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Self-Efficacy Predictors of Consistent Condom Use among an Ethnically and Racially Diverse Sample of Young Adults

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Abstract

Background: Condom use can decrease the likelihood of acquiring STIs. Condoms are more efficacious when used consistently and correctly. However, low percentages of consistent condom use have been reported by adults and young adults, with consistent condom use decreasing with age. Furthermore, there are racial/ethnic differences in both condom use and STI incidence. Self-efficacy has been found to be positively related to condom use, and various domains of self-efficacy have been studied in previous research. **Purpose:** The present study explored potential sub-types of self-efficacy related to consistent condom use among a racially/ethnically diverse sample of young adults; and examined these domains as predictors of consistent condom use. **Methods:** A racially and ethnically diverse sample of 1240 sexually active young adults attending a minority-serving institution were surveyed on their self-efficacy beliefs about condom use and sexual behavior. Principal component analysis was used to extract relevant components related to self-efficacy. Blocked logistic regression was then applied to the component items in order to determine their predictive value and odds of consistent condom use, using race/ethnicity as a moderator. **Results:** Principal component analysis extracted a three-factor solution, identifying the following self-efficacy domains: Experiential Self-efficacy, Self-efficacy for Partner Communication, and Barrier Self-efficacy. Regarding the blocked logistic regression analysis, various racial/ethnic interactions emerged. For instance, Hispanic and African American young adults were seven and five times more likely, respectively, than White young adults (reference group) to use condoms consistently if they were

able to stop and acquire a condom when aroused (Experiential Self-Efficacy). Asian/Pacific Islanders and African Americans who believed it was too much trouble to carry a condom (Barrier Self-Efficacy) were significantly less likely to be consistent condom users. Other logistic relationships are discussed. **Discussion:** The results underscore the need for interdisciplinary approaches regarding campus health integration in promoting consistent condom use and reducing access barriers for minority young adults, who suffer greater disparity of HIV risk and STI transmission.

Keywords

Condom Use, Self-Efficacy, Sexually Transmitted Infections, Sexual Behavior, Diversity

1. Introduction

According to the CDC, in 2019, STIs were reported to have reached an all-time high for the sixth consecutive year (CDC, 2021a). This included over 2.5 million cases of gonorrhea, chlamydia, and syphilis, and constituted a 30% increase from four years prior. The symptoms and consequences of acquiring sexually transmitted infections (STIs) include fertility problems, pelvic inflammatory conditions, unwanted pregnancy, and greater susceptibility to contracting human immunodeficiency virus (HIV), a serious STI for which there is currently no cure. Condom use can decrease the likelihood of acquiring STIs. In the U.S., about 59% of women and 66% of men, 15 to 49 years old, reported to have used a condom during their first intercourse (CDC, 2021b). However, among unmarried men and women of the same ages, only 25% of women and 34% of men practice consistent condom use; while 68% of women and 55% of men report never using a condom (CDC, 2021b).

There are also racial/ethnic differences in both condom use and STI incidence. Current condom use is higher among non-Hispanic Black and Hispanic women than among non-Hispanic White women; and is higher among non-Hispanic Black men (at their last sexual intercourse) than non-Hispanic White and Hispanic men. Regarding condom non-use, 63% of non-Hispanic White women, ages 15 - 44, reported never using condoms, compared to 50% and 59% of non-Hispanic Black women and Hispanic women, respectively (Copen, 2017). Fifty-two percent of non-Hispanic White men, ages 15 - 44, reported never using condoms, compared to 35% and 44% of non-Hispanic Black men and Hispanic men, respectively (Copen, 2017). Although these condom consistency estimates and condom non-use estimates may seem similar, or even favorable, among racial-ethnic minorities, the burden of STI incidence remains disproportionate due to various social determinants of health. In 2019, STI prevalence rates were 5 - 8 times higher for non-Hispanic Black adults, 3 - 5 times higher for Native/Pacific Islanders, and 1 - 2 times higher for Hispanics compared to non-Hispanic White adults (CDC, 2021a).

1.1. Self-Efficacy and Condom Use

Self-efficacy is known as the situation-specific belief in one's ability to perform a particular task and often requires the resources or knowledge to carry out such tasks. Self-efficacy remains a stable construct in many health promotion theories of behavior such as the Theory of Planned Behavior and the Integrative Model of Behavior Prediction (Ajzen, 1985; Fishbein, 2009), and the Social Cognitive Theory (Bandura, 1977). Thus, it continues to be a prominent psychological construct that theoretically influences behavior. Various sub-domains of self-efficacy have been identified in previous research. These include experiential self-efficacy (Akhtar, 2008), vicarious self-efficacy (Akhtar, 2008), barrier self-efficacy (Ryan & Dzewaltowski, 2002), consistent and correct use self-efficacy (Hanna, 1999), & self-efficacy for partner communication, which involve sexual risk reduction behaviors that require mutual agreement (Carmack et al., 2020; Hanna, 1999). Experiential self-efficacy is the confidence or assuredness one obtains upon carrying out a task successfully. The more experiences someone may have in using condoms strengthens their self-efficacy for condom use. Vicarious experiences may also provide self-efficacy in carrying out a task. This type of self-efficacy is closely related to Bandura's (1977) social cognitive model. It may be obtained from our observations of people within our environment, particularly those who we believe are important to us. Seeing people who are similar to ourselves or those for whom we have adoration and mutual respect complete a task relevant to us implants the belief that we are able to master such a task. For example, knowing that your best friend practices condom use and would be pleased with your own condom use may increase your likelihood of condom use. Barrier self-efficacy is common type of self-efficacy that refers to one's ability to carry out an activity when faced with barriers, such as forgetting to bring a condom to an expected sexual encounter. Although barrier self-efficacy is more commonly found throughout physical activity behavioral research, it could also have implications for other health behaviors.

