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Understanding Motivations for STI Testing: Comparing Presenters and Non-presenters Using the Theory of Planned Behavior and Health Belief Model

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ABSTRACT

Sexually transmitted infections (STIs) are a leading health risk to the college-aged population with young adults age 15-24 accounting for half the new STI diagnoses in the United States (Centers for Disease Control and Prevention, 2018). Despite these alarming numbers, approximately 50-70% of college students have not been tested for STIs (Barth, Cook, Downs, Switzer, & Fischhoff, 2002; Bontempi, Mugno, Bulmer, Danvers, & Vancour, 2009; Boudewyns & Paquin, 2011). The current manuscript draws on the Theory of Planed Behavior and the Health Belief Model to explore how attitudes, norms, perceived behavioral control, and barriers contribute to STI testing intentions. In a novel extension of Boudewyns and Paquin (2011) and Wombacher, Dai, Matig, and Harrington (2018), two unique groups of students are examined: those presenting for STI testing at a university health center, and individuals who did not present for testing. Results suggest attitude is the strongest predictor of intention to get tested, and individuals with previous experience as well as those presenting have greater intentions to engage in future STI testing. This comparison between young adults engaging in a positive health behavior (i.e., testing) and those who have not illuminates differences between these populations and provides valuable insight for future STI testing campaign message development.

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BACKGROUND

College students are among the biggest risk-takers when it comes to sexual health. Approximately 70% of college students are sexually active and though many report having multiple partners, few report consistently using condoms (American College Health Association, 2018). Many health campaigns have attempted to reduce risky sex behavior through sex education programs and campaigns that encourage either abstinence or safer sex practices, but messages focused on regular testing (e.g., MTVs GYT: Get Yourself Tested) have not been as prominent. As evidenced by the prevalence of sexually transmitted infections (STIs) among this population, these healthy behaviors have not been adopted universally. It is essential to gain a better understanding of why college students *are* or *are not* presenting for STI testing in order to construct messages to effectively encourage these behaviors and increase regular testing among high-risk young adult populations.

Sexually Transmitted Infections

STI testing is researched less frequently than condom use perhaps because it is viewed as reactive, whereas a more proactive approach may be a preferable way to protect one's health. Additionally, a large portion of the research about STI testing has been focused on HIV testing (e.g., Albarracín, Gillette, Early, Glasman, Durantini, & Ho, 2005; Fisher & Fisher, 2000; Weinhardt, Carey, Johnson & Bickham, 1999) with far fewer studies focused on more common STIs like Chlamydia and Gonorrhea. Young people aged 15-24 account for the majority (i.e., 62.6%) of chlamydia cases and males 20-24 have the highest rates of gonorrhea (CDC, 2018). Only 27-52% of college students report having had an STI test (Barth, Cook, Downs, Switzer & Fischhoff, 2002; Bontempi, Mugno, Bulmer, Danvers, & Vancour, 2009; Boudewyns & Paquin, 2011), and even less data is available about consistent and regular STI testing behaviors.

The risks associated with STIs include pelvic inflammatory disease, infertility and damage to sexual organs, but many of these detriments can be avoided or minimized when caught early. Regarding Gonorrhea, most women remain asymptomatic (ASHA, 2018; CDC, 2018) and Chlamydia is also highly asymptomatic with 75% of women and 50% of males being asymptomatic (ASHA, 2018). It is essential more individuals get an STI test as part of their regular health check-up routine, instead of only after they experience the side-effects of the infections. Additionally, the two most common STIs in the college-aged population (i.e., Chlamydia and

Gonorrhea) are bacterial infections that can be cured relatively easily via antibiotics. Increasing the number of individuals getting regularly screened for STIs will also have a positive effect by lowering the number of asymptomatic infected persons who are unknowingly spreading the diseases.

In the college population, fewer than half of sexually active students have used a condom in the past 30 days (ACHA, 2018). Because of the high risk of acquiring an STI with unsafe sex practices in this age group, and the damage STIs can do to reproductive organs, the CDC recommends yearly testing for all sexually active females age 15-24 and men in environments with a high prevalence of chlamydia (CDC, 2018). Designing new testing environments that are more appealing to young people who are most at risk of acquiring asymptomatic STIs can be an important strategy to improve overall testing rates by reducing the number of barriers involved in testing.

