.

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## **CHAPTER I**

### **INTRODUCTION**

Most human beings are likely to experience feelings of guilt some time during their life. Guilt is a rich emotion in human beings and is developed through the first and earliest interactions with people in one's life (Tangney & Dearing, 2004). We might have experienced guilt after we lied to our mother about breaking her favorite crystal bowl or after teasing our bookworm classmate in school, or after watching a pornographic picture of a supermodel. While theorists such as Freud provided explanations about the nature and source of guilt emotions by emphasizing the superego in early 1890s, Mosher (1960) was the first scientist to quantify guilt and develop testable hypotheses to measure it. Mosher (1998) suggested that there were three aspects of personality disposition of guilt: hostility guilt, morality conscience, and sex guilt. Sex guilt, which according to literature has an important impact on individuals' sexual life, is the focus of this study.

#### **Mosher's Conceptualization of Guilt**

Mosher and Cross (1971) defined sex guilt as "a generalized expectancy for self-mediated punishment for violating or anticipating violating standards of proper sexual conduct" (p. 27). Sex guilt might cause individuals to resist sexual temptations and thus discourage them from engaging in sexual behaviors (Mosher & Cross, 1971). In case these individuals actually engaged in sexual behaviors, which according to their standards are wrong, feelings of tension, remorse, preoccupation with the wrongdoing and a strong wish to undo the deed would be common consequences (Tracy, Robins, & Tangney, 2007). For example, a man who thinks watching pornographic movies is morally wrong

will try to fight against this temptation, but should he fail to suppress the temptation and actually watch those movies, he will judge and punish himself with negative emotions.

Sex guilt is initially learned through the early punitive reactions of parents to their children's expressions of sexuality. Among the earliest punitive reactions are: "Don't play with yourself down there" or simply "Stop it." Parents' common warnings are usually about dangers of masturbation, pornography, and premarital sexual behavior. Through these warnings, parents introduce a moral training about what sexual behaviors are or are not appropriate. In addition, parents' punitive reactions will lead children to experience intense guilt emotions following committing sexual behaviors and later these negative guilt emotions will be generalized to every sex-related situation throughout their lives (Mosher, 1979a). Sex guilt is a personality disposition and personality dispositions have the power to influence individuals' perceptions of different situations and affect their behavioral reactions to them. Thus, it is no surprise that sex guilt can affect individuals' perceptions of sex-related situations and modify their sexual behaviors (Mosher & Cross, 1971).

### **Sex Guilt and Sexual Behavior**

According to existing research, sex guilt can predict many sexual behaviors. For instance, Mosher (1979a) indicated that sex guilt has an inhibiting effect on sexual experience. He found that both men and women who were higher on sex guilt measures were less sexually experienced and they reported engaging in less advanced sexual behaviors (e.g., kissing and breast petting as opposed to more advanced sexual behaviors such as oral-genital sex). Mosher (1985) compared high and low sex guilt women on frequency of their sexual activities. He found that 37% of high sex guilt women reported

that they had coital sexual intercourse within the last week compared to 81% of low sex guilt women who had engaged in such behavior. Studies show that individuals with high sex guilt also masturbated less frequently and they reported less desire to engage in oral-genital sex or anal intercourse (Mosher, 1973). Similar to Mosher's findings, Gerrard (1980) found that when comparing sexually active and inactive women, those who were sexually inactive had higher sex guilt. Sexually active women were found to be usually older and they were more likely to be upperclassmen compared to sexually inactive women. Both older age and higher class standing predicted lower sex guilt (Mosher, 1973).

Sex guilt not only inhibits individuals from engaging in sexual interactions, but it also encourages them to avoid any sexually arousing stimuli. Mosher (1973) found that high sex guilt men and women were found to be less likely to voluntarily seek pornography, and when they watched pornography, they reported becoming less aroused compared to low sex guilt persons. Morokoff (1985) studied the effects of sex guilt on sexual arousal. In Morokoff's study, high sex guilt individuals reported less sexual arousal following presentation of an erotic stimulus compared to low sex guilt individuals. However, when the researcher used physiological measures to assess subjects' sexual arousal, he found that high sex guilt persons were actually more sexually aroused than low sex guilt persons. This finding led Morokoff to conclude that high sex guilt individuals were just more reluctant to acknowledge that they were sexually aroused due to their guilt about experiencing sexual desire.

Sex guilt impacts individuals' cognitions about sexuality as well. Pelletier and Herold (1988) found that female participants who were high on sex guilt reported a lower

frequency of sexual fantasies and fewer different types of sexual fantasies. These findings are congruent with Mosher's (1979b) functional definition of sex guilt. The unpleasantness of sex guilt emotions discourages individuals from having sexual thoughts and from seeking sexual information.

A study by Gerrard (1980) indicated that women who were higher on sex guilt measures had more conservative thoughts about sexuality. For example, high sex guilt women were more likely to state that they would not have sexual relationships prior to marriage compared to low sex-guilt women and both high guilt men and women endorsed the view that girls who engage in premarital sexual intercourse lose respect. Mosher (1973) found that high, compared to low, sex guilt men and women also have more conservative religious and political views. For example, high sex guilt individuals are more likely to advocate for excluding homosexuals from society and support government acts on enforcing sex laws. The association between religion and sex guilt has been widely studied (e.g., Gunderson & McCary, 1979; Langston, 1973; Mosher, 1973) and this research has found a positive association between religiosity and sex guilt. Langston (1973) also reported that the sex guilt scores were significantly greater in individuals with a high religious affiliation.

More interestingly, perhaps, are the results regarding the association between sex guilt, abortion, and the use of contraceptives. Mosher (1973) found that women and men who were higher on sex guilt were less favorable regarding the legalization of abortion and in general they had more negative attitudes toward abortion compared to low guilt persons. Nevertheless, research indicates that high guilt women are more likely to seek an abortion compared to low guilt women (Gerrard, 1977). The results suggest that women

with higher sex guilt might have a higher rate of unwanted pregnancy (Mosher, 1985). Why might high sex guilt women experience more unwanted pregnancies if they have fewer sexual activities? The answer lies within their attitudes toward contraception. Mosher (1985) found that high sex guilt women reported that they were less likely to use contraceptives and if they did, the method was less likely to be coitus-independent (e.g., implantable hormones, IUDs, and oral contraceptives). Using contraceptives, specifically coitus independent ones requires that women visit doctors and start wearing or using contraceptives before the sexual intercourse occurs. In other words, it requires planning ahead for a future sexual activity which in turn might trigger strong guilt emotions in high sex guilt women. As a consequence, high sex guilt women tend to either not use contraceptives at all or to use foam, condoms, or suppositories which do not require women to plan ahead for using them (Mosher 1985).

### **Explicit Measure of Sex Guilt**

Most of our knowledge about sex guilt comes from researchers' use of explicit self-report measures. The Revised Mosher Sex Guilt Inventory (Mosher, 1998) is the most widely used explicit measure of sex guilt. This scale was first developed by Mosher in 1960 (called the Mosher Forced Choice Guilt Scale) and then revised in 1998 (Mosher, 1998). The Mosher Guilt Inventory was initially developed using responses to sentence completion type items. Mosher assigned weights to the sentences to construct true-false forced choice items. The variant weights made separate scoring for men and women possible (Mosher, 1966). Later, O'Grady and Janda (1979) used 0 and 1 scoring codes for guilty and non-guilty items instead of assigning weights to the sentences and they

reported that their scoring items correlated .99 with the original weighted sentences items. Therefore, O'Grady and Janda suggested that there is no need to use weights.

The Mosher Sex Guilt Forced Choice Inventory has 39 items on the female form and 28 items on the male form. In 1998, Mosher demonstrated that his measure contained some items that drew 100% non-guilty choices. Nevertheless, the scale is still an accurate predictor of many sexual behaviors and sexual cognitions indicating strong construct validity. However, he revised the inventory in the same year. To do so, Mosher constructed a scale consisting of non-overlapping items of the original Forced Choice Inventory (151) and the true-false inventory (233). After administering the items to a sample of 187 male and 221 female students, he dropped many guilty-true and guilty-forced choice items that were shown to be redundant. The revised inventory was left with 114 items which were arranged in pairs of responses to the original completion sentences. The Revised Mosher Guilt Inventory uses a 7-point Likert-type format and it has 50 items on the sex guilt subscale. Mosher also examined the discriminant validity of the revised measure. He reported that 90% of the items were correlated with their own subscale which was significantly different from the correlation of the items with the other subscale totals. The revised version, according to Janda and Bazemore (2011), has a correlation of .82 with the original version of the Mosher Guilt Inventory.