Emerging adults, particularly those who are of traditional college age, are typically at a stage of cultivating their independence (Covarrubias et al., 2019). This period may include negotiating sexual relationships and decisions on whether to utilize STI prevention methods such as condom use (Carmack et al., 2020). Previous research has shown self-efficacy to be a strongly associated and predictive of many risk-related behaviors, including condom use and other STI risk related behaviors (Oppong Asante et al., 2016; Carmack et al., 2015). For sexually active individuals, condom use remains the most efficacious and practical method of preventing STIs (Oppong Asante et al., 2016). Self-efficacy has been shown to be positively and significantly related to both condom use intentions as well as actual condom use (Oppong Asante et al., 2016). Condom use during sexual activity involves the agreement of two or more persons. Thus, expressing one's desire for condom use and condom use negotiation is important for young adults. Having the belief that you are able to communicate to your partner your desire

for condom use is conceptualized as self-efficacy for condom use communication (Carmack et al., 2020; Leddy et al., 2016) and condom negotiation self-efficacy (Nesoff et al., 2016). Self-efficacy for condom use communication was significantly associated with condom use behavior (p = .02) among a sample of 252 minority college students (Carmack et al., 2020); and among a sample of 433 college-educated young adult women, condom use negotiation was found to be significantly related to condom use consistency, although this varied by relationship type (Nesoff et al., 2016). Women who reported casual partners only, compared to women who reported main partners only, were 3 times more likely to have used a condom at each sexual encounter within the past three months. In contrast, women with both casual and main partners were less likely to report using a condom at each sexual encounter within the past three months than those with casual partners only, although they were not significantly different from those with main partners only. *Consistent* condom use involves various psychosocial constructs such as possessing the assuredness of using a condom at each sexual intercourse and having a condom available "just in case" (Aziz et al., 2021; Carmack et al., 2020; Hanna, 1999), as well as the correct use of condoms (Assarzadeh et al., 2019; Gwala, 2019).

1.2. Present Study

The relationship between condom use self-efficacy and actual condom use has been established in previous research. However, efforts to understand how self-efficacy can be maximized to increase condom use remain essential. It is plausible that different sub-domains of self-efficacy for condom use may variably influence condom use. Given the need to lessen the burden of STIs among minority populations and the utility of self-efficacy to influence condom use, it would be beneficial to examine sub-domains of condom use self-efficacy among racially/ethnically diverse populations. Specifically, we wanted to examine which specific self-efficacy skills yield consistent condom use. Thus, the purpose of the present study was to 1) reduce the number of self-efficacy items while exploring potential sub-types of self-efficacy related to consistent condom use among a racially/ethnically diverse sample of young adults; and 2) examine the self-efficacy predictors of consistent condom use among a racially/ethnically diverse sample of young adults. Understanding the sub-domains of condom use self-efficacy that are the most influential in affecting consistent condom use could assist in planning risk-reduction intervention programs, particularly on the college campus for young adult populations.

2. Methods

2.1. Participants

The sample consisted of 1589 college students attending a minority-serving institution of higher education. Data was collected during the Spring, Summer, and Fall academic semesters in 2019. Sixty-one percent (N = 969) reported fe-

male, 36% (N = 572) reported male, and 3% (N = 48) reported non-binary. The sample consisted of 30% Hispanic (any race) (N = 477), 27% (N = 429) African American, 20% (N = 318) White, 22% (N = 349) Asian/Pacific Islander, and 1% (N = 16) other. Ages ranged from 18 - 25 (M_{age} = 19.7, s = 1.4); and .7% (N = 11) of the sample reported being currently married.

2.2. Procedures

The institution's IRB approved all procedures. Data were gathered through convenience sampling via a confidential online survey. Participants were recruited within an online research participation platform at the university. Upon selecting the study, potential participants were provided information about the study and their rights as participants in human subjects research. They were informed that their responses would remain anonymous and used as aggregate data only. Potential participants were required to acknowledge that they understood their voluntary participation and the aforementioned information by giving electronic consent via the cover sheet "accept" button before being directed to the actual survey. All responses were captured in real-time. Participation (consent/assent and survey administration) took approximately 15 minutes.

2.3. Measures

The complete survey instrument consisted of 72 items that measured demographics (biological sex at birth, gender identity, age, race/ethnicity, university classification), sexual health knowledge, STI knowledge, condom use attitudes, intentions, norms, and self-efficacy. The self-efficacy subscale included 18 self-efficacy items about condom use gathered from previous studies using racial and ethnically diverse samples of adolescents and young adults (Carmack et al., 2020; Carmack et al., 2016; Jemmott et al., 1998). The present study analysis utilized the self-efficacy subset items, condom use behavior items, and demographics. The self-efficacy subset assessed various domains of self-efficacy (e.g., I can talk to my partner about using a condom before sex; If aroused, I can stop to get us a condom). The condom use behavior item asked participants, "Within the past year, about how often have you used condoms during sex," with response choices as 1) Not at all; 2) Sometimes; 3) Half the time; 4) Almost always; and 5) Every time.

