



Received: 25 July 2016  
Accepted: 06 March 2017  
First Published: 10 March 2017

\*Corresponding author: Hazel Spears,  
Center for Health Behavior and  
Communication Research, Annenberg  
School for Communication, University  
of Pennsylvania, 3901 Walnut Street  
Suite 503, Philadelphia, PA 19104, USA;  
Department of Social and Behavioral  
Sciences, Cheyney University of  
Pennsylvania, Cheyney, PA, USA  
Email: [dr.hazel.spears@gmail.com](mailto:dr.hazel.spears@gmail.com)

Reviewing editor:  
Ross Wilkinson, University of Newcastle,  
Australia

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## SOCIAL PSYCHOLOGY | RESEARCH ARTICLE

# Predictors of sexual abstinence: A prospective study of college women in the United States

Hazel Spears<sup>1,2\*</sup>, John B. Jemmott III<sup>1,3</sup> and G. Anita Heeren<sup>4</sup>

**Abstract:** *Purpose:* Using the theory of reasoned action (TRA), this research examined predictors of sexual intercourse among first- and second-year college women. *Methods:* Participants completed a confidential self-administered questionnaire on their attitude, subjective norm, and intention regarding sexual intercourse and their behavioral beliefs about the consequences of abstinence and sexual intercourse. *Results:* At baseline, 58 (34%) of the 172 participants (mean age = 18.2; SD = 0.56) reported ever having sexual intercourse, and 41 (24%) reported having sexual intercourse within the last three months. Proportional-odds analysis on baseline data revealed that attitude and subjective norm were associated with a greater intention to have intercourse, as was relationship status (i.e. being in a relationship), a variable external to the TRA. Three-month follow-up questionnaires were completed by 165 (96%) of the participants. Logistic regression indicated that baseline intention and relationship status predicted self-reported sexual intercourse three months later. Examination of the relation of behavioral beliefs to attitude revealed that beliefs about the positive consequences of abstinence were associated with a negative attitude toward intercourse, whereas beliefs about the negative consequences of intercourse were unrelated to attitude toward intercourse. Being in a relationship and alcohol use were also related to positive attitude toward intercourse. *Conclusions:* These results suggest that, for college women, the TRA is a useful model of sexual

### ABOUT THE AUTHORS

How messages move people has been a focus of Dr Spears teaching and research interests, whether in the acceptance of disabled others, minority pursuit of higher education, or adoption of a healthful lifestyle. Her co-authors are long-time researchers in the area of interventions to reduce sexual risk behaviors among young people both in the United States and in South Africa. Given the rise of STIs on college campuses, closed communities that can foster the spread of illnesses, they are an ideal setting for the dissemination of health behavior messages. Accordingly, the identification and design of effective behavior change interventions for young people, including college students, remain the motivation and goals of these researchers.

### PUBLIC INTEREST STATEMENT

Annually, 10 million new sexually transmitted infections (STIs) occur among college-aged youth (15-24 year olds). Consider too that almost half of college students think they can tell if a person has an STI just by looking at them, and it is clear that sexual health among college women is deserving of attention and intervention. This study found that as many as two-thirds of young women entering college are not yet sexually active, which indicates that they may be receptive to messages about abstinence. The study also found that, over time, it is not beliefs about the negative consequences of sexual engagement that influences women's behavior, but beliefs about the benefits of abstinence. The important implication is that focusing on the positive side of abstaining from sex could prove a useful tool for college health centers to employ in their continuing quest to keep their charges safe and healthy.

behavior and that abstinence interventions may be a viable risk-reduction approach if the abstinence message is framed to emphasize the positive consequences of abstinence rather than the negative consequences of sexual intercourse.

**Subject: Behavioral Sciences**

**Keywords: sexual abstinence; college women; human immunodeficiency virus; sexually transmitted diseases; sexual intercourse; risk-reduction; theory of reasoned action**

## 1. Introduction

HIV and other sexually transmitted diseases (STD) are a major health threat for adolescents and young adults in the US. Among developed countries, US teenagers have the highest STD rates (Panchaud, Singh, Feivelson, & Darroch, 2000). Over half of the STDs in the US occur among people 15–24 years of age (Centers for Disease Control & Prevention, 2013a), and one-fifth of all new HIV infections occur in this same age group (Centers for Disease Control & Prevention, 2013b). The risk of HIV/STD is tied to unprotected sexual intercourse. Two strategies can be used to reduce unprotected sexual intercourse: condom use and abstinence (Jemmott, Jemmott, & Fong, 1998). Interventions can utilize either of these strategies exclusively or can use both to varying degrees. The sexual risk-reduction intervention literature reveals two dominant approaches: interventions focused on abstinence-only and interventions focused on both abstinence and condom use, which are called comprehensive interventions (Zhang, Jemmott, & Jemmott, 2015).