In 2011, Janda and Bazemore revised the Mosher Sex Guilt Inventory to develop a brief version of the inventory. From the 50 items, the researchers picked those items that had high item-total correlations and had means closer to the midpoint of the 7-point scale. They also sought to match the content of the brief inventory items with content of the revised Mosher items. Finally the researchers downsized the 50 item Revised Mosher

Sex Guilt Inventory to a 10-item Brief Mosher Sex Guilt Inventory. According to Janda and Bazemore, this brief version correlates .95 with the revised version and it also has good internal consistency ( $\alpha = .85$ ). The Mosher Sex Guilt Scale is similar to other explicit measures in that responses may be influenced by dissimulation and/or social desirability. Implicit measures can control for such sources of variation.

### **Implicit Measures and Implicit Association Test (IAT)**

For many decades researchers have strived to find a measurement technique that would enable them to assess implicit attitudes that might influence behavior, that is, attitudes individuals might not be aware of possessing (Asendorpf, Banse, & Mucke, 2002). Being unaware of one's own attitudes may prevent someone from displaying the attitude on explicit self-assessment measures. These explicitly self-report instruments may not provide a good assessment of underlying, implicitly held attitudes. Furthermore, when studying controversial attitudes, participants who hold what might be viewed as socially undesirable attitudes may be reluctant to admit holding them and thus be unwilling to display these attitudes on self-report tests (Fazio & Olson, 2003). Development of implicit measures has made assessing individuals' concealed attitudes and stereotypes possible. Various implicit measurement techniques have been developed (e.g., the Evaluative Priming Task, the Affect Misattribution Procedure, and the Go/No-go Association Task) but the Implicit Association Test (IAT) is employed the most frequently to tap non-conscious attitudes (De Houwer, Teige-Mocigemba, Spruyt & Moors, 2009).

The IAT was initially developed by Greenwald, McGhee, and Schwartz (1998) and it measures the strength of an association between a target-concept dimension and an



attribute dimension. In this technique participants are exposed to a target concept and they are asked to respond to this concept by choosing one of the two opposite attitudinal responses. The basic notion behind the IAT is that participants will match the specific concept with an attitudinal response faster if they have the corresponding association in their mind. Thus, longer latencies in responding to a concept by a specific attitudinal response can be interpreted as an absence of the corresponding association. If someone takes longer to respond to a concept with a specific attitudinal response, it means that they do not hold that specific attitude towards the given concept as strongly as if he or she responded more quickly. This strategy allows the participants' attitudes toward the specific concept to be assessed and the results may differ from those obtained on explicit measures of the attitude or concept in question. This discrepancy between the implicitly and explicitly assessed attitudes could be attributed to either of the following two reasons: either someone is reluctant to admit that she or he possesses the attitude or they are simply unaware of their implicit associations.

The racial attitudes study conducted by Nosek, Greenwald and Banaji (2002) is a frequently cited example of IAT research. Participants in this study were presented with the target concept of race (Black vs. White). The respondents were required to match the African American and European American first names as well as the morphed faces of the two races with positive and negative attribute dimensions. Participants matched names and faces associated with White race, compared to those associated with Black race, more quickly. Nosek et al. concluded that participants significantly preferred White race over Black race individuals based on the latency scores. More interestingly, when the IAT and self-report racial attitudes scores were compared, results showed some

discrepancy ( $r = .24$ ). Nosek and his colleagues found that participants' implicit biases were stronger than their explicit biases toward Blacks and sometimes their implicit and explicit biases were in contradiction. Thus while many White and Black participants indicated no preference for Whites over Blacks on self-report measures, their implicit IAT scores revealed a clear pro-White bias.

Greenwald, Poehlman, Uhlmann, and Banaji (2009) performed a meta-analysis to investigate the predictive validity of implicit tests. The researchers collected 122 reports that contained 184 independent samples (14,900 subjects). The weighted average criterion correlation for these IAT measures was  $r = .27$ , which, according to Cohen (1977), is considered a small correlation. They also compared the predictive validity of implicit measures with their corresponding self-report measures. The results indicated that IAT measures as compared to self-report measures had higher predictive validity when they were assessing interracial or other intergroup behaviors -- for instance, when assessing individuals' attitudes toward gay men (Banse, Seise, & Zerbes, 2001), or when assessing participants' racial attitudes toward African-Americans (Kim, 2003; Mitchell, Nosek, & Banaji, 2003). Interestingly, the findings revealed that the predictive validity of explicit self-report measures were reduced dramatically (24%) when the assessed attitudes were socially sensitive, whereas, the predictive validity of IAT was reduced only slightly (3.4%) when assessing socially sensitive attitudes. To assess the sensitivity of the topics, participants rated the degree to which they were likely to be affected by social desirability concerns when indicating their attitudes. The large effect of social desirability on explicit measures leads us to the conclusion that impression management can reduce

validity of explicit measures in socially sensitive domains (Nosek, Greenwald, & Banaji, 2007).

This literature review suggests two conclusions. First, implicit measures might be more valid instruments for assessing socially sensitive attitudes, and second, implicit and explicit tests might yield different results when assessing socially sensitive criteria.

Sexual attitudes reflect a highly sensitive topic. Therefore, it is very probable that many individuals may find it difficult to indicate their true attitudes due to either their concerns about confidentiality or social desirability. With that being said, considerable inconsistency between the results of explicit self-report tests and implicit measures on sexual attitudes would be expected. Banse, Seise, and Zerbes (2001) conducted a study to assess individuals' attitudes toward gay men that revealed this discrepancy vividly. The results indicated that participants expressed a positive attitude toward gay men when they were performing on an explicit self-assessment measure but they appeared to hold negative attitudes when assessed on a homosexual-heterosexual attitude IAT. Thus, employing implicit tests for assessing individuals' sexual attitudes may yield important information beyond that obtained by explicit measures.

### **Hypotheses**

Implicit measures are found to have higher predictive validity in assessing socially sensitive constructs compared to explicit measures, because, they are less influenced by social desirability and dissimulation. Since sexual attitudes deal with socially sensitive domains, implicit measures may be more valid measures for assessing such constructs and may yield important information beyond that obtained by explicit measures. Therefore this study predicts that (1) implicit measures will correlate

significantly higher than explicit measures with various sexual behaviors, and (2) the implicit and explicit measures of sex guilt will account together for significantly more variance in sexual behaviors than either used alone. In other words, we predict that the sex guilt implicit association test will demonstrate good incremental validity such that it will increase the predictive ability beyond that provided by Mosher Sex Guilt Scale.

## CHAPTER II

### METHODS

#### Participants

The participants were 295 undergraduate students (50 men and 245 women) who were enrolled in psychology courses at Old Dominion University. Students volunteered for the survey through the university recruitment tool for respondents “SONA system” and they received course credit for participating. All participants were treated according to American Psychological Association (APA) ethical standards. Data were collected within the period of September 2014 to November 2014. Participants ranged in age from 18 to 53 and the mean age was 22.69 ( $SD = 6.29$ ). A boxplot analysis was performed on the age variable. Participants older than 33 stood out as outliers and were excluded from the study ( $n = 22$ ). The final sample included 273 participants (48 men and 225 women) who ranged in age from 18 to 33 with a mean age of 21.24 ( $SD = 3.46$ ). See Table 1 for the detailed description of demographics of study sample.

#### Materials

**Demographics form.** The demographics form consisted of 7 items. It included questions about age, gender, ethnicity, year in college, relationship status, sexual orientation, and religion (see Appendix B for the complete list of items).