2.4. Analysis Procedure

The current analysis included participants who were sexually active within the past 12 months. Of the 1589 survey participants, 22% (N = 349) had not been sexually active within the past year and were excluded from the analysis, yielding an analytic sample of N = 1240. There were no significant differences in the past 12 months of sexual activity among any of the demographics. All analyses were conducted in SPSS 24.0.

Principal components analysis (PCA) was used to reduce the variables into

smaller components, based on common variation. PCA, which is efficient in finding the components that maximize variance, allowed us to reduce the number of variables while keeping maximum conflict. This procedure is useful for simplifying further analyses that will utilize the component variables. PCA was calculated using promax rotation due to the correlations between the components. The number of components was retained by having an eigenvalue 1 or greater and examination of the scree plot, noting that the bend in the plot shows the optimal number of factors according to the sample data (DeVellis, 1991). Interpretations were conceptualized for each set of components (sub-domains).

Multivariate analyses were conducted to examine the relationship between self-efficacy sub-domains and consistent condom use. A blocked logistic regression analysis was used to predict consistent condom use for the entire sample. The measured variables that composed each component identified through the PCA analysis were blocked together and used as predictor variables. Consistent condom use served as the outcome variable. To predict the odds of consistent condom use, the outcome variable was recoded to indicate consistent condom use (1) and non-use/inconsistent condom use (0). Responses that indicated "Every time (5)" were recoded as 1 = consistent condom use. Responses that indicated "Not at all (1)", "Sometimes (2)", "Half the time (3)", and "Almost always (4)" were recoded as 0 = inconsistent condom use/none use. Demographic variables were entered into the model as covariates. Furthermore, a second blocked logistic regression was conducted to examine racial/ethnic variations in the model of self-efficacy sub-domains x race/ethnicity. This interaction effect was analyzed to predict consistent condom use. Significant demographic variables identified in the initial blocked logistic regression were entered into the model as control covariates.

3. Results

3.1. Demographics and Sample Characteristics

Of the 1240 sexually active college students 59% (N = 732) reported female, 40% (N = 496) reported male, and 1% (N = 12) reported non-binary. The sample consisted of 30% Hispanic (any race) (N = 372), 27% (N = 335) African American, 18% (N = 223) White, 24% (N = 298) Asian/Pacific Islander, and 1% (N = 12) other. Ages ranged from 18 - 25 (M_{age} = 19.4, s = 1.5). Table 1 shows the demographics and condom use percentages the current study population.

3.2. Extracted Components

Components were extracted using a Promax (oblique) rotation to relax the orthogonal constraint and aid in ease of interpretation. The PCA resulted in 3 meaningful components. The Kaiser-Meyer-Olkin test was examined and showed a sample size adequacy of .91, $p < .01$ and the Bartlett test of sphericity of was significant, $p < .001$, indicating that the correlation matrix is significantly different than the identity matrix which allows for appropriate estimation of the

Table 1. Demographics and sample characteristics.

	N (%)	M (s)
Gender		
Male	498 (40)	
Female	732 (59)	
Non-Binary	12 (1)	
Age		19.4 (1.5)
Race/Ethnicity		
Hispanic	372 (30)	
NH Black	335 (27)	
NH White	223 (18)	
NH Asian/PI	298 (24)	
Classification		
Freshman	174 (14)	
Sophomore	322 (26)	
Junior	484 (39)	
Senior	260 (21)	
Condom Use		
Every time	136 (11)	
Almost always	211 (17)	
Half the time	285 (23)	
Sometimes, but less than half the time	347 (28)	
Not at all	261 (21)	

principal components (Tabachnick & Fidell, 1989). Both the eigenvalue criteria and the scree plot showed that the three-factor solution was the optimal number of components.

The three-factor solution accounted for 64% of the variance, with factor 1 accounting for 32% of the variance, factor 2 accounting for 23% of the variance, and factor 3 accounting for 9% of the variance. The three-factor solution was conceptualized as factor 1—*Experiential Self-efficacy* (4 items), factor 2—S*elf-efficacy for Partner Communication* (4 items), and factor 3—*Barrier Self-efficacy* (3 items). Of the 18 self-efficacy items, 13 were retained; 5 did not load on any factor. Table 2 shows the principal components and the items loaded for each component.

3.3. Multivariate Analyses

Four blocks were entered in the overall blocked logistic regression model for the multivariate analyses to examine specific self-efficacy predictors of consistent

Table 2. Principal component loadings for condom use self-efficacy.

Component and Items	Component Loadings		
	1	2	3
1. Experiential Self-Efficacy			
If aroused, I can stop to get us a condom	.86		
I can stop sex to put on/get my partner to put on a condom	.77		
It's easy to keep condoms all the time	.70		
I can use/get my partner to use a condom in the dark	.62		
2. Self-Efficacy for Partner Communication			
I can talk to my partner about using a condom before sex		.91	
I or my partner can put on a condom without ruining the mood		.83	
I can tell my partner I should get a condom when we get aroused		.73	
I can say no if we have no condom		.70	
3. Barrier Self-Efficacy			
It is too much trouble to carry condoms[b]			.88
Condoms cost too much[b]			.82
It's hard to get condoms[b]			.59

a. The following items did not load on any factor: hard to use condoms, can wait for sex if there is no condom, I can use condom without ruining mood, can get condoms, easy to get partner to use condoms, cannot talk with my partner about condoms, and can get my partner to use a condom during sex; b. For simpler matrix interpretations, scale reverse coded to indicate higher values as pro-condom.

condom use. The first block consisted of demographics: gender, age, race/ethnicity, and classification. The second block consisted of component 1 (Experiential Self-efficacy) items; the third block consisted of component 2 (Self-efficacy for Partner Communication) items, and forth block consisted of component 3 (Barrier Self-efficacy) items. Consistent condom use (0, 1) was entered into the model as the outcome variable. Demographics accounted for 4.7% of the variance in consistent condom use and was not statistically significant. The overall blocked model accounted for 35% of the variance in consistent condom use and was statistically significant ($p < .001$).