Considerable research has been conducted on condom use, and several successful theory-based comprehensive interventions to increase condom use have been identified (DiClemente et al., 2004; Heeren, Jemmott, Ngwane, Mandeya, & Tyler, 2013; Jemmott, Jemmott, Fong, & Morales, 2010). In contrast, little is known about abstinence, and few successful abstinence intervention studies have been published (Chin et al., 2012; Jemmott et al., 1998; Jemmott, Jemmott, & Fong, 2010; Sather & Zinn, 2002; Thomas, 2000; Tortolero et al., 2010). In the recent past, governmental policy focused on funding “abstinence-only until marriage” sex education. However, identifying the factors that predict sexual involvement can provide important information for designing more effective safer-sex and abstinence interventions (Santelli et al., 2006).

By senior year in high school, approximately 57.2% of adolescent girls in the US have had sexual intercourse (Kann et al., 2016). Among college women aged 18–24, almost 67% become sexually experienced during their college years (March & Serdar Atav, 2010). Some of the demographic factors associated with being sexually active are prior sexual experience, being older, being Black, lower income, lower parental education, poorer academic performance, and general tendency to participate in high risk behaviors, including cigarette smoking, drug use, and alcohol use (Aten, Siegel, Enaharo, & Auinger, 2002; Goodson, Evans, & Edmundson, 1997; Kohler, Manhart, & Lafferty, 2008; McCave, Azulay Chertok, Winter, & Haile, 2013; Raine et al., 1999). Some of the modifiable factors related to sexual involvement are attitude, subjective norm, and the behavioral and normative beliefs that form those attitudes and subjective norms (Goodson et al., 1997; Jemmott, 2012).

Studies of sexual abstinence interventions have been hampered by lack of long-term follow-up (Christopher & Roosa, 1990), lack of any follow-up (Goodson et al., 1997), lack of power due to small samples (Jorgensen, Potts, & Camp, 1993) or too few participants initiating sexual activity (Thomas, 2000), high attrition rates (Christopher & Roosa, 1990), and lack of a theoretical framework (Thomas, 2000).

In an effort to address some past limitations, the research presented here is a prospective, theory-based study. This study examines sexual abstinence among college women. We considered two themes regarding abstinence: (1) abstinence is good, or (2) sex outside of marriage is bad (Kempner, Amberg, & Bracksmajer, 2000), two divergent orientations, one emphasizing the positive aspects of abstinence, the other the negative aspects of unmarried sex. Programs to promote abstinence could

use either or both of these themes (Zhang et al., 2015). For instance, Department of Health and Human Services guidelines for abstinence-until-marriage education programs funded under Title V Section 510 of the Social Security Act include “teaching the social, psychological, and health gains to be realized by abstaining from sexual activity,” and that “sexual activity outside of the context of marriage is likely to have harmful psychological and physical effects” (Title V Section 510 of the Social Security Act, n.d.). Research on framing of health message appeals (Detweiler, Bedell, Salovey, Pronin, & Rothman, 1999; Garcia-Retamero & Cokely, 2013; Rothman & Salovey, 1997) suggests that although negative framing works well for predicting diagnostic behavior (e.g. breast self exams), positive framing will more effectively predict preventative behavior, such as condom use or abstinence. Using the findings from message framing research, one would predict that positive messages would be more effective in convincing young women to remain abstinent.

## 2. Theoretical framework

This research was guided by the theory of reasoned action (TRA) (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). According to this theory, specific behavioral intentions are the determinants of behaviors, and intentions are determined by attitudes and subjective norms regarding the behavior. Thus, for example, women will intend to practice abstinence when they evaluate that behavior positively and believe significant others think they should practice abstinence. A valuable feature of the TRA is that it directs attention to the basis of people’s attitudes and subjective norms. Attitudes toward behavior are seen as reflecting behavioral beliefs about the consequences of performing the behavior. Subjective norms are seen as reflecting normative beliefs about whether specific reference persons or groups would approve or disapprove of the behavior.