Table 1  
*Demographics of Study Sample*

Characteristic	<i>n</i>	%
<b>Ethnicity</b>		
African American	112	41.0
American Indian or Alaska Native	1	.04
Asian or Asian American	14	5.1
Caucasian	129	47.3
Hispanic	12	4.4
Native Hawaiian or Pacific Islander	5	1.8
<b>Gender</b>		
Male	48	17.6
Female	225	82.4
<b>Year in college</b>		
Freshman	80	29.3
Junior	59	21.6
Sophomore	60	22.0
Senior	74	27.1
<b>Relationship status</b>		
Single	110	40.3
Dating	49	17.9
In a long-term relationship	79	28.9
Engaged	7	2.6
Married	28	10.3
<b>Sexual orientation</b>		
Exclusively heterosexual	218	79.9
Mostly heterosexual	24	8.8
Bisexual	18	6.6
Mostly homosexual	4	1.5
Exclusively homosexual	8	2.9
Other	1	.4
<b>Religion</b>		
Catholic	54	19.8
Orthodox	6	2.2
Protestant	65	23.8
Jewish	2	.7
Muslim	4	1.5
Buddhist	3	1.1
Hindu	3	1.1
Atheist	25	9.2
Agnostic	23	8.4
Other	88	32.2

**Brief Mosher Sex Guilt Scale.** For the current study, the 10-item Brief Mosher Sex Guilt Scale was used. According to Janda and Bazemore (2011), the 10-item version of the scale correlates .95 with the full 50-item version of the scale. Participants rated the degree to which each item accurately described them on a Likert-type scale from 1 (*not at all true*) to 7 (*extremely true*). Sample items include: “When I have sexual dreams I try to forget them”; “Sex relations before marriage should not be recommended” (see Appendix D for the full questionnaire). An overall sex guilt score ranging from 10 to 70 was generated. Higher scores indicated higher levels of guilt. Janda and Bazemore (2011) reported a Cronbach’s alpha of .85 for this scale. The reliability of the Brief Mosher Sex Guilt Scale was relatively high in the current research (Cronbach’s  $\alpha = .81$ ).

**IAT measure of sex guilt.** An Implicit Association Test (IAT) was created for the purposes of this study. This IAT consists of two dimensions: pictorial and lexical. For the pictorial section, the target category of sex was contrasted with the more neutral category of exercise. This section includes eight drawings for sex and eight drawings for exercise. The sex drawings were taken from a Human Sexuality textbook, and the exercise drawings are created for the purposes of this study (see Appendix C for examples of the drawings). The lexical dimensions were guilt-innocent. The negative and positive adjectives were taken and modified from other IATs at the website <https://implicit.harvard.edu>. The negative adjectives to be associated with “guilt” that were used in the IAT were: hurt, terrible, evil, shame, horrible, failure, nasty, and blame. Shame and blame were not among the adjectives used on the IATs published on <https://implicit.harvard.edu>, but two other negative adjectives were substituted for them because of the subject matter of the IAT used in the present study. The positive adjectives

that were associated with innocent were the same as those published at <https://implicit.harvard.edu>. They were: joy, pleasure, happy, love, glorious, peace, wonderful, laughter. The reliability and validity of this IAT has not been documented previously, as the test was created specifically for the current study, nevertheless, IATs have generally shown to have an acceptable level of reliability. Greenwald, McGhee, and Schwartz (1998) reported that the IAT effect that they found in their research was robust to variations in the interval between the stimulus and response, stimulus locations (left or right), and number of items (5 to 25). Additionally Lane, Banaji, Nosek, and Greenwald (2007) in a meta-analysis of IATs across 50 studies found a Cronbach's alpha of .79.

**Sexual experiences.** Participants' sexual experiences were assessed with a number of items, based on completing Likert-type scales or categorical measures. Questions measured a wide range of sexual behaviors including frequency of sexual activity, contraceptive use, and number of sexual partners.

The first four items in the questionnaire, which assessed participants' experiences of first consensual vaginal intercourse, were drawn from Janda and Bazemore (2011) study. Results of their research indicated that all of the four items were significantly correlated with sex guilt. The rest of the items are the questions that Mosher (1973) employed for assessing his participants' sexual experiences which are adapted in the present study. Again all of the items showed significant correlation with sex guilt in Mosher's study. In addition, participants' condom use assertiveness is assessed with a 3 item questionnaire created by Brien, Thombs, Mahoney, and Wallnau (1994). Coefficient alpha reported for this measure is .71 (Bryan, Aiken, & West, 1997). See Appendix E for the sexual experiences questionnaire.



**Religiosity.** To assess religiosity participants completed the two-item scale that had two components: organizational and non-organizational religiosity. Organizational religiosity measures individuals' tendency to attend and/or engage in religious activities specifically in a place of worship. Non-organizational religiosity reflects individuals' internal beliefs. The two items in the scale were adapted and selected from Strawbridge, Shema, Cohen, Roberts, and Kaplan's (1998) five-item religiosity scale. The original five items were: (1) "How often do you go to religious services?"; (2) "Besides religious services, how often do you take part in other activities in a place of worship?"; (3) "How often do you pray?"; (4) "How important are your religious or spiritual beliefs for what you do every day?"; and, (5) "How important are your religious or spiritual beliefs as a source of meaning in your life?". The first three items assessed organizational religiosity by measuring the frequency of attending religious activities and the remained two items measured non-organizational religiosity by assessing the importance of participants' religious beliefs in their lives. Strawbridge et al. performed a confirmatory factor analysis on these five items and they found that results support for a two-factor solution. Thus, they combined the first three questions to measure the organizational religiosity and they combined the second two questions to assess the non-organizational religiosity. Reliability for organizational vs. non-organizational religiosity were  $\alpha = .80$  and  $\alpha = .92$ , respectively.

The two items that were selected for assessing religiosity in the present study were: "How often do you attend religious services and activities" and "How certain are you about the existence of God or a Supreme Being." These two items assessed organizational and non-organizational religiosity, respectively. Responses to both of the

questions were rated on a Likert-type scale ranging from 7 (*several times per week*) to 1 (*never*) for the first question and 7 (*extremely certain*) to 1 (*extremely uncertain*) for the second question.

## **Procedure**

Participants took the survey through the university recruitment tool SONA system. The survey was accessible online with the name “Attitudes toward Sexuality” and respondents were able to take it at their convenience. Before proceeding with the questionnaire, prospective participants were informed of the risks and benefits of the study. The risks were at the worst, feeling distress and discomfort in response to some of the items. The benefits included receiving course credit and perhaps learning something of value regarding their sexual lives. Participants were assured of the anonymity and their right to withdraw from the study anytime without any penalty was respected. Brief explanation on the aim of the study was provided. They also were provided with instructions for completing the various measurements. For completing the sex guilt IAT the participants were given a URL which directed them to survey website. Participants were not informed about the goal of the IAT, but they were given a brief instruction on how to complete the IAT. The online link for participating in this study was available for two months. IAT was presented to participants before self-report sexuality scales to guarantee participants’ blindness of what the IAT measures. In completing the IAT, participants were required to match pictures related to “exercise” and “sex” to terms related to “guilt” and “innocence.” The IAT events were presented to participants in a randomized order but the IAT blocks were presented to all of the participants in the same

order. IAT events were the single slides to which the participants respond with pushing a key. IAT blocks are sequences of IAT events which share the same task (see Appendix C for examples of the items in each Block).

**Block 1.** During the first block participants matched the “sex pictures” with the term “sex” on the upper left side of the computer screen and matched “exercise pictures” with the term “exercise” on the upper right side of the computer screen.

**Block 2.** During the second block, participants matched *negative adjectives* (hurt, terrible, evil, shame, horrible, failure, nasty, and blame) with the term “guilt” on the upper left side of the computer screen and *positive adjectives* (joy, pleasure, happy, love, glorious, peace, wonderful, laughter) with the term “innocence” on the upper right side of the computer screen.

**Block 3.** During the third block, participants were asked to match *negative adjectives* (hurt, terrible, evil, shame, horrible, failure, nasty, and blame) and *sex pictures* with the term “sex or guilt” on the upper left side of the computer screen and match *positive adjectives* (joy, pleasure, happy, love, glorious, peace, wonderful, laughter) and *exercise pictures* with the term “exercise or innocence” on the upper right side of the computer screen.