Pertaining to Experiential Self-efficacy, young adults who reported that they could stop to get a condom when aroused were eight times more likely to be consistent condom users than those who were not confident about stopping to get a condom when aroused (AOR(CI) = 8.03 (3.03 - 21.41), $p = .01$). Pertaining to Self-efficacy for Partner Communication, those who could talk to their partner about using a condom before sex were 6.5 times more likely to be consistent condom users than those who could not (AOR(CI) = 6.52 (1.77 - 13.01), $p = .011$). Those who reported being able to put on a condom or have their partner put on a condom without ruining the mood were 7.7 times more likely to be a consistent condom user (AOR(CI) = 7.68 (3.57 - 10.00), $p = .05$). Those who re-

ported that they could tell their partner to use a condom when aroused were 2.7 times more likely to be consistent condom users than those who did not (AOR (CI) = 2.70 (1.01 - 15.38), p = .04). Pertaining to the Barriers Self-efficacy, those who reported that it was too much trouble to carry condoms were 36% less likely to be consistent condom users (AOR(CI) = .64 (.37 - .79), p = .04); while those reporting that condoms cost too much were 44% less likely to be consistent condom users (AOR(CI) = .56 (.20 - .82), p = .03). Table 3 shows the final logistic regression model for the overall sample.

In the second logistic model, race/ethnicity was used as a moderator to detect whether race/ethnic groups interacted with self-efficacy predictors of consistent condom use. Gender, age, and classification were controlled for and accounted for 2.6% of the variance in consistent condom use and were not statistically significant. All items from the Experiential Self-efficacy, Self-efficacy for Partner Communication, and Barrier Self-efficacy predictors were blocked per component and entered into the model with an interaction of race/ethnicity (i.e., If aroused, I can stop to use condom x race/ethnicity; I can use condom without ruining mood x race/ethnicity; etc.). For all race/ethnicity interaction results that follow, non-Hispanic White participants were used as the reference group.

Block 2, the Experiential Self-efficacy predictors, accounted for 24% of the variance and was a statistically significant (p < .05). Within the Experiential Self-efficacy predictors, interaction effects were found among African Americans and Hispanics. African Americans who reported that if aroused, they could stop to get a condom were 5.5 times more likely to be consistent condom users (AOR(CI) = 5.53 (2.0 - 13.1), p = .01); and Hispanics who reported the same were 7 times more likely to be consistent condom users (AOR(CI) = 7.37 (2.9 - 11.1), p = .01). The addition of the Self-efficacy for Partner Communication predictors (block 3) allowed the model to account for 39% of the variance in consistent condom use and was statistically significant (p < .05). Within the

Table 3. Logistic regression predicting consistent condom use.

Self-Efficacy Predictors of Consistent Condom Use (Final Model Predictors)	B	OR (95% CI)	P-value
Experiential Self-Efficacy			
If aroused, I can stop to get us a condom	2.78	8.03 (3.03 - 21.41)	.01**
Self-Efficacy for Partner Communication			
I can talk to my partner about using a condom before sex	2.45	6.52 (1.77 - 13.01)	.01**
I, or my partner, can put on a condom without ruining the mood	2.88	7.68 (3.57 - 10.00)	.05*
I can tell my partner I should get a condom when we get aroused	1.59	2.70 (1.01 - 15.38)	.04*
Barrier Self-Efficacy			
It is too much trouble to carry condoms	−1.61	.64 (.37 - .79)	.04*
Condoms cost too much	−.80	56 (.20 - .82)	.03*

*p ≤ .05 **p ≤ .01.

Self-efficacy for Partner Communication predictors, interaction effects were found among African Americans and Hispanics. African Americans who reported that they can talk to their partner about using a condom before sex were 10 times more likely to be consistent condom users (AOR(CI) = 9.92 (3.65 - 17.24), p = .03); and Hispanics who reported the same were over 7.5 times more likely to be consistent condom users (AOR(CI) = 7.64 (2.84 - 10.3), p = .04). The addition of the Barrier Self-efficacy predictors (block 4) allowed the model to account for 46% of the variance in consistent condom use and was statistically significant (p < .01). Within the Barrier Self-efficacy predictors, interaction effects were found among African Americans, Asian/Pacific Islanders, and Hispanics. African Americans who believed it was too much trouble to carry condoms were almost 50% less likely be consistent condom users (AOR(CI) = .51 (.37 - .84), p < .001); while Asian/Pacific Islanders who believed it was too much trouble to carry condoms were 30% less likely be consistent condom users (AOR(CI) = .68 (.21 - .77), p = .03). Hispanics who believed that condoms cost too much were 71% less likely to practice consistent condom use (AOR (CI) = .29 (.20 - .35), p = .009). Table 4 shows the logistic regression for the final model with race/ethnicity interaction estimates.