In the case of sexual intercourse, perhaps the most widespread behavioral beliefs are that sexual intercourse increases the risk of pregnancy and HIV infection. Other key considerations are beliefs about the social consequences of sexual activity, such as the impact on educational or career goals, self-respect, and parental respect if one engages in sexual intercourse. Important referents for young women’s normative beliefs include romantic partners, parents, and friends (DiClemente et al., 2001; Meston & Ahrold, 2010).

The TRA predicts that attitudes and subjective norms have independent and direct effects on intentions and that intentions predict subsequent behavior. We examined the TRA as a model of sexual abstinence in college women collecting data on two occasions three months apart to test these predictions using a prospective design. In addition, we examined whether beliefs about the positive consequences of sexual abstinence and beliefs about the negative consequences of sexual intercourse were associated with attitudes toward sexual intercourse.

## 3. Methods

### 3.1. Participants

Participants were female undergraduates recruited for a study of STD prevention, sexual health, alcohol use, nutrition, and exercise among college women. Participants received \$20 for completing the baseline questionnaire and \$20 for completing the follow-up questionnaire 3 months later.

### 3.2. Procedure

The Institutional Review Board of the University of Pennsylvania approved the study. Written informed consent was required to participate. Based on information from participants in focus groups, a questionnaire was designed to measure college women’s sexual behavior, marijuana use, alcohol consumption, and attitudes and beliefs about such behavior. All first- and second-year women on a list of undergraduates supplied by the registrar’s office were sent, via campus mail, a letter inviting them to participate in a study concerning drinking, dating, exercise, and nutrition behavior among college women. This procedure was done to enhance the representativeness of the sample, by giving all members of the target population a chance to participate, as opposed to recruiting from dining halls, sororities, or limited enclaves. Potential participants were invited to attend a data-collection

session to complete the baseline questionnaire sessions and to return three months to complete the follow-up questionnaire.

We took several steps to increase the validity of self-reported behavior. To reduce potential memory problems, we asked participants to report their behaviors over a three-month period (and wrote the dates bracketing that period on the whiteboard in the questionnaire-administration room). Before completing the questionnaire, the participants signed a “survey agreement” form that emphasized the importance of responding honestly, a procedure that has been shown to yield more valid self-reports on sensitive issues (Shu, Mazar, Gino, Ariely, & Bazerman, 2012) and served to reduce socially desirable responding. This form let participants know that their responses would be used to develop programs for other undergraduate women and that the programs would be successful only if they answered the questions truthfully. In this sense, we attempted to arouse the “social responsibility motive” to counteract any possible social desirability motive. Participants were also assured that their responses were confidential and that code numbers rather than names would be used on the questionnaires.

### 3.3. Measures

The questionnaire included measures of basic demographic information, sexual attitudes, self-reported sexual behavior, relationship status, and alcohol and drug use. Tendency to engage in socially desirable responding was measured using the Marlowe–Crowne Social Desirability Scale (Crowne & Marlow, 1964).

#### 3.3.1. Self-reported sexual intercourse

Participants were asked whether they had sex in the past 3 months, with sex defined as “a man’s penis inserted into your vagina.”

#### 3.3.2. Intention to have sexual intercourse

Respondents were asked, on a 5-point scale ranging from 1 (*very unlikely*) to 5 (*very likely*), “How likely is it that you will decide to have sex in the next 3 months?” In a randomized controlled trial, an abstinence-based intervention reduced scores on this single-item measure of intention compared with the control group, whereas an intervention emphasizing condom use did not (Jemmott et al., 1998).

#### 3.3.3. Attitude toward and behavioral beliefs about having sexual intercourse

Attitude toward having sex was measured by asking “How do you feel about having sex in the next 3 months?” which participants rated on 5-point scales ranging from 1 (*very bad idea*) to 5 (*very good idea*). In a randomized controlled trial, an abstinence-based intervention reduced scores on this single-item measure of attitude compared with the control group, whereas an intervention emphasizing condom use did not (Jemmott et al., 1998). To measure behavioral beliefs toward having sex, participants responded to items on scales ranging from 1 (*disagree strongly*) to 5 (*agree strongly*). Behavioral beliefs about the positive consequences of sexual abstinence ( $\alpha = 0.90$ ) were assessed by asking participants whether they thought that not having sex would help them focus on their education, maintain their emotional health, increase their chances of having a good marriage, be proud of themselves, and maintain their parents’ respect. Behavioral beliefs about the negative consequences of having sex ( $\alpha = 0.81$ ) were assessed by asking participants whether they thought having sex would result in failing to graduate from college, failing to have the career they desired, getting pregnant, or getting infected with the HIV.