Theory of Planned Behavior

The Theory of Planned Behavior (TPB) provides an explanation of the different influences on one's intentions to engage in a certain behavior (Ajzen, 1991). Behavioral intention is a function of: 1) one's attitude about the behavior (viewed positively or negatively), 2) social acceptance, or social norms, of the behavior (i.e., what the person believes their peers think and do in regard to the behavior), and 3) perceived behavioral control (e.g., access, cost). Together these elements influence one's intention to perform a certain behavior which in turn influences actual enacted behavior (Ajzen, 2011). TPB has demonstrated its usefulness in health communication campaign design, exploring topics such as condom use (e.g., Albarracín, Johnson, Fishbein, & Muellerleile., 2001), physical activity (e.g., Plotnikoff, Lubans, Costigan & McCargar, 2013), HPV vaccination (e.g., Fisher, Kohut, Salisbury, & Salvadori, 2013), smoking and alcohol use (e.g., Campo. Brossard, & Frazer, 2004) and literally thousands of other contexts. Though the TPB has not been applied to STI testing very frequently, studies conducted by Boudewyns and Paquin (2011) and Wombacher and colleagues (2018) provide a strong foundation for continued research in the area.

The TPB maintains attitude is the degree to which a person holds positive or negative feelings of a behavior (Fishbein & Ajzen, 1975). Attitude is made up of the positives and negatives one views to engaging in the behavior. The more positive views one has about a certain behavior, the more likely they are to engage in that behavior. For example, one is more likely to have a positive attitude about STI testing if one believes getting an STI test leads to positive outcomes (e.g., greater sense of well-being, protecting a partner, avoiding detriments to one's health) and prevents negative outcomes (e.g., damage to sexual organs, painful and unpleasant side-effects). Both Boudewyns and Paquin (2011) and Wombacher, Dai, Matig, and Harrington (2018) found that among college students, attitudes were the strongest predictor of getting an STI test.

The TPB not only accounts for one's own beliefs, but also the impact of one's perceived beliefs of others (i.e., normative beliefs). Thus, individuals with more support from their friends and family should have more positive intentions to get an STI test. The more favorably an individual believes his or her social network is of STI testing, or the more an individual sees that activity enacted in their social network, the more likely he or she is to get tested. Individual behavior can be affected by actual behaviors of relevant others (i.e., descriptive norms) as well as the approval of relevant others (i.e., injunctive norms; Park & Smith, 2007). Regarding health behaviors, there is a stronger connection between descriptive norms and intentions among younger people (Rivis & Sheeran, 2003). In addition to attitude, Boudewyns and Paquin (2011) also found subjective norms had a significant effect on STI testing. Wombacher, Dai, Matig, and Harrington (2018) did not find any significant effects for either descriptive or injunctive norms.

The last element of the TPB introduces the concept of perceived behavioral control (PBC), or ease to act (Ajzen, 1991). PBC provides information about the potential constraints on an action as perceived by the actor and is one explanation of why intentions do not always predict behavior (Albarracín et al., 2001; Povey, Conner, Sparks, James & Shepard, 2000). Wombacher, Dai, Matig, and Harrington (2018) did not find a significant effect of behavioral control enablers or barriers on intentions. Given college students limited funds, busy schedules, and sometimes limited access to transportation, further exploration of this important factor is warranted.

Health Belief Model

The Health Belief Model (HBM) posits individuals are motivated to engage in healthy behaviors based on perceived severity, susceptibility, benefits, and barriers (Rosenstock, 1974). In order to engage in a recommended healthy behavior, an individual must believe there are negative consequences and he or she must feel vulnerable to those negative consequences. Additionally, that individual must think there are ample benefits to the action and few barriers in the way of performing the action. For example, college students thinking about getting an STI test must believe they are vulnerable to STIs and that there are very negative consequences associated with STIs. They must also perceive that getting an STI test will

provide sufficient benefits and the barriers to getting tested are surmountable.