4. Discussion

The present study sought to examine the self-efficacy predictors of consistent condom use among a racially/ethnically diverse sample of young adults. Data

Table 4. Logistic regression with race/ethnicity interaction predicting consistent condom use.

Self-Efficacy Predictors of Consistent Condom Use × Race/Ethnicity (Final Model Predictors)	B OR (95% CI)	P-value
Experiential Self-Efficacy		
If aroused, I can stop to get us a condom X race/eth		
African American	5.53 (2.0 - 13.1)	.01**
Hispanic	7.37 (2.9 - 11.1)	.01**
Self-efficacy for Partner Communication		
I can talk to my partner about using a condom before sex X race/eth		
African American	9.92 (3.65 - 17.24)	.03*
Hispanic	7.64 (2.84 - 10.3)	.04*
Barrier Self-Efficacy		
Too much trouble to carry condoms X race/eth		
African American	.51 (.37 - .84)	<.001***
Asian/Pacific Islander	.68 (.21 - .77)	.03*
Condoms cost too much X race/eth		
Hispanic	.29 (.20 - .35)	.009**

*$p \le 0.05$ **$p \le 0.01$ ***$p \le 0.001$.

reduction techniques were applied to the original condom use self-efficacy items. Three sub-domains related to self-efficacy for condom use were deduced from the data: Experiential Self-efficacy, Self-efficacy for Partner Communication, and Barrier Self-efficacy. Overall, specific aspects within each of the condom use self-efficacy sub-domains were significantly related to the likelihood of consistent condom use for the overall sample. For the overall sample, being able to stop and get a condom when aroused (experiential self-efficacy), the ability to talk to their partner about using a condom before sex and being able to put on a condom (or have their partner to put on a condom) without ruining the mood (self-efficacy for partner communication) were the strongest predictors of consistent condom use. These findings echo Sayles et al. (2006) that found high self-efficacy for sexual negotiation to be significantly related to the ease of condom acquisition and previous experience with condom use.

Interesting racial/ethnic interactions were found within the data as well. Hispanic young adults were over seven times more likely than White young adults (reference group) to use condoms consistently if they were able to stop and acquire a condom when aroused; and African American young adults were five and a half times more likely than White young adults to use condoms consistently under the same conditions. This speaks to the importance of experiential self-efficacy to increase condom use consistency. Young adults who are able to use a condom, even under the pressure of sexual arousal, are more likely to be consistent condom users. Understanding that arousal, foreplay, and/or sex can be temporarily halted in order to be sexually safe is an important belief that shapes pro-condom behaviors, particularly among African American and Hispanic young adults. Additional research is needed to identify the characteristics that predict low experiential self-efficacy. This will facilitate the identification of adolescents and young adults that will benefit from interventions to increase this type of self-efficacy.

It is concerning that only 11% of the participants overall reported consistent condom use. This is lower than the averages reported by the Centers for Disease Control National Health Statistics Report (14.8% for women ages 15 - 44 and 19% for men ages 15 - 44; Copen, 2017). Although percentages of consistent condom use were higher for both men and women ages 15 - 19, trends show that consistent condom use decreases with age. Intervention efforts may capitalize upon this by presenting, discussing, or role-playing condom use behaviors in many different situations that involve sexual arousal. Intervention efforts that aim to normalize the process of incorporating condoms into foreplay could affect the perception of condom use among adolescents and young adults; especially those in racial and ethnic minority populations. Perceptions and attitudes toward sexual behaviors are greatly influenced by the images young adults and adolescents consume through various media outlets. If the perception of condoms can be more integrative and viewed in a more "sex-positive" outlook and even romanticized more, than perhaps condom use would increase among the

young adult and adolescent population. For instance, demonstrating how a condom can be put on effectively and very quickly without ruining the mood, or demonstrating scenarios where it would be a good time to say, "I am going to go get a condom," would be beneficial for young adults. Interventions should incorporate many different condom options that are available, so that young adults can find the condom that feels the best for them, as people are more likely to use something if it is customized to their liking.

The ability to effectively communicate condom use is important for both young men and women of any race or ethnicity. The present findings also reiterate this importance of partner communication regarding sexual preferences for all young adults, and particularly among African American and Hispanic young adults (Carmack et al., 2020). In the present study, those who could talk to their partner about using a condom before a sexual encounter were about six and a half times more likely to practice consistent condom use. Additionally, African Americans who were able to convey this communication were almost 10 times more likely to consistently use condoms, and Hispanic young adults were over seven and a half times more likely. These findings indicate that increasing self-efficacy around the communication of condom use is key to increasing consistent condom use in this population. Campus interventions aimed at reducing risky sexual behavior and increasing consistent condom use on campus may need to directly address relationship communication and methods of empowering minority young adults to be clear about their condom preferences before the sexual encounter.

To normalize and strengthen the desire for consistent condom use, knowledge of STI facts, peer-led interventions and testimonials, and role play interventions are strategies that have increased self-efficacy for partner communication (Calloway et al., 2014; Sterk, Klein, & Elifson, 2003; Zoboli et al., 2017). In addition to peer education, there should be readily available resources (e.g., online booklets, pamphlets, posters). This may help reduce anxiety or social embarrassment of publicly seeking advice about a potentially sensitive topic. University health center websites could host safer sex and condom usage video presentations (online and in-clinic) and pamphlet information. Students would be able to watch how to communicate condom use with their partners in private by having access to video vignettes on "how to initiate the conversation of condom use to your partner," "the best time to put on a condom," "proper condom storage," and other topics. In partnership with university health centers, willing instructors could incorporate health center information on class syllabi, highlighting the university health center's availability of information on safe sexual practices (e.g., STI screening availability, free condom locations, etc.).