#### 3.3.4. Subjective norms regarding sexual intercourse

Subjective norms regarding sexual intercourse ( $\alpha = 0.79$ ) were assessed using four items concerning participants’ ratings of how much their sexual partner, friends, mother, and father “would approve of your having sex in the next 3 months?” The ratings were made on 5-point scales ranging from 1 (*disapprove strongly*) to 5 (*approve strongly*).

### 3.3.5. Substance use

Alcohol use was assessed by asking, “In the past 30 days, on how many days did you drink alcohol?” Marijuana use was assessed by asking, “In the past 30 days, on how many days did you use marijuana?”

### 3.4. Statistical analysis

Chi square and t-tests were performed to analyze attrition. Zero-order correlations were computed using Pearson product-moment correlation coefficients for the continuous variables, and point-biserial correlation coefficients for the dichotomous variables. Two dummy variables were created to represent race/ethnicity with White as the default. One dummy variable was coded 1 if the person was Asian, and 0 for all others. The second dummy variable was coded 1 if the person was African-American, Latina, or Native American, and 0 for all others. Relationship status was coded so that 1 = no steady relationship, 2 = steady relationship. To test the predictions of the TRA hierarchical proportional-odds analysis was used. The first step focused on the predictors of intention, an ordinal variable, and included attitude and subjective norm. In the second step, relevant external variables were added to the model to determine if they had direct effects on intention, behavior, or attitudes. Logistic regression was used to examine whether intention predicted the dichotomous variable of self-reported sexual intercourse in the past 3 months.

## 4. Results

A total of 1,390 letters were mailed inviting undergraduate women to participate, and 172 women completed the baseline questionnaire. They ranged in age from 16 to 20 years (mean = 18.2; SD = 0.56). About 56% were White, 24% were Asian, 8% were African-American, and 5% were Latina. Approximately 83% reported that their mother and 88% reported that their father had a 4-year college degree or more education. Fifty-eight participants (34%) reported ever having coitus, and 41 (24%) reported having coitus in the previous three months. Fifty-eight participants (34%) reported being in a steady relationship (median length = 9 months). Only one student reported having more than one partner, and none reported having intercourse with a person of their own gender or with both genders.

### 4.1. Attrition/missing data analyses

There were no missing data at baseline on any of the study variables of interest with the exception of one participant who did not indicate whether she had sexual intercourse in the past 3 months at baseline. Of the 172 participants, 165 (96%) completed the three-month follow-up questionnaire. None of the 165 who returned had any missing data. No differences were found on any of the theoretical or external variables of interest, sexual experience, or recent coitus at baseline between those who attended the follow-up, as compared with those who did not.

### 4.2. Correlations among variables of interest

Table 1 presents zero-order correlations among key variables examined. It can be seen that intention to have sex is positively correlated with the TRA constructs, attitude, and subjective norm. Negatively correlated with intention are two other variables the TRA encompasses, abstinence behavioral beliefs (beliefs about positive consequences of abstinence), and coitus behavioral beliefs (beliefs about the negative consequences of sex). Relationship status, alcohol use, and marijuana use also emerge as being significantly and positively correlated to intention.

### 4.3. Proportional-odds analyses testing the TRA on the prediction of intention

The TRA states that attitudes and subjective norms affect intention, and any effect of external variables will be mediated through attitudes and subjective norms. In step one in Table 2 of the analyses, intention was regressed on attitude and subjective norm regarding sexual intercourse, all measured at baseline. Both attitude (OR = 8.75; 95% CI = 5.40, 14.17;  $p < 0.0001$ ), and subjective norm (OR = 2.22; 95% CI = 1.26, 3.91;  $p < 0.0056$ ) were significantly related to intention. Women expressing more favorable attitudes toward having sex and perceiving more normative support for