**Block 4.** During the fourth block, participants were asked to match *positive adjectives* and *exercise pictures* with the term “exercise or innocence” on the upper right side of the computer screen and match *negative adjectives* and *sex pictures* with the term “sex or guilt” on the upper left side of the computer screen.

**Block 5.** During the fifth block, participant matched the *negative adjectives* with the term “guilt” this time on the upper right side of the computer screen and they matched

*positive adjectives* with the term “exercise” this time on the upper left side of the computer screen.

**Block 6.** During the sixth block, participants were asked to match *negative adjectives* and *exercise pictures* with the term “exercise or guilt” on the upper right side of the computer screen and to match *positive adjectives* and *sex pictures* with the term “sex or innocence” on the upper left side of the computer screen.

**Block 7.** During the last block, participants were asked to match *negative adjectives* and *exercise pictures* with the term “exercise or guilt” on the upper right side of the computer screen and to match *positive adjectives* and *sex pictures* with the term “sex or innocence” on the upper left side of the computer screen.

**IAT scoring.** For scoring the IAT, we used the D-algorithm developed by Greenwald, Nosek, and Banaji in 2003. Both the response latencies and the error rates are taken into account in this algorithm. In order to improve the psychometric properties, trials with latencies greater than 10,000 ms were removed from the data. At the next step we excluded participants whose latencies were extraordinary short; that is, those whose reaction times to > 10% of the trials were less than 300 ms. Based on the D-algorithm, means were calculated for the following four blocks; 3, 4, 6, 7. Then, the standard deviation for all of the trials at blocks 3 and 6, and the standard deviation for all of the trials at block 4 and 7 were calculated. The difference scores between Block 3 and Block 6 as well as the difference scores between block 4 and block 7 were computed. These two sets of D scores were divided by their corresponding standard deviations. Finally, the averages of the two sets of scores were computed. A positive score indicated the preference for exercise; whereas, a negative score indicated the preference for sex.

After completing the IAT, participants entered their SONA IDs, and completed the self-report scales. These measures included: the demographics form, the Brief Mosher Sex Guilt Scale, the sexual experiences items, and, lastly, the Religiosity Scale. All of the self-report measures were created using Inquisite survey builder software. The IAT and the self-report measures were presented to the participants on the same website.

## CHAPTER III

### RESULTS

#### **Sexual Experiences of the Research Participants**

A majority of participants had experienced consensual sexual vaginal intercourse and were sexually active at the time of the study. Participants were on average 16.4 years old at their first sexual intercourse. More than half of the respondents indicated that they used condoms or some form of birth control the first time they had sexual intercourse. Participants were on average neither dissatisfied nor satisfied with their first sexual intercourse experience. Eighty five percent of the participants indicated that they had been using some form of contraception for their ongoing sexual encounters. On the condom assertiveness scale, most of the participants were fairly to strongly confident in their ability to discuss or suggest using of condoms with their sexual partners. Unwanted pregnancies and contracting STDs had affected less than 10% of the sample.

Fear of pregnancy, contracting STDs, and being disapproved by the partner were common feelings which participants reported to experience during their sexual encounters. More than 30% indicated that they experienced these fears at least sometime during their sexual interactions. Nearly 60% of the respondents had more than 3 sexual partners in the past and they engaged in sexual intercourse once in two weeks or more. See Table 2 for a summary of participants' responses about their sexual experiences.

Table 2  
*Item Descriptive Statistics of Sexual Experiences Questionnaire*

Likert-type Items/Scale	<i>M (SD)</i>
How often do you experience any of the following feelings when you are having sexual intercourse? Rated on a 5-point scale ( <i>never to always</i> )	
Fear of pregnancy (yourself or your partner)	2.81 (1.61)
Fear of contacting sexually transmitted disease	2.22 (1.70)
Fear of being disapproved by the partner	2.42 (1.69)
Feelings of guilt	2.14 (1.65)
Three-item Condom Assertiveness Scale rated on a 5-point scale ( <i>strongly disagree to strongly agree</i> )	
I feel confident in my ability to discuss condom usage with any partner I might have	4.45 (.85)
I feel confident in my ability to suggest using condoms with a new partner	4.48 (.82)
I feel confident I could suggest using a condom without my partner feeling diseased	4.36 (.96)
If you have had sexual intercourse, to what extent were you satisfied or dissatisfied to first have sex at that age? Rated on a 5-point scale ( <i>extremely satisfied to extremely dissatisfied</i> )	2.77 (1.17)
Dichotomous/Categorical Items	<i>n (%)</i>
Have you ever had consensual sexual vaginal intercourse?	
Yes	235 (86.1%)
No	38 (13.9%)
Are you currently sexually active? (Have you had sexual intercourse within the past 30 days?)	
Yes	184 (67.4%)
No	89 (32.6%)
Was a condom used for your first experience of sexual intercourse?	
Yes	165 (60.4%)
No	76 (27.8%)
Not applicable (have not had consensual intercourse)	32 (11.7%)
Did you or your partner use any form of birth control the first time you had sexual intercourse?	
Yes	137 (50.2%)
No	103 (37.7%)
Not applicable (have not had consensual intercourse)	33 (12.1%)
Have you ever been forced to engage in any coital sexual activity against your will?	
Yes	29 (10.6%)
No	232 (85.0%)
I do not know	12 (4.4%)

Table 2. Continued

Dichotomous/Categorical Items	<i>n</i> (%)
Have you ever been diagnosed with a sexually transmitted disease?	
Yes	26 (9.5%)
No	244 (89.4%)
Uncertain	3 (1.1%)
Have you or your partner ever had an unwanted pregnancy?"	
Yes	26 (9.5%)
No	247 (90.5%)
What type of contraceptive do you and your partner usually use?	
None	42 (15.4%)
Birth control pills	61 (22.3%)
Diaphragm or condom	3 (1.1%)
IUD	12 (4.4%)
Emergency contraception	18 (6.6%)
Spermicides such as foam, film, suppositories	41 (15.0%)
Condoms in combination with some other type of contraception	123 (45.0%)
What type of contraceptive did you and your partner use for your most recent encounter?	
None	44 (16.1%)
Birth control pills	41 (15.0%)
Diaphragm or condom	2 (.8%)
IUD	8 (3%)
Emergency contraception	16 (5.9%)
Spermicides such as foam, film, suppositories	46 (17.5%)
Condoms in combination with some other type of contraception	142 (40.3%)
How many sexual partners have you had in the past? Responses rated on a 7-point scale	
0	30 (11.0%)
1	51 (18.7%)
2	33 (12.1%)
3	28 (10.3%)
4	22 (8.1%)
5	26 (9.5%)
6 or more	83 (30.4%)
How often do you engage in sexual intercourse? Responses rated on a 7-point scale	
More than 7 times a week	8 (2.9%)
4 to 7 times a week	34 (12.5%)
Once to 3 times a week	82 (30%)
Once in two weeks	42 (15.4%)
Once in a month	27 (9.9%)
Less than once in a month	32 (11.7%)
I do not have sexual intercourse	48 (17.6%)



### **Internal Consistency of Sex Guilt IAT and Mosher Sex Guilt Scale**

Before testing the research hypothesis, the internal consistency and the convergent validity of the sex-guilt IAT and Mosher Sex Guilt Scale was assessed. For testing the internal consistency of the IAT, we used the split-half reliability (odd-even method) was used. First, all of the trials were listed by their block number and were grouped by participants. Only blocks 3, 4, 6, and 7 were used in the calculation. These four blocks contained 60 trials overall. Every individual responded to all of the 60 trials which were consisted of equal number of odd and even trials. The average of latencies for the odd trials and the even trails was calculated separately for each participant. Then the two sets of average scores were correlated. After applying Spearman-Brown correction, our data indicated a split-half reliability of .99 for the latency scores. Mosher sex guilt also demonstrated good internal consistency ( $\alpha = .82$ ).