Unfortunately, there is a lack in culturally relevant condom use educational interventions and program especially for racially/ethnic populations, creating additional barriers regarding partner communication and increasing risky sexual behaviors across vulnerable populations (Burlew et al., 2018). Interventions that

are more tailored to the targeted population (minority young adults) are essential in changing the narrative and promoting condom use. Cultural competency is necessary for educating minority populations on the importance of safe sex, risk factors, and STI transmission and prevalence. Addressing the barriers that impede consistent condom use would be beneficial in increasing consistent condom use for some racial/ethnic young adults. In the present study, Asian/Pacific Islanders and African Americans who believed it is too much trouble to carry condom were significantly less likely to be consistent condom users. Having the resources to carry out a particular task is inherent to possessing self-efficacy. Having the confidence to carry out a behavior will not manifest tangibly if one does not have the necessary physical materials needed to carry out the behavior. It is also possible that those who report that carrying condoms is troublesome rely on potential partners to supply them, prefer the feeling of intercourse without a condom, or do not feel that it is important to carry condoms.

Previous studies have reported low self-efficacy scores pertaining to buying, carrying, and correct application of condoms among racially/ethnic minority young adults due to the cross-cultural stigmatized views regarding sex and barriers related to gender-differences (McLaurin-Jones et al., 2016; Thomas et al., 2015). Young adults require consistent repeated preventive exposures of the benefits of condom use to help them develop strong self-efficacy skills to purchase, carry, and apply condoms during every sexual encounter (Thomas et al., 2015). More skill-based interventions regarding carrying condoms are needed to overcome these barriers (Thomas et al., 2015). A deeper investigation of what makes carrying condoms troublesome within these young adult populations is needed. Once we identify the reasons why some perceive carrying condoms to be troublesome, we can develop interventions to address these barriers.

Additionally, lack of information and understanding the income and socioeconomic status of most college students is an important factor in addressing and promoting condom use. Certain barriers related to the social determinants of health must be considered when examining the young adult collegiate population such as income, transportation, and access to healthcare. "It is too much trouble to carry a condom" was significantly correlated with "condoms cost too much," but were distinctively different enough not to be redundant according to the examination of the PCA results. For Hispanic young adults in this sample, the cost of condoms presents a barrier that impedes consistent condom use, making it less likely to occur. In the city and surrounding area of the MSI university, an average box of 3 condoms cost approximately $7 at national pharmacy chains. This may pose undue financial burden for some college students.

Access to condoms would eliminate one of the many barriers many college students face regarding safe-sex practices. Location and placement of condoms such as condom vending machines in dorms and restrooms may address access concerns on the college campus. Higher learning institutions should have condoms readily available on campus student centers and health centers. Most dorms have peer residential assistants, or RA's. Another example of normalizing

condom use would be to have RA's keep a "free condoms" box by their door. Having them accessible on each residential housing floor and at the front desk would be beneficial. Acquiring a condom from the health center may pose a barrier when sexual encounters also happen "in the moment" and access to a condom is quickly needed for university young adults. Should free condoms on campus already exist, it should be widely publicized so that no college student would be without a prophylactic due to its cost. It is important to determine whether the cost of condoms is a real or perceived barrier, in order to develop interventions that properly address this construct.

5. Future Research & Research Implications

The present study findings have implications for STI risk reduction interventions. STI risk reduction interventions are designed to provide education, efficacy skills, and positive attitudes about condom use, among other factors. Other factors that may be addressed to increase condom use self-efficacy and consistent condom use may include refraining from multiple concurrent partners (Ajayi et al., 2019) and substance use (Nehl et al., 2016) in the context of sexual occurrences. Likewise, other within-person factors such as vulnerability, self-esteem, and body consciousness may also be addressed in STI risk reduction interventions. For instance, body shame was shown to be directly and indirectly related self-efficacy for condom use (Parent & Moradi, 2015). Nevertheless, addressing the ability communicate to a partner one's requirement for condom use, having condoms readily available for sexual encounters, and demonstrations of correct condom use are basic staples of STI risk reduction interventions and have been shown to increase condom use and consistency (Hanna, 1999; Jemmott et al., 1998).

The burden of disease may be greater for racial/ethnic minorities; thus, interventions should be tailored for cultural appropriateness and relevance. It is unclear whether the racial/ethnic differences seen here are reflective of cultural underpinnings within the racial/ethnic groups. However, future research may want to examine these preliminary racial/ethnic differences within college campuses more closely. Regardless, the current findings provide some guidance on some of the topics that interventions should include (e.g., talking to a partner about using condoms before intercourse or when aroused). Peer education may also be a beneficial way to teach college students about effective condom use communication with their partners. Younger college adults, especially college freshmen and sophomores may be more receptive to their college peers about the starting and framing positive discussions with their partners about condom use.