**Table 1. Means, standard deviations (SD), and correlations among analysis variables**

Variable	1	2	3	4	5	6	7	8	9	10	Mean	SD
1. 3-month follow-up coitus	-										1.27	0.45
2. Intention	0.76****	-									2.41	1.43
3. Attitude	0.61****	0.85****	-								2.63	1.32
4. Subjective norm	0.44****	0.66****	0.70****	-							2.44	0.82
5. Abs behavioral beliefs	-0.40****	-0.64****	-0.73****	-0.76****	-						3.02	1.08
6. Coitus behavioral beliefs	-0.29****	-0.42****	-0.49****	-0.50****	0.63****	-					1.99	0.72
7. Relationship status	0.57****	0.54****	0.39****	0.32****	-0.19**	-0.18*	-				1.34	0.47
8. Alcohol use	0.27***	0.35****	0.43****	0.34****	-0.43****	-0.40****	-0.00	-			4.07	3.62
9. Marijuana use	0.20**	0.18*	0.17*	0.20**	-0.21**	-0.22**	0.02	0.32****	-		0.55	1.48
10. Asian	-0.14	-0.17*	-0.18*	-0.35****	0.28***	0.29***	-0.08	-0.25****	-0.17*	-	0.24	0.43
11. Other minority	0.13	0.05	-0.00	0.00	0.12	-0.01	0.11	-0.01	-0.06	-0.28***	0.20	0.40

Notes: Abs behavioral beliefs = beliefs about the positive consequences of sexual abstinence. Coitus behavioral beliefs = beliefs about the negative consequences of sexual intercourse. Relationship status is coded “2” if the person has a steady boyfriend and “1” if the person does not have a steady boyfriend. Alcohol use is sum of the self-reported number of days on which they consumed alcohol in the past 30 days. Marijuana use is sum of the self-reported number of days on which they consumed marijuana in the past 30 days. Asian is a dummy variable where 1 = Asian and 0 = not Asian. Other minority is a dummy variable where 1 = Black, Latina, or Native American and 0 = White or Asian.

- \* $p < 0.05$ .
- \*\* $p < 0.01$ .
- \*\*\* $p < 0.001$ .
- \*\*\*\* $p < 0.0001$ .

**Table 2. Hierarchical proportional-odds analysis of predictors of baseline intention to have sexual intercourse (n = 172)**

Predictors	Step 1: Theory of reasoned action		Step 2: Adding external variables	
	OR (95% CI)	p-value	OR (95% CI)	p-value
Attitude	8.75 (5.40, 14.17)	<0.0001	8.84 (5.24, 14.92)	<0.0001
Subjective norm	2.22 (1.26, 3.91)	0.0056	2.10 (1.13, 3.85)	0.0174
Relationship status	-		6.21 (2.84, 13.56)	<0.0001
Alcohol use	-		1.02 (0.92, 1.14)	0.6493
Marijuana use	-		1.13 (0.91, 1.40)	0.2614
Asian	-		1.21 (0.49, 3.03)	0.6809
Other minority	-		1.36 (0.52, 3.55)	0.5317

Notes: Relationship status is coded “2” if the person has a steady boyfriend and “1” if the person does not have a steady boyfriend. Alcohol use is sum of the self-reported number of days on which they consumed alcohol in the past 30 days. Marijuana use is sum of the self-reported number of days on which they consumed marijuana in the past 30 days. Asian is a dummy variable where 1 = Asian and 0 = not Asian. Other minority is a dummy variable where 1 = Black, Latina, or Native American and 0 = White or Asian.

engaging in sex, express stronger intentions to have sex within the next 3 months than do those holding less favorable attitudes toward having sex or perceiving less favorable normative support.

As shown in Table 1, several external variables were strongly correlated with intention and behavior. Their direct effects were examined in a second step of the proportional-odds analysis. External variables, including relationship status, frequency of alcohol use, frequency of marijuana use, and race/ethnicity were added to the model containing attitude and subjective norm. Only relationship status (OR = 6.21; 95% CI = 2.84, 13.56;  $p < 0.0001$ ) appears to have a direct effect on intention to have sex.

#### 4.4. Logistic regression analyses testing the TRA on the prediction of behavior

Predictors of intercourse were examined, first by examining the effect of intention to have sex on self-reported sexual intercourse at 3-month follow-up, and then by adding the TRA and external variables.