### **Convergent Validity of Sex-Guilt IAT and Mosher Sex-Guilt Scale**

Correlational analysis was performed to investigate the relationship between IAT scores and the self-reported Mosher scores (see Table 3 for descriptive statistics for IAT and Mosher sex guilt). There was a significant correlation between the two measures ( $r(271) = .25, p < .001$ ). While this finding supports the convergent validity of the sex-guilt IAT, the relationship between IAT scores and the measured sexual behaviors was explored next. The IAT was significantly correlated with the following sexual behaviors: whether or not the participants were sexually active, the degree to which participants were satisfied with their first sexual intercourse, participants' frequency of engaging in sexual intercourse, and participants' choice of contraception method. Based on the correlation analysis, participants who scored higher on sex guilt IAT were less likely to

be sexually active and they were less satisfied with their first sexual intercourse. Furthermore, participants with high implicit sex guilt were more likely to choose “none” as the method of contraception compared to participants with lower IAT scores. In addition, high sex guilt persons reported engaging in sexual intercourse less frequently compared to low sex guilt persons.

The relationship between sex guilt and some of the measured outcome variables were assessed for the first time in this study. Among these outcome variables are condom assertiveness, fear of contracting STDs, and fear of unwanted pregnancy. Participants with higher explicit sex guilt reported to feel less confident in their ability to discuss condom usage with their partner ( $r(271) = -.16, p = .008$ ), and felt less confident in their ability to suggest using a condom without their partner feeling his/her character was being questioned ( $r(271) = -.12, p = .050$ ). In addition, while persons with high sex guilt did not report receiving an STD diagnoses significantly more than persons with low sex guilt ( $r(271) = .07, p = .250$ ), they indicated experiencing fear of contracting STDs more frequently ( $r(271) = .14, p = .017$ ). Similarly, high and low guilt participants did not differ on the incidence of unwanted pregnancy for themselves or their partners ( $r(271) = .04, p = .472$ ); however, high sex guilt participants reported to be significantly more fearful of having an unwanted pregnancy (themselves or their partners) than low sex guilt participants ( $r(271) = .16, p = .009$ ). High sex guilt persons were more fearful about being disapproved by their partner ( $r(271) = .21, p = .001$ ) as well and they reported experiencing more guilt feelings during sexual intercourses ( $r(271) = .29, p < .001$ ). The result on the association between religiosity and sex guilt was also interesting. High sex guilt persons were more certain about the existence of God or a Supreme Being ( $r(271) =$

.31,  $p < .001$ ) and they attended religious services more frequently ( $r(271) = .47, p < .001$ ) compared to low sex guilt persons.

The IAT and Mosher Sex Guilt Scale displayed similar patterns of correlations, however, Mosher scale demonstrated better convergent validity as it correlated with almost all of the outcome variables, whereas, IAT correlated with only four (See Table 4 for correlation coefficients). In order to better understand the differences between the two measures on convergent validity, the significance of the differences between correlations of IAT and Mosher with outcome variables was also assessed. An online calculator provided at <http://quantpsy.org/> was used to conduct the test of the difference between two dependent correlations with one variable in common. This calculator converts each correlation coefficient to a  $z$ -score using Fisher's  $r$ -to- $z$  transformation. Then it computes asymptotic covariance of the estimates using Steiger's (1980) equations. Finally the calculator uses the quantities achieved from Steiger's equations to compute the asymptotic  $z$ -test. The difference between correlations is significant if the obtained  $z$ -value is greater than 1.96 for a two-tailed test. The present study conducted a series of significance of the difference tests for all of the outcome variables. Results indicated that Mosher scale and IAT correlated significantly different from each other only with two of the outcome variables: number of sexual partners ( $Z = 3.52, p < .001$ ) and feelings of guilt ( $Z = -2.52, p = .006$ ). Except for these two outcome variables, Mosher scale and IAT did not correlated significantly different with the other outcome variables (See Table 4 for  $Z$ -scores).

Table 3  
*Descriptive Statistics for IAT and Mosher Sex-Guilt Scores (N=273)*

Sex-guilt measure	<i>M</i>	<i>SD</i>	Minimum	Maximum
IAT	.26	.50	-1.16	1.41
Mosher	30.03	9.52	10.00	65.00

*Note.* IAT means Implicit Association Test

Table 4  
*Correlations between the Sex Guilt Measures and Sexual Behaviors*

Sexual behaviors	IAT	Mosher	Z-scores
Age at first sex	.02	.11	-1.05
Satisfaction with first sex	-.13*	-.22**	1.07
Condom usage at first sex	-.04	-.11	.82
Birth control usage at first sex	-.01	-.12	1.28
Ever being forced to have sex	.04	-.07	1.28
Sexually active or inactive	-.21**	-.27**	.73
Number of sexual partners	-.05	-.34**	3.52**
Frequency of sexual intercourse	-.18**	-.32**	1.71
Contraception usage	-.13*	-.28**	1.81
Condom assertiveness	-.02	-.15**	1.52
Fear of pregnancy	.04	.14*	1.17
Fear of contracting STDs	.05	.15**	-1.17
Fear of being disapproved by the partner	.08	.21*	-1.54
Feelings of guilt	.08	.29**	-2.52**

*Note.* Pearson correlation coefficients are reported for “Age at first sex” and “Condom assertiveness”. Point-biserial correlation coefficients are reported for the rest of the outcome variables.

Z-scores indicate the differences between the IAT and Mosher correlations on the corresponding outcome variables.

\*  $p < .05$ . \*\*  $p < .01$ .

### **Incremental Validity of the IAT Sex Guilt**

A series of two-step logistic and linear regressions were performed to assess the incremental validity of the IAT and to explore whether the IAT could explain additional variance in the sexual behaviors beyond what Mosher Scale explained. In step one the sexual behaviors were regressed on the Mosher scores. Logistical regression results indicated that Mosher alone explained 9.8% of variance in whether or not participants were sexually active and 8.4% of variance in whether or not participants used a method of contraception for their usual sexual encounters. Results on linear regression indicated that Mosher alone explained 4.8% of variance in the degree to which participants were satisfied with their first sexual intercourse and 10.4% of variance in the frequency of engaging in sexual intercourse.

In step two the IAT was added as an additional predictor to the model. Results showed that the Nagelkerke  $R^2$  changed significantly for one of the outcome variables after adding the IAT to the model. IAT could explain additional variance in whether or not participants were sexually active. The addition of the IAT to the model did not significantly improve prediction of participants' degree of satisfaction with their first sexual intercourse, their frequency of sexual intercourse, or their choice of contraception method (See Table 5 for the summary of stepwise logistical and linear regression analyses).

Table 5

*Stepwise logistical and linear regression analyses of outcome variables on Mosher and IAT sex guilt*

Predictor	Sexual behaviors							
	Sexually active or inactive		Satisfaction with first sex		Frequency of sexual intercourse		Contraceptive usage (none vs. use of a method)	
	Nagelkerke $\Delta R^2$	$B$	$\Delta R^2$	$\beta$	$\Delta R^2$	$\beta$	Nagelkerke $\Delta R^2$	$B$
Step 1	.098**		.048**		.101**		.128**	
Mosher sex guilt		-.06**		-.22**		-.32**		-.80**
Step 2	.032*		.006		.01		.009	
Mosher sex guilt		-.05**		-.20**		-.30**		-.78**
IAT sex guilt		-.75*		-.08		-.11		.08

*Note.* Logistical and linear regression analyses were performed on dichotomous and Likert-type outcome variables respectively. *Sexual activity* and *contraceptive usage* were dichotomous variables. *Satisfaction with first sex* and *frequency of sexual intercourse* were Likert-type variables.

Nagelkerke  $R^2$  is a pseudo  $R^2$  measure that measures the variance accounted for by each model.

\*  $p < .05$ . \*\*  $p < .01$

### Association between Participants' Demographic Characteristics and Sex Guilt

Age significantly predicted explicit sex guilt scores. Results on regression showed that older participants had lower explicit sex guilt compared to younger participants ( $\beta = -.17$ ,  $F(1, 271) = 7.88$ ,  $p = .005$ ,  $R^2 = .028$ ). However, age did not predict implicit sex-guilt scores ( $\beta = .00$ ,  $F(1, 271) = .07$ ,  $p = .795$ ,  $R^2 = .000$ ). Gender was not treated as an independent variable in this study because, the number of the male participants was less than 66 (the required sample size for the optimum power of .80). The differences in implicit and explicit sex guilt scores between participants with different relationship statuses were explored through performing a one-way ANOVA. Results indicated that no group was significantly different from another on implicit ( $F(4, 268) = .449$ ,  $p = .773$ ,  $\eta^2 = .007$ ) and explicit sex-guilt scores ( $F(4, 268) = 1.172$ ,  $p = .323$ ,  $\eta^2 = .017$ ).