Future studies should explore how self-efficacy is related to other sexual risk-related behaviors (drugs & alcohol, multiple partners, "hook-up" behaviors, etc.) Future studies should also develop relevant skill-based condom use intervention programs to reduce inconsistent condom use behaviors, reduce stigma,

and provide free condoms on college campuses. Although the present study did not focus on sexual orientation as a factor for condom use, future research should explore sexual orientation differences regarding types of self-efficacies that influence condom use, as higher rates of sexually transmitted infection have been reported among some LGBTQ+ sub-populations.

6. Limitations

Limitations within the present study include the use of cross-sectional data. Data illustrates a point-in-time estimate of psychosocial cognitions and behaviors. Longitudinal analyses would strengthen the study, particularly if we were able to obtain a metric of consistent condom use every few months, as opposed to a historical recollection of the past 12 months. Self-report data is also a limitation that must be noted. Currently, there is no practical or ethical way to know if someone is using a condom each time during sexual intercourse, so self-report data is sufficient for its purpose. However, we attempted to curtail social desirability by providing multiple gauges of consistent condom use (e.g., almost every time, half the time, etc.). Psychologically, the respondent would lessen cognitive dissonance by selecting "almost every time" or "half the time," even if they actually used a condom less than half the time. However, anything other than "every time" was coded as non-use/inconsistent condom use. Results also reflect an urban university in the Southern United States and may not be reflective of other universities or young adults.

7. Conclusion

Condom use should be promoted through a culturally competent and multifaceted lens, which may be accomplished by examining the underlying cultural beliefs related to specific self-efficacies. In order to effectively address and promote condom use to reduce the rate of STI transmission among these populations, it is imperative that there is an understanding of the obstacles that are unique to ethnic/minority populations, what influences the decisions of this population, and how to best educate various sub-populations. The current study provides further evidence of the important role that self-efficacy plays in health behaviors. Self-efficacy is a broad construct with several dimensions. It is important to identify all dimensions and examine their relationship with condom use in different populations. This will make it possible to develop effective interventions to increase condom use among young adults. Further, given the differences that we identified by ethnic/racial group, researchers should continue to explore how condom use-related self-efficacy differs among different groups and how to tailor interventions so that we can meet young adults where they are and provide effective education on STI prevention.

Ethical Approval

All procedures in this study involving human participants were in accordance

with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent

Informed consent was obtained from all individual participants included in this study.

Funding

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

Ajayi, A. I., Ismail, K. O., & Akpan, W. (2019). Factors Associated with Consistent Condom Use: A Cross-Sectional Survey of Two Nigerian Universities. *BMC Public Health, 19,* Article No. 1207. https://doi.org/10.1186/s12889-019-7543-1

Ajzen, I. (1985). *From Intentions to Actions: A Theory of Planned Behavior.* Springer. https://doi.org/10.1007/978-3-642-69746-3_2

Akhtar, M. (2008). *What Is Self-Efficacy? Bandura's 4 Sources of Efficacy Beliefs.* Positive Psychology. http://positivepsychology.org.uk/self-efficacy-definition-bandura-meaning

Assarzadeh, R., Khalesi, Z. B., & Jafarzadeh-Kenarsari, F. (2019). Sexual Self-Efficacy and Associated Factors: A Review. *Shiraz E-Medical Journal, 20,* 1-7. https://doi.org/10.5812/semj.87537

Aziz, S., Ewere, T., Serrano, K., & Carmack, C. (2021). Profiles of Emerging Adult Online Daters and Psychosocial Cognitions about Condom Use. *Open Journal of Social Sciences, 9,* 198-213. https://doi.org/10.4236/jss.2021.97014

Bandura, A. (1977). *Social Learning Theory.* Prentice-Hall.

Burlew, A. K., Shambley-Ebron, D., Lanaway, D., McCuistian, C., Sherman, L., & Steele, L. (2018). Community Collaborative Cultural Adaptation: Creating Culturally Appropriate Behavioral Interventions through University and Community Collaborations. *American Journal of Community Based Research and Practice, 2,* Article No. 1. https://doi.org/10.33596/coll.12

Calloway, D. S., Long-White, D. N., & Corbin, D. E. (2014). Reducing the Risk of HIV/AIDS in African American College Students: An Exploratory Investigation of the Efficacy of a Peer Educator Approach. *Health Promotion Practice, 15,* 181-188. https://doi.org/10.1177/1524839913504757

Carmack, C., Lewis, R. K., & Roncancio, A. (2015). Get the Message: Targeting Beliefs to Develop Risk Reduction Intervention Messages for African American Adolescents. *American Journal of Community Psychology, 55,* 396-410. https://doi.org/10.1007/s10464-015-9719-x

Carmack, C., Lewis, R. K., Roncancio, A. M., & Gerecht, L. T. (2016). Guidelines for Construct Measurement Yielding Unexpected Higher-Order Constructs: An Application for the Theory of Planned Behavior Applied to Condom Use. *American Journal of Psychology and Behavioral Sciences, 3,* 25-33.

Carmack, C., Roncancio, A. M., Gerecht, L., & Ansari, M. (2020). Perceived Partner Beliefs about Condoms and Self-Efficacy Communication within the Context of the Theory of Gender and Power. *Journal of Community Psychology, 48,* 1424-1437. https://doi.org/10.1002/jcop.22337

Centers for Disease Control (CDC) (2021a). *Reported STDs Reach All-Time High for 6th Consecutive Year.* https://www.cdc.gov/media/releases/2021/p0413-stds.html

Centers for Disease Control (CDC) (2021b). *Key statistics from the National Survey of Family Growth.* https://www.cdc.gov/nchs/nsfg/key_statistics/c.htm#consistencycondom

Copen, C. E. (2017). *Condom Use during Sexual Intercourse among Women and Men Aged 15-44 in the United States: 2011-2015 National Survey of Family Growth.* National Health Statistics Reports No. 105.