In step 1 in Table 3, self-reported sex at 3-month follow-up was regressed on baseline intention to have sex. This revealed that women who had stronger intentions to have sexual intercourse at baseline were more likely to report having sexual intercourse at 3-month follow-up (OR = 5.71; CI = 3.45, 9.45;  $p < 0.0001$ ), than were those with less strong intentions. In step 2, attitude and subjective norm measured at baseline, as well as the external variables of relationship status, alcohol use, marijuana use, and the race dummy variables were added to the model. The coefficients for attitude and subjective norm were not significant, indicating they did not have direct effects on behavior. Only relationship status was a significant predictor of having sexual intercourse in the 3 months preceding follow-up, (OR = 8.42; CI = 2.08, 33.99;  $p < 0.0028$ ). Therefore, the 2-step hierarchical analysis suggests that intention to have sex and being in a relationship have direct effects on having sexual intercourse three months later.

#### 4.5. Proportional-odds analyses examining the effect of behavioral beliefs on attitude

Additional analyses were performed to identify specific behavioral beliefs that predicted attitude because attitude predicted intention, consistent with the TRA. To examine the effects of specific behavioral beliefs on attitude, attitude toward sex at baseline was regressed on the two types of behavioral beliefs about sex. As shown in step 1 in Table 4, women who hold stronger behavioral beliefs about the positive consequences of abstinence have a more negative attitude toward sexual intercourse (OR = 0.17; CI = 0.11, 0.27;  $p < 0.0001$ ) than do women who hold less favorable abstinence beliefs. In contrast, behavioral beliefs about the negative consequences of engaging in sexual intercourse were not related to attitude toward sex.

Step 2 of the analysis examined whether external variables had direct effects on attitude toward sex. As shown in Table 4, relationship status (OR = 5.35; CI = 2.74, 10.45;  $p < 0.0001$ , and alcohol use (OR = 1.15; CI = 1.04, 1.26;  $p < 0.0044$ ,) are significant predictors of attitude toward sex. Using alcohol and having a steady boyfriend were related to having a favorable attitude toward sex.

**Table 3. Hierarchical logistic regression analysis of self-reported coitus at 3-month follow-up (n = 165)**

Predictors	Step 1: Intention		Step 2: Adding TRA variables and external variables	
	OR (95% CI)	p-value	OR (95% CI)	p-value
Intention	5.71 (3.45, 9.45)	<0.0001	4.54 (1.84, 11.24)	0.0011
Attitude	-		1.13 (0.42, 3.07)	0.8040
Subjective norm	-		0.62 (0.21, 1.82)	0.3879
Relationship status	-		8.42 (2.08, 33.99)	0.0028
Alcohol use	-		1.13 (0.95, 1.36)	0.1668
Marijuana use	-		1.23 (0.94, 1.61)	0.1256
Asian race	-		0.91 (0.16, 5.23)	0.9150
Other race	-		1.85 (0.39, 8.78)	0.4387

Notes: Relationship status is coded "2" if the person has a steady boyfriend and "1" if the person does not have a steady boyfriend. Alcohol use is sum of the self-reported number of days on which they consumed alcohol in the past 30 days. Marijuana use is sum of the self-reported number of days on which they consumed marijuana in the past 30 days. Asian is a dummy variable where 1 = Asian and 0 = not Asian. Other minority is a dummy variable where 1 = Black, Latina, or Native American and 0 = White or Asian.

**Table 4. Hierarchical proportional-odds analysis of predictors of baseline attitude toward sexual intercourse (n = 172)**

Predictors	Step 1: Behavioral beliefs		Step 2: Adding external variables	
	OR (95% CI)	p-value	OR (95% CI)	p-value
Abstinence behavioral belief	0.17 (0.11, 0.27)	<0.0001	0.16 (0.10, 0.26)	<0.0001
Coitus behavioral belief	0.67 (0.38, 1.16)	0.1516	0.78 (0.43, 1.41)	0.4117
Relationship status	–		5.35 (2.74, 10.45)	<0.0001
Alcohol use	–		1.15 (1.04, 1.26)	0.0044
Marijuana use	–		0.98 (0.80, 1.20)	0.8384
Asian	–		1.68 (0.76, 3.69)	0.1985
Other minority	–		1.62 (0.71, 3.68)	0.2538

Notes: Abstinence behavioral beliefs = beliefs about the positive consequences of sexual abstinence. Coitus behavioral beliefs = beliefs about the negative consequences of sexual intercourse. Relationship status is coded “2” if the person has a steady boyfriend and “1” if the person does not have a steady boyfriend. Alcohol use is sum of the self-reported number of days on which they consumed alcohol in the past 30 days. Marijuana use is sum of the self-reported number of days on which they consumed marijuana in the past 30 days. Asian is a dummy variable where 1 = Asian and 0 = not Asian. Other minority is a dummy variable where 1 = Black, Latina, or Native American and 0 = White or Asian.