Relationship status was then treated as a binomial variable. The *single* and *dating* groups were combined to make the first category and the *in a long term relationship, engaged*, and *married* groups were combined to make the second category. Results on one way ANOVA indicated significant differences between the two groups ( $F(1, 271) = 3.53$ ,  $p = .061$ ,  $\eta^2 = .013$ ). Students who were single or dating had higher sex guilt scores ( $M = 30.94$ ,  $SE = .76$ ) compared to those who were in a long term relationship, engaged, or married ( $M = 28.74$ ,  $SE = .89$ ).

Sexual orientation was not treated as an independent variable because the number of participants who did not indicate their sexual orientation as exclusively heterosexual was less than 66. Lastly, the association between religious affiliation and sex guilt scores was studied. A one-way ANOVA indicated significant differences between participants with different religious affiliation on their explicit ( $F(10, 273) = 3.08$ ,  $p = .001$ ,  $\eta^2 = .105$ )



but not implicit ( $F(5, 267) = .64, p = .779, \eta^2 = .024$ ) sex guilt scores. Tukey HSD post hoc tests were performed and results showed that protestants were significantly different on their explicit sex guilt scores from agnostics and atheists; such that, protestants had the highest explicit sex guilt scores ( $M = 32.62, SD = 12.44$ ) and atheists ( $M = 24.2, SD = 7.59$ ) and agnostics ( $M = 24.00, SD = 7.03$ ) had the lowest explicit sex guilt scores.

## CHAPTER IV

### DISCUSSION

The purpose of this research was to compare implicit and explicit measures of sex guilt in predicting certain sexual behaviors. First, the study explored the interrelationships between implicit sex guilt, as measured with an IAT, and explicit guilt as measured with the Brief Mosher sex guilt scale, to understand whether these two measures overlap or are independent in explaining variance in sexual behaviors. Second, the study tested the construct and convergent validity of the IAT sex guilt measure by investigating the correlations between IAT scores and the measured sexual behaviors. Third, the study examined whether IAT and explicit measures of sex guilt combined explained more variance in sexual behaviors than the explicit measure used alone.

#### **Interrelationships between Implicit and Explicit Measures of Sex Guilt**

The results indicated that implicit and explicit measures of sex guilt were significantly correlated but the correlation coefficient ( $r = .25$ ) was small according to Cohen (1998). This finding was consistent with the literature on the interrelations of implicit and explicit measures (Hofmann, Gawronski, Gschwendner, Le, & Schmitt, 2005). Theoretically, it is assumed that implicit and explicit measures assess different aspects of the behavior. While implicit scales are expected to tap into affect-driven and motivational aspects of a behavior, explicit measures assess self-concept related aspects of behavior such as goals and values (Schultheiss, Yankova, Dirlikov, & Schad, 2009). Therefore, it is expected that implicit and explicit measures may not correlate highly with one another. This is called the *independence postulate* which assumes that implicit and

explicit measures are independent from each other in predicting different aspects of behaviors and, therefore, it is expected that the correlation between the two measures should be close to zero (Schultheiss, Yankova, Dirlikov, & Schad, 2009). However, there was never a non-significant correlation in the studies comparing between the implicit and explicit measures (Kollner & Schultheiss, 2014). The meta-analysis research that Hofmann and colleagues conducted indicated that the average correlation coefficient between implicit and explicit measures over 126 studies was .24 which is almost identical to the correlation coefficient that we found in the present study. To understand what aspects of behavior can be better explained by sex guilt IAT and what others can be explained by Mosher Sex Guilt Scale, the convergent validity of both of the measures was assessed in the current study.

### **Convergent Validity of the Measures and Hypotheses Testing**

The results in the present study documented the superior convergent validity of Mosher Sex Guilt Scale compared to the IAT measure. According to the literature, sexual guilt predicts many sexual behaviors, 18 of which were assessed in the present study. While Mosher sex guilt was significantly correlated with most of these 18 outcome variables, implicit sex guilt correlated only with four of them. The sexual behaviors that IAT sex guilt predicted were: whether or not participants were sexually active, the degree to which participants were satisfied with their first sexual intercourse, frequency of engaging in sexual intercourse, and participants' choice of contraception method. Mosher Sex Guilt Scale, besides these four sexual behaviors, predicted condom assertiveness, number of sexual partners, fear of pregnancy (for themselves or their partners), fear of contracting STDs, fear of being disapproved by their partner, and feelings of guilt. In

addition Mosher Sex Guilt Scale correlated with religiosity, age, and religious affiliation. The correlation coefficients that were found between Mosher sex guilt and the outcome variables were comparable to those reported by Janda and Bazemore (2011) and Mosher and Cross (1971). Thus, the first hypothesis is rejected. Implicit sex guilt was not a better predictor for sexual behaviors compared to explicit sex guilt.

Although the Mosher scale correlated with more outcome variables compared to the IAT, the correlation coefficients of the Mosher scale and the IAT were not significantly different from each other except for only two outcome variables: “number of partners” and “feelings of guilt.” Thus, despite the fact that Mosher scale correlated significantly with condom-assertiveness for example and the IAT did not, the weak correlation between Mosher scale and condom-assertiveness was not significantly different from the non-significant correlation between the IAT and this outcome variable. Therefore the present study documented that Mosher scale might possess better convergent validity compared to the IAT but only in predicting individuals’ number of sexual partners and their feelings of guilt during sexual intercourse.

Greenwald et al. (2009) suggested that the low correlation between implicit and explicit measures might be an explanation for low predictive validity of both the implicit association tests and the explicit measures. According to Greenwald et al. the low correspondence between the IAT and explicit measures reflects a conflict between the automatic and self-controlled processes which reduces the predictive power of both the IAT and the explicit test. Greenwald et al. argued that when the correspondence between the implicit and explicit measures is high, it indicates that the two measures are working together rather than competing which will result in better prediction of criterion variables.

In contrast, discrepancies between automatic and self-controlled attitudes attenuate the degree to which both aspects are shown in the behavior; thus, reduces the predictive validity of both measures. So according to this perspective, the predictive validity of Mosher Sex Guilt Scale also would have been higher if there was a greater correspondence between the implicit and explicit responses.

Finally, the present study investigated whether the implicit and explicit measures of sex guilt combined can explain significantly more variance in outcome variables than Mosher used alone. When we added sex guilt IAT as a predictor to the model, the IAT did not explain additional variance in sexual behaviors except for sexual activity beyond the Mosher Sex Guilt Scale. This result led to rejection of our second hypothesis.

Given sexual attitudes are among the socially sensitive domains, participants might dissimulate their answers on the sex guilt explicit measure due to social desirability concerns. In other words, they may try to fake their answers in favor of the attitudes that are socially more desirable. Faking the answers requires the participants to have a clear idea of what behaviors and attitudes are socially desirable and what attitudes are maybe more frowned upon. Much of the published IAT research is being conducted on prejudice and stereotyping, such as assessing racial attitudes towards African Americans (Hugenberg & Bodenhausen, 2004; Livingston, 2001; Richeson & Shelton, 2003) or negative attitudes toward homosexuals (Banse, Seise, & Zerbis, 2001; Jellison, McConnel, Gabriel, 2004). In those studies the majority of participants only relying on common sense unanimously agreed that racism and discrimination against homosexuals was socially considered cruel and wrong. Therefore, on self-report measures they might have tried to fake their answers and to indicate more positive

attitudes toward these minorities and thus, implicit association tests –which are assumed to be robust to social desirability biases- totally outperformed the explicit measures in those researches.