Covarrubias, R., Valle, I., Laiduc, G., & Azmitia, M. (2019). "You Never Become Fully Independent": Family Roles and Independence in First-Generation College Students. *Journal of Adolescent Research, 34,* 381-410. https://doi.org/10.1177/0743558418788402

DeVellis, R. (1991). *Scale Development: Theory and Application.* SAGE.

Fishbein, M. (2009). An Integrative Model for Behavioral Prediction and Its Application to Health Promotion. In R. J. DiClemente, R. A. Crosby, & M. C. Kegler (Eds.), *Emerging Theories in Health Promotion Practice and Research* (pp. 215-234). Jossey-Bass/Wiley.

Gwala, N. (2019). *Factors Influencing Consistency of Condom Use among College Students in Durban, South Africa.* Doctoral Dissertation, University of KwaZulu-Natal.

Hanna, K. M. (1999). An Adolescent and Young Adult Condom Use Scale. *Journal of Pediatric Nursing, 14,* 59-66. https://doi.org/10.1016/S0882-5963(99)80061-X

Jemmott III, J. B., Jemmott, L. S., & Fong, G. T. (1998). Abstinence and Safer Sex HIV Risk-Reduction Interventions for African American Adolescents: A Randomized Controlled Trial. *JAMA, 279,* 1529-1536. https://doi.org/10.1001/jama.279.19.1529

Leddy, A., Chakravarty, D., Dladla, S., de Bruyn, G., & Darbes, L. (2016). Sexual Communication Self-Efficacy, Hegemonic Masculine Norms and Condom Use among Heterosexual Couples in South Africa. *AIDS Care, 28,* 228-233. https://doi.org/10.1080/09540121.2015.1080792

McLaurin-Jones, T., Lashley, M.-B., & Marshall, V. (2016). Minority College Women's Views on Condom Negotiation. *International Journal of Environmental Research and Public Health, 13,* Article No. 40. https://doi.org/10.3390/ijerph13010040

Nehl, E. J., Elifson, K., DePadilla, L., & Sterk, C. (2016). Sex Partner Type, Drug Use and Condom Use Self-Efficacy among African Americans from Disadvantaged Neighborhoods: Are Associations with Consistent Condom Use Moderated by Gender? The *Journal of Sex Research, 53,* 805-815. https://doi.org/10.1080/00224499.2015.1092018

Nesoff, E. D., Dunkle, K., & Lang, D. (2016). The Impact of Condom Use Negotiation Self-Efficacy and Partnership Patterns on Consistent Condom Use among College-Educated Women. *Health Education & Behavior, 43,* 61-67. https://doi.org/10.1177/1090198115596168

Oppong Asante, K., Osafo, J., & Doku, P. N. (2016). The Role of Condom Use Self-Efficacy on Intended and Actual Condom Use among University Students in Ghana. *Journal of*

Community Health, 41, 97-104.
https://doi.org/10.1007/s10900-015-0073-6

Parent, M. C., & Moradi, B. (2015). Self-Objectification and Condom Use Self-Efficacy in Women University Students. *Archives of Sexual Behavior, 44,* 971-981. https://doi.org/10.1007/s10508-014-0384-1

Ryan, G. J., & Dzewaltowski, D. A. (2002). Comparing the Relationships between Different Types of Self-Efficacy and Physical Activity in Youth. *Health Education & Behavior, 29,* 491-504. https://doi.org/10.1177/109019810202900408

Sayles, J. N., Pettifor, A., Wong, M. D., MacPhail, C., Lee, S. J., Hendriksen, E., Coates, T. et al. (2006). Factors Associated with Self-Efficacy for Condom Use and Sexual Negotiation among South African Youth. *Journal of Acquired Immune Deficiency Syndromes (1999), 43,* 226-233. https://doi.org/10.1097/01.qai.0000230527.17459.5c

Sterk, C. E., Klein, H., & Elifson, K. W. (2003). Perceived Condom Use Self-Efficacy among At-Risk Women. *AIDS and Behavior, 7,* 175-182. https://doi.org/10.1023/A:1023950425731

Tabachnick, B., & Fidell, L. (1989). Principal Components and Factor Analysis. In B. Tabachnick, & L. Fidell (Eds.), *Using Multivariate Statistics* (pp. 597-677). Harper & Row.

Thomas, T. L., Yarandi, H. N., Dalmida, S. G., Frados, A., & Klienert, K. (2015). Cross-Cultural Differences and Sexual Risk Behavior of Emerging Adults. *Journal of Transcultural Nursing: Official Journal of the Transcultural Nursing Society, 26,* 64-72. https://doi.org/10.1177/1043659614524791

Zoboli, F., Martinelli, D., Di Stefano, M., Fasano, M., Prato, R., Santantonio, T. A., & Fiore, J. R. (2017). Correlation between Knowledge on Transmission and Prevention of HIV/STI and Proficiency in Condom Use among Male Migrants from Africa and Middle East Evaluated by a Condom Use Skills Score Using a Wooden Penile Model. *BMC Research Notes, 10,* Article No. 216. https://doi.org/10.1186/s13104-017-2520-1