When it comes to STIs, college students are susceptible to the risk and the risk itself is quite severe. Each year, undiagnosed STIs in the U.S. cause 24,000 women to become infertile (CDC, 2018). The risk for sterilization also exists for men but is far less common. The CDC does suggest screening men in a clinical setting with a high prevalence of chlamydia, such as university settings (CDC, 2018).

Meta-analytic work (see Carpenter, 2010; Janz & Becker, 1984; Zimmerman & Vernberg, 1994) suggest barriers are the strongest predictor in the HBM. That is, barriers affect adherence to recommended behaviors more than any of the other predictors (i.e., severity, susceptibility, benefits). Barriers are the best predictor even when risks are severe, susceptibility is high, and there are tangible benefits to engaging in the healthy behavior. Boudewyns and Paquin (2011) suggest cost may be a strong barrier to receiving regular STI testing. Wombacher, Dai, Matig, and Harrington (2018) measured the effects of cost, stigma, and lack of knowledge, which did not affect intention to get tested. Limited college student budgets, busy schedules, and the inability of most university health centers to offer regular free testing may be strong barriers to regular STI testing among young adults.

Practical considerations

Boudewyns and Paquin (2011) found one strong motivation to get an STI test is partner related. That is, many students reported they intended to get an STI test because they largely viewed doing so as a sign of respect for their partner (Boudewyns & Paquin, 2011). This finding has not been replicated therefore it is important to further empirically test this other-oriented testing motivation.

Past behavior can also strongly influence behavioral intentions and behaviors (Albarracin, Johnson, Fishbein & Mullerleile, 2001; Ouellette & Wood, 1998). That is, individuals who have previously gotten tested for STIs may be more likely to intend to get tested regularly in the future. Getting tested for STIs even one time may increase intentions to continue future testing.

Purpose

This research extends other work (see Boudewyns & Paquin, 2011; Wombacher, Dai, Matig, & Harrington, 2018) that began to explain how behavioral theory can help guide public health practitioners and health communicators in crafting messages about the importance of STI testing within the college-aged population. The current manuscript extends this investigation to examine individuals who present for STI testing as a population of interest. Comparing individuals who get STI tests to those who do not will increase understanding regarding what motivates individuals to get tested and continue regular testing and provides a novel perspective that can aid in campaign construction. The current study examines motivations students have for getting STI tests and compares individuals presenting for testing against the general student population regarding future STI testing intentions.

The Theory of Planned Behavior (Ajzen, 1991) and the Health Belief Model (Rosenstock, 1966) guide this work that specifically examines the attitudes, social norms, and perceived barriers of college students regarding STI testing. With a greater understanding of the variables in these theories, public health practitioners and health communication professionals can better design health campaigns targeted at increasing this important safe-sex behavior and help to design services that will meet the needs of this high-risk group. Thus, based on the background provided above, the following hypotheses are advanced:

H1: a) Attitude, b) norms, and c) perceived behavioral control will have a positive influence on intention to get an STI test.

H2: Attitude regarding STI testing will differ between presenters and non-presenters.

H3: Having a close friend or personal experience with an STI will result in a high intention to get tested.

H4: Cost will be the biggest barrier to getting an STI test.

H5: Having a partner request a test will be the strongest predictor of getting an STI test.

H6: Having had an STI test will positively increase one's intentions to engage in future testing.

METHODS

Participants

The study took place on the campus of a large public university in Florida. The sample population (N=389) consisted of two distinct groups (i.e., presenters, n=265 and non-presenters, n=124) and ranged in age from 18-44 (*M*=20.86, *SD*=2.77). Participants in the presenting group were recruited at two free STI testing events on campus, and in lower and upper level university courses for the non-presenting group. The sample was reflective of the diverse campus which this testing took place with 30.1% of respondents identifying as White or Caucasian, 19.9% as Black or African American, 17.6% as Hispanic or Latino/a, 5.4% as Asian or Pacific Islander, 8.3% as Biracial or Multiracial, 17.1% as "other". There were more female participants than male, with 61% female, and 39% male. Regarding sexual orientation, a large percentage, 89.7%, of the sample reported identifying as "straight or heterosexual", and 10.3% identified as

another sexual orientation (e.g., gay, bisexual). Participants were almost evenly split when it comes to prior STI test experience, with 52% of participants reporting having an STI test in the past.