However in the present study, it may be that when participants were answering to the Mosher Sex Guilt Scale items, they were not unanimous on what sexual attitudes were considered socially desirable and what were not. In other words there was no common sense in terms of what sexual behaviors are more acceptable. For instance, consider the following two items from the Mosher Sex Guilt Scale: “Masturbation helps one feel eased and relaxed” and “Sex relations before marriage help people adjust.” Media, parents, and schools convey so many contradictory perspectives on masturbation and premarital relationship that it is hard to say what attitude is more socially desirable. Therefore, it may be that participants, based on what they thought was socially desirable faked their answers. Those participants who believed that society think less of people who have premarital sexual experience will fake their answers in favor of stricter sexual double standards. In contrast those who believe that, nowadays in peoples’ eyes, those who haven’t had premarital sexual experiences are considered old fashioned and inexperienced will try to fake their answers in favor of more relaxed sexual attitudes. Therefore, social desirability bias might have affected the explicit sex guilt results in two opposite directions; boosting or attenuating sexual guilt scores.

All of the outcome variables were assessed explicitly. Thus, social desirability bias might have affected outcome variables as well. However, social desirability affects the outcome variables in the same direction that it affects explicit sex guilt scores. This is because explicit sex guilt measure and outcome variables were assessing similar sexual

attitudes and behaviors. Participants who faked their answers in favor of more strict sexual standards would have done the same when they answered to outcome variables questions. Therefore, there was a good correspondence between explicit sex guilt scores and most of the outcome variables which was reflected in correlation coefficients. The IAT scores on the other hand are not affected by social desirability concerns. Thus, when we correlated them with the outcome variables that were being affected by social desirability bias in different directions, results indicated weaker correlations. In conclusion, while sex guilt IAT could provide us with a social desirability bias free assessment, it did not outperform the Mosher Sex Guilt Scale explicit measure.

Besides social desirability concerns, as it was discussed earlier, implicit and explicit measures tap onto different aspects of behavior and attitudes and it is expected that there be a low correspondence between them. Therefore, an explicit measure, if it has good reliability and construct validity, would correlate better with the explicit criterions compared to implicit measures.

### **Limitations and Implications for Future Study**

There are several limitations that must be considered. The first limitation concerns application of explicit measures for assessing criterion variables. As discussed before, it is very probable that participants have dissimulated their answers on the criterion questions due to social desirability concerns which resulted in lower correlation between IAT and these outcome variables. Future research can employ implicit tests to assess at least some of the outcome variables. Also, it will be helpful to assess social desirability bias as a moderator in the model to understand how much the correlation between IAT and criterion variables is being affected by social desirability biases. Lastly it might be

useful to use the mental health record of participants to assess variables such as contracting STDs or experiencing unwanted pregnancies.

Another limitation of this study is the small number of male participants. We required a minimum number of 66 male and 66 female participants in order to be able to treat gender as a grouping variable. However, the sample size of 48 male participants did not provide sufficient power to study males and females separately. This might be problematic because males' and females' attitudes toward sexuality (such as, male and female attitudes toward masturbation and premarital sexual relationships) are different in nature (Oliver & Hyde, 1993).

Another limitation of the study concerns sampling bias. The participants of the present study volunteered to take the survey named "Attitudes toward Sexuality." Research has demonstrated that individuals who volunteer for sexuality surveys significantly differ in their sexual attitudes and behaviors from those individuals who are randomly recruited by the researchers. For example, volunteers are found to be more sexually experienced, less conventional, and in general to have more relaxed sexual attitudes and behaviors (Dunne, Martin, & Bailey, 1997; Strassberg & Lowe, 1995; Catania, McDermott, & Pollack, 1986). Dune et al. (1997) reported that individuals who volunteered for the sexuality surveys agreed with casual sex, gay rights, birth controls, legalized abortions, condom vending machines, and legalized prostitutions significantly more. With all that being said, we suppose that our volunteer sample might be lower on sex-guilt measures, and might uphold more relaxed and effective sexual behaviors and attitudes compared to the population. Future research could use random sampling the way



that adequate number of male and female participants is recruited and there will not be volunteer bias, and the sample would be a better representative of the population.

### **Conclusion**

The present results provided some support for predictive validity of the sex guilt IAT. However, when compared to Mosher Sex Guilt Scale, the convergent validity of IAT was weaker. Moreover, when IAT was added to the model as a second predictor, it did not improve the prediction of the criterion variables. It may be that since the criterion variables were assessed explicitly, and since the implicit and explicit measures tap onto different aspect of behaviors, the explicit sex guilt measure corresponded better with the explicit criterion variables. Therefore, Mosher Sex Guilt Scale indicated a better convergent validity compared to sex guilt IAT. However, the sex guilt IAT's significant correlation with Mosher Sex Guilt Scale and four other sexual behaviors indicated that IAT does assess sexual guilt in participants but further research is required to improve the convergent validity of this measure.

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## APPENDIX A

### NOTIFICATION SHEET

#### **Attitudes Toward Sexuality**

Investigators: Louis H. Janda, Ph.D., Delaram Asadzadeh, Graduate Student, Psychology Department, Old Dominion University

Description: This questionnaire/assessment study concerns the relationship among numerous items intended to measure attitudes toward sex and their relationship with sexual behaviors.

Who May Participate? You must be an undergraduate at Old Dominion University and at least 18 years old to participate in this study.

Why Are You Being Asked to Participate? Undergraduate students have a variety of views toward sexuality and this study is intended to aid in the development of scales to measure these views.

How Many People Will Take Part In This Study? Approximately 200 individuals are expected to participate in this study.

What is Involved in the Study? You will be asked to provide demographic information (age, gender, etc.). You will also be asked to complete scales measuring your attitudes toward sexuality and to provide some information about your sexual experiences.

What are the Risks of the Study? The materials you will be presented with include some explicit sexual images. You may feel a degree of distress/discomfort while viewing these images or while thinking about your attitudes or recalling your experiences; human sexuality can be a sensitive subject.

Are There Benefits to Taking Part in the Study? Completing the questionnaire may provide you with insights about the issues raised in the content of the survey. If you decide to participate in this study, you will receive 2 Psychology Department research credits, which may be applied to course requirements or extra credit in certain Psychology courses. Equivalent credits may be obtained in other ways. You do not have to participate in this study, or any Psychology Department study, in order to obtain this credit.

What About Anonymity? To ensure that your responses are kept anonymous your name will not be connected to your responses. You would only provide your name only at the end of the survey by accessing another web site so you receive research credit for you psychology courses. There is no way the two sites can be linked, and therefore no way that anyone will know your answers on the questionnaires

What Are My Rights As A Participant? Taking part in this study is 100% voluntary. If at any point you are completing the survey you do not wish to continue your participation you have the right to stop without penalty.

Who Do You Contact If You Have Questions About the Survey? For questions or concerns about the study please contact Delaram Asadzadeh at [dasad001@odu.edu](mailto:dasad001@odu.edu) or 757.339.5537 or contact Dr. Janda at [ljanda@odu.edu](mailto:ljanda@odu.edu) or 757.683.4211. Also, if you are interested in the progress or outcomes of the study please contact either Delaram Asadzadeh or Dr. Janda.

**APPENDIX B****DEMOGRAPHIC QUESTIONNAIRE****Sex***{Choose one}*

- Male
- Female

**Age (in year)***{Enter text answer}*

[]

**Relationship Status***{Choose one}*

- Single
- Dating
- In a long-term relationship
- Engaged
- Married

**Ethnicity***{Choose one}*

- White
- Black or African American
- Asian or Asian American
- American Indian or Alaska Native
- Native Hawaiian or Pacific Islander

**Sexual orientation***{Choose one}*

- Exclusively heterosexual
- Mostly heterosexual
- Bisexual
- Mostly homosexual
- Exclusively homosexual
- Other

**Year in school***{Choose one}*

- Freshman
- Junior
- Sophomore
- Senior



**Religion***{Choose one}*

- Catholic
- Orthodox
- Protestant
- Jewish
- Muslim
- Buddhist
- Hindu
- Atheist
- Agnostic
- Other

**If you selected other above please specify***{Enter text answer}*

[ ]


## APPENDIX C

## EXAMPLES OF IAT ITEMS

Example Item of Block 1

Sex

Exercise



Press the E key if the image depicts Sex or the I key if the image depicts Exercise.