### 5. Discussion

The results of this prospective study suggest that the TRA is appropriate for understanding abstinence among college women. Consistent with the TRA, baseline attitude toward having sexual intercourse and subjective norms regarding sexual intercourse predicted intention, and intention measured at baseline predicted self-reported sexual intercourse 3 months later. In addition, behavioral beliefs about the benefits of abstinence predicted attitude and intention, whereas beliefs about the adverse consequences of sexual intercourse did not. These findings have implications for interventions with college women.

The TRA holds that the relative predictive power of attitudes and subjective norms will vary depending on the behavior and the population in question. This study suggests that attitudes and subjective norms are important in predicting sexual intention among college women, but that attitudes are particularly important. Accordingly, interventions to reduce college women’s intention to have sexual intercourse might be more efficacious if they focus on attitude toward sexual intercourse.

The TRA holds that external variables will not have direct effects on the theorized mediators and outcome measures. In this study, however, two external variables were found to have such direct effects. Relationship status and alcohol use had direct effects on attitude toward sex. Relationship status also had direct effects on intention to have sex when attitude and subjective norms were in the model. Finally, relationship status and alcohol use had direct effects on subsequent self-reported sexual intercourse. There are two possible explanations for these findings. It is possible that the relevant beliefs were not measured. Or it may be that some external variables supersede mediation by attitude, norm, or intention as predicted by the TRA model. For the prediction of intention, descriptive norm and self-efficacy, which are components of the reasoned action approach (Fishbein & Ajzen, 2010), an extension of TRA not assessed in this study, may explain the effects of relationship status and using alcohol. On the other hand, relationship status and alcohol use may be part of a constellation of situational factors that make it more likely an individual will have sex (Kempner et al., 2000) without the predisposing attitude, norm or intention of doing so. Their presence constitutes more of a vulnerability to an event than an active seeking out of an event. Since these findings are consistent with earlier findings that associate relationship status (Sanderson & Jemmott, 1996) and substance use (Rosenbaum & Kandel, 1990) with more active and more risky sexual behavior, research testing these two possible explanations in one design would help clarify the boundaries of the TRA. Adding more items tapping behavioral beliefs in the areas of hedonistic beliefs about sex,

substance use associated with sexual intercourse, and how being in a relationship might affect attitude toward sex would address this question.

The findings, however, do suggest that certain avenues can be fruitful for interventions to influence sexual intercourse in college women. This prospective study suggests that encouraging abstinence may be a viable approach with college women. First, a large percentage of the college women (67%) were sexually inexperienced; in fact, only 24% of the whole sample reported having sexual intercourse in the previous 3 months. Second, behavioral beliefs about the benefits of abstinence predicted attitudes, these attitudes predicted intentions, which, in turn, predicted sexual intercourse 3 months later. The influence of positive beliefs about abstinence is particularly noteworthy because behavioral beliefs about the adverse effects of sexual intercourse were not related to intentions or behaviors. Although “abstinence-only” approaches may focus on both the positive consequences of abstinence and the negative consequences of sexual activity, the finding suggests focusing on the benefits of abstinence might be a more effective sexual risk reduction strategy than is emphasizing the negative consequences of sexual intercourse. This suggestion is consistent with a recent mediation analysis of a theory-based abstinence-only intervention reporting that beliefs about the positive consequences of abstinence mediated the intervention’s efficacy in reducing sexual initiation over a 24-month period whereas beliefs about the negative consequences of sexual intercourse did not (Zhang et al., 2015). Similar to Detweiler et al.’s (1999) sunbathers, who responded more to messages emphasizing the benefits of protecting their healthy skin than to messages warning of the dire consequences of failing to protect their skin, the college women in this study seemed more focused on preserving benefits they have, rather than avoiding negative consequences in the future when it comes to remaining sexually abstinent. Determining the influence of gain versus loss framing for the promotion of abstinence may be an effective manipulation for increasing the efficacy of such programs, of particular import given the widespread prescription and funding of abstinence-only intervention by government agencies. Further research should test whether this finding holds in populations of different ages, socioeconomic status, and education.