Procedure

A free STI testing event (funded through a partnership with a local health department) was hosted at the health center on the campus of a large public university in Florida. Students were informed about the testing opportunity in a variety of ways including flyers, posts to the university's calendar of events, recommendations by medical providers at the health center, social media posts, and word of mouth. Participants were not given any compensation for their participation, aside from the free STI test. Before taking the STI test (a urine sample), participants were asked to participate in a survey using their smartphone or one of the tablets made available for their use. The survey was IRB approved and compatible with mobile devices.

It should be noted the term STD was used instead of the more clinically correct term (i.e., sexually transmitted infection, STI) because STD is a more familiar term for the sample population. The survey was intentionally brief to encourage participation and took less than 10 minutes to complete. Survey participation was not a requirement to receive the free STI test and any individuals were free to opt out. Due to the sensitive nature of the information collected, no identifying information was collected from the participants, and participants were informed they could skip any questions they did not wish to answer.

To provide for a better representation of all students, wording of survey items was slightly modified to be appropriate for groups of students not presenting for STI testing (N=124). This version of the survey was very similar, and the only changes made were to account for the fact that the student was not assumed to be sexually active. The survey was administered to a variety of undergraduate students enrolled in communication and education classes on the same large public university campus. These groups of students were offered credit for completion of the survey from their professor. The survey was administered using secure on-line survey software.

Measures

Unless otherwise noted, all items were measured using a five-point Likert-type scale with one indicating *strongly disagree* and five indicating *strongly agree*.

Attitude. Attitude toward the behavior is defined as the individual's positive or negative feelings about performing a behavior. To measure attitude, a 5-item scale, with one item scored on a 5-point Likert type scale (e.g., *Getting a yearly STD test is important to me*), and the other 4 items scored on a 5-point semantic scale (e.g., bad– good, dumb – smart, unnecessary – necessary). The five items were averaged and demonstrated adequate reliability (α=.78).

Perceived behavioral control. Perceived behavioral control is defined as one's perceptions of their ability to perform a given behavior. This includes whether they consider themselves capable of the behavior, as well as barriers such as money, time and location. To measure PBC, a question measuring confidence (i.e., *I feel confident in my ability to get a yearly STD test.*) was utilized.

Norms. Subjective norms are defined as the perceived social pressure to engage or not to engage in a behavior. These can come from one's views about what other people think about a certain behavior, as well as what one believes other people do in regard to a certain behavior. This study measures both descriptive and injunctive norms. Personal descriptive norms were measured using a single item related to an individual's view of friends' actions regarding STI testing (i.e., *Most of my friends get a yearly STD test*.). Personal injunctive norms were assessed using a single item examining the participants view of the level of approval from friends (i.e., *Most of my friends approve of yearly STD testing*.)

Barriers. Barriers are defined as the perceived presence of factors that may impede one's performance of the recommended behavior. This included factors such as money, time and accessibility and fear. Barriers were measured using eight items assessing the participant's view of the barrier (*e.g., My schedule makes it difficult to find the time to get an STD test; The fear of my parents finding out I got an STD test prevents me from getting tested*.).

Benefits. Benefits are defined as what one perceives as gaining from partaking in the activity. This includes tangible and intangible benefits including being able to have sex with a partner who demands testing or having a greater sense of health and well-being. Five items were used to measure benefits (*e.g., Getting a yearly STD test makes me a more desirable sexual partner; Yearly STD testing protects my sexual partner.*).

Behavioral Intention. To measure the intention of students to engage in annual STI testing one item was utilized, (e.g., *I intend to get tested for STDs yearly)*. To investigate if past behavior is a strong prediction of future behavior, participant's STI testing history (e.g., *Have you been tested for STDs before?*) was also recorded. Available responses were *yes* or *no*.

RESULTS

Hypothesis one suggested the TPB (i.e., attitudes, norms, PBC) would predict intention to get an STI test in the future. The first linear regression analysis was performed to predict the intention of STI testing in the complete sample. Attitude, descriptive norm,

injunctive norm, and PBC were all entered as potential predictors of intention. The regression model was statistically significant (R^2=.57, p<.001) and attitude (β=.46, p< .001) was the strongest predictor followed by PBC (β=.38, p<.001). Descriptive (β=.02, p= .66) and injunctive norms (β=.03, p=.50) were not significant predictors.