Example Item of Block 2

Guilt

Innocence

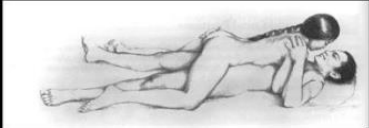
Hurt

Press the E key if the word is associated with Guilt or the I key if it is associated with Innocence.

## Example Item of Block 3

Sex  
or  
Guilt

Exercise  
or  
Innocence



Press the E key if the image depicts Sex or the word is associated with Guilt. Press the I key if the image depicts Exercise of the word is associated with Innocence.

## Example Item of Block 4

Sex  
or  
Guilt

Exercise  
or  
Innocence

**Shame**

Press the E key if the image depicts Sex or the word is associated with Guilt. Press the I key if the image depicts Exercise of the word is associated with Innocence.

## Example Item of Block 5

Innocence

Guilt

**Nasty**

Press the E key if the word is associated with Innocence or the I key if it is associated with Guilt.

## Example Item of Block 6

Sex  
or  
Innocence

Exercise  
or  
Guilt


**Terrible**

Press the E key if the image depicts Sex or the word is associated with Innocence. Press the I key if the image depicts Exercise of the word is associated with Guilt.

## Example Item of Block 7

Sex  
or  
Innocence

Exercise  
or  
Guilt



Press the E key if the image depicts Sex or the word is associated with Innocence. Press the I key if the image depicts Exercise of the word is associated with Guilt.

## APPENDIX D

## BRIEF MOSHER SEX-GUILT SCALE

**This next group of questions concerns your attitude towards sex and sexuality. Please rate your feelings on the following statements, from "strongly disagree" to "strongly agree".**

**Attitudes toward sex**

**Masturbation helps one feel eased and relaxed.**

*{Choose one}*

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

**Sex relations before marriage help people adjust.**

*{Choose one}*

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

**When I have sexual dreams I try to forget them.**

*{Choose one}*

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

**Unusual sex practices don't interest me.**

*{Choose one}*

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

**Sex relations before marriage are good in my opinion.**

*{Choose one}*

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

**When I have sexual desires I enjoy it like all healthy human beings.**

*{Choose one}*

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

**When I have sexual desires I try to repress them.**

*{Choose one}*

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

**Sex relations before marriage should not be recommended.**

*{Choose one}*

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

**"Dirty" jokes in mixed company are in bad taste.**

*{Choose one}*

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

**When I have sexual desires they are quite strong.**

*{Choose one}*

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

## APPENDIX E

## SEXUAL BEHAVIOR ITEMS

**Have you had consensual vaginal sexual intercourse?**

*{Choose one}*

Yes

No

**If you answered "yes" to the above question, how old were you in years when you first had vaginal sexual intercourse?**

*{Enter text answer}*

**If you have had sexual intercourse, to what extent are you satisfied or dissatisfied with the age at which you first had sex?**

*{Choose one}*

Extremely satisfied

Satisfied

Neither satisfied nor dissatisfied

Dissatisfied

Extremely dissatisfied

**Was a condom used for your first experience of sexual intercourse?**

Yes

No

**Did you or your partner use any form of birth control the first time you had sexual intercourse?**

Yes

No

**Have you ever been forced to engage in any coital sexual activity against your will?**

*{Choose one}*

Yes

No

I don't know

**Are you currently sexually active (have you had sexual intercourse within the past 30 days)?**

*{Choose one}*

Yes

No

**How many sexual partners have you had in your life time?**

*{Choose one}*

0

1

2

3

4

5

6 or more



**How often do you engage in sexual intercourse?***{Choose one}*

- More than 7 times a week
- 4 to 7 times a week
- Once to 3 times a week
- Once in two weeks
- Once in a month
- Less than once in a month
- I do not have sexual intercourse

**What type of contraceptives do you and your partner typically use?***{Choose all that apply}*

- None
- Birth control pills
- Diaphragm or Condom
- IUD
- Emergency contraception
- Spermicides such as foam, film, suppositories
- Condoms in combination with some other type of contraceptives

**What type of contraceptives did you and your partner use for your most recent encounter?***{Choose all that apply}*

- None
- Birth control pills
- Diaphragm or Condom
- IUD
- Emergency contraception
- Spermicides such as foam, film, suppositories
- Condoms in combination with some other type of contraceptives

**Have you ever been diagnosed with a sexually transmitted disease?***{Choose one}*

- Yes
- No
- Uncertain

**Have you or your partner ever had an unwanted pregnancy?***{Choose one}*

- Yes
- No

**How often do you experience any of the following feelings when you are having a sexual intercourse or immediately after?****Fear of pregnancy (yourself or your partner)***{Choose one}*

- Never
- Rarely
- Sometimes
- Often
- Always

**Fear of contacting sexually transmitted disease***{Choose one}*

- Never
- Rarely
- Sometimes
- Often
- Always

**Fear of being disapproved by the partner***{Choose one}*

- Never
- Rarely
- Sometimes
- Often
- Always

**Feelings of guilt***{Choose one}*

- Never
- Rarely
- Sometimes
- Often
- Always

**CONDOM ASSERTIVENESS****Please rate the degree to which you agree with the following sentences.****I feel confident in my ability to discuss condom usage with any partner I might have***{Choose one}*

- Strongly disagree
- Disagree
- Neither disagree not agree
- Agree
- Strongly agree

**I feel confident in my ability to suggest using condoms with a new partner***{Choose one}*

- Strongly disagree
- Disagree
- Neither disagree not agree
- Agree
- Strongly agree

**I feel confident I could suggest using a condom without my partner feeling diseased***{Choose one}*

- Strongly disagree
- Disagree
- Neither disagree not agree
- Agree
- Strongly agree

**APPENDIX F****RELIGIOSITY****How certain are you about the existence of God or a Supreme Being?**

- Extremely Uncertain
- Uncertain
- Somewhat Uncertain
- Neither Certain nor Uncertain
- Somewhat Certain
- Certain
- Extremely Certain

**How often do you attend religious services or activities?**

- Never
- At least once per year
- At least once per month
- Several times per year
- Several times per month
- At least once per week
- Several times per week

## VITA

### **Delaram Asadzadeh Totonchi**

Department of Psychology  
Old Dominion University  
Norfolk, VA 23529

### **EDUCATION:**

**B.S. in Clinical Psychology**, Allameh Tabataba'i University, Tehran, Iran, Feb 2012

### **SCIENTIFIC PRESENTATIONS:**

Asadzadeh Totonchi, D., & Derlega, V. (2015). Evaluative Reactions Directed at HIV Positive Persons Who Do or Do Not Disclose Their Seropositive Status to Sexual Partners. Association for Psychological Sciences, the 27th APS Annual Convention, New York, NY.

Asadzadeh Totonchi, D. (2015). Traditional Gender Roles and the Effects on Conflict Resolution Strategies and Emotional Responses to Romantic Conflicts. Association for Psychological Sciences, the 27th APS Annual Convention, New York, NY.

Asadzadeh Totonchi, Delaram (2014). Traditional Gender Roles and the Effects on Women's Conflict Resolution Strategies, Emotional Responses to Conflicts, and Relationship Satisfaction. Old Dominion University Graduate Annual Symposium, Norfolk, VA.

Asadzadeh Totonchi, D., & Derlega, V. (2014). Evaluative Reactions Directed at persons with HIV; Effects of HIV Disclosure to Sexual Partners, Harm, and Participants' Knowledge of HIV Nondisclosure Laws. Old Dominion University Graduate Annual Symposium, Norfolk, VA.

### **INVITED PRESENTATION:**

Asadzadeh Totonchi, D. (2015). Implicit Sex Guilt and the Effects on Sexual Behaviors: Application of an Implicit Association Test. The 8th International and 13th National Congress of Clinical Psychology, Grenada, Spain.

### **ODU ASSISTANTSHIPS**

Graduate Research Assistant (Dr. Tony Perez) August 2015 – December 2015  
Graduate Teaching Assistant (Quantitative Methods) August 2014- August 2015  
Graduate Teaching Assistant (Abnormal Child Psychology) May 2014 – August 2014

### **INTERNSHIP**

Research and Lab Assistant (Dr. Alev Erisir), May 2014 – August 2014, Erisir Neural Plasticity Research Laboratory, University of Virginia, Charlottesville, VA.