The findings also suggest that it may be efficacious for risk reduction efforts to focus on certain subpopulations, such as those who have a steady partner or are alcohol users. These characteristics were shown to have an unmediated effect on being sexually active and/or attitude toward sexual intercourse.

One of the study’s strengths is its prospective design, which allows it to predict and measure behavior in relation to prior attitude and intention, which a cross-sectional design examining intention and behavior at a time point would not. Additionally, it was able to maintain very low attrition and few missing data. This study also showed that the rate of abstinence among college women is substantially higher than that of the general non-college female population, which is in keeping with the findings for those with high cognitive functioning (Halpern, Joyner, Udry, & Suchindran, 2000). The limitations of this study should also be considered. The participants were predominantly White and Asian and from an Ivy League university where only 12% of those invited enrolled; therefore future research should examine the generalizability of findings to other college female populations. The study used single-item measures of attitude and intention; the use of multi-item measures in future research would increase statistical power. Although the primary analysis was prospective, some analyses were cross-sectional (e.g. attitude-intention), which does not preclude the possibility of reverse causality. Future studies might address causal relationships by directly manipulating theoretical variables and examining the effects on outcomes. The study did not include measures of descriptive norm and self-efficacy, which might help understand abstinence in college women and should be examined in future studies.

Despite these limitations, the results of this study suggest that, for college women, the TRA is a useful model of sexual abstinence. Attitude and subjective norm predicted intention and intention predicted self-reported sexual intercourse three months later. The finding that beliefs about positive consequences of abstinence, but not negative consequences of intercourse, predict attitude,

suggests that abstinence interventions may be a viable risk-reduction approach if the abstinence message is framed to emphasize the positive consequences of abstinence rather than the negative consequences of sexual intercourse. Future research using a randomized controlled trial design directly comparing the efficacy of these two abstinence messages would address an important research question about the best approach to encouraging abstinence.

### Implications and contributions

Beliefs about positive consequences of abstinence, but not negative consequences of intercourse, predict attitude, suggesting abstinence messages be framed positively. The theory of reasoned action is a useful model of college women's sexual abstinence: attitude and subjective norm predict intention to have intercourse, and intention predicts self-reported intercourse three months later.

### Acknowledgments

The authors wish to thank all participants for their time.

### Funding

This research was supported by grant R03 MH60584 from the National Institute of Mental Health (NIMH). This sponsor had no role in the study design, the collection, analysis, and interpretation of data, the writing of the report, or the decision to submit this manuscript for publication. The first author, Dr. Hazel Spears, wrote the first draft of the manuscript. None of the authors received an honorarium, grant, or other form of payment to produce the manuscript.

### Competing Interest

The authors declare no competing interests.

### Author details

Hazel Spears<sup>1,2</sup>

E-mail: [dr.hazel.pears@gmail.com](mailto:dr.hazel.pears@gmail.com)

John B. Jemmott III<sup>1,3</sup>

E-mail: [jjemmott@asc.upenn.edu](mailto:jjemmott@asc.upenn.edu)

G. Anita Heeren<sup>4</sup>

E-mail: [gheeren@sju.edu](mailto:gheeren@sju.edu)

ORCID ID: <http://orcid.org/0000-0001-7376-1132>

<sup>1</sup> Center for Health Behavior and Communication Research, Annenberg School for Communication, University of Pennsylvania, 3901 Walnut Street Suite 503, Philadelphia, PA 19104, USA.

<sup>2</sup> Department of Social and Behavioral Sciences, Cheyney University of Pennsylvania, Cheyney, PA, USA.

<sup>3</sup> Department of Psychiatry, Perelman School of Medicine, University of Pennsylvania, 3901 Walnut Street, Philadelphia, PA 19104, USA.

<sup>4</sup> Health Services, St. Joseph's University, Philadelphia, PA, USA.

### Citation information

Cite this article as: Predictors of sexual abstinence: A prospective study of college women in the United States, Hazel Spears, John B. Jemmott III & G. Anita Heeren, *Cogent Psychology* (2017), 4: 1304605.

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