Two regressions were then performed to further examine if there were any differences between students presenting for STI testing and those who did not. The second linear regression analysis was performed to predict the intention of STI testing in a population of students who did ***not*** present for STI testing. The regression model was statistically significant (R^2=.47, p<.05) and attitude (β=.51, p< .001) was the strongest predictor. Descriptive norms (β=.17, p< .05) and PBC (β=.19, p<.05) were also significant predictors. Injunctive norms were not a significant predictor (β=.01, p=.93).

A third linear regression analysis was performed to predict the intention of STI testing in a population of students who *did* present for STI testing. The regression model including attitude, descriptive norm, injunctive norm, and PBC was statistically significant (R^2=.52, p<.001). Of the variables examined, attitude (β=.48, p< .001) and perceived behavioral control (β=.37, p< .001) were significantly associated with intention to get tested. Neither descriptive nor injunctive norms were significant predictors of testing intention in this group (β=-.06, p=.25 and β=.03, p=.54 respectively).

Hypothesis two suggested individuals presenting for STI tests would differ from those who did not present regarding their attitudes about STI testing. An independent samples t-test compared attitudes of students presenting for STI testing (M = 4.80, SD = .32) with those not presenting for testing (M = 4.35, SD = .62). These two groups differed in a statistically significant manner, $t(368) = -7.71$, p< .001, indicating students presenting for testing had more positive attitudes about testing.

Hypothesis three posited individuals having close friends or personal experience with STIs would have greater intentions to get an STI test. An independent samples t-test was performed comparing testing intentions of students with close friend or personal experience with STIs (M = 4.25, SD = 1.00) with those without close friend or personal experience (M = 3.80, SD = 1.20). These two groups differed in a statistically significant manner, $t(373) = 3.97$, p< .001. This indicates students with close friend or personal experience with STIs had greater intentions to get an STI test than those without the close or personal experience.

Hypothesis four suggested cost would be the biggest barrier to getting tested for STIs. A list of potential barriers to getting tested (*e.g., money, schedule, transportation, fear of testing positive, fear of parents finding out*) was provided and a single sample t-test was performed comparing the impact money had on students' intentions to get an STI test against the scale midpoint (i.e., 3). Money was the biggest barrier (M = 2.67, SD = 1.25) and the difference was statistically significant, t(-5.13) = 381, p< .001 which indicates that although this was the biggest barrier, the mean value was still significantly below the scale midpoint. Schedule, transportation, and the potential for parents to find out were also among the biggest barriers to testing. Complete results can be found in table one.

Hypothesis five proposed the primary reason student present for STI testing is at the request of their partner. The most frequent student response to a question asking about their primary reason for getting tested was "*I get tested for STIs as a part of regularly checking my health.*" (29%), followed by 25% stating "*It just seemed like a good idea.*" and 23% stating "*I recently had unprotected sex and wish to get tested."* The data do not support hypothesis five.

Hypothesis six suggested student who had previously received an STI test would have stronger intentions to get tested again in the future. An independent samples t-test compared the future testing intention of students who had already had an STI test (M = 4.41, SD = .85) to those who did not have an STI test in the past (M = 3.51, SD = 1.23). These data support this hypothesis as these two groups differed in a statistically significant manner, $t(316) = 8.24$, p< .001. This indicates students who have had an STI test in the past have greater intentions to test again than those who have never had an STI test before.

DISCUSSION

This study was guided by two of the most frequently used theories of health behavior (i.e., TPB and HBM) and provides data regarding college student STI testing. Specifically, students who presented for STI testing and those who did not were compared on several dimensions. This section proceeds by providing a summary of results before presenting theoretical and practical implications, limitations, and directions for future research.

Table 1. Means and Standard Deviations for Barriers to STI Testing

Barrier	Mean	Standard Deviation
Money	2.67*	1.26
Schedule	2.42*	1.13
Transportation	2.11*	1.05
Discussion	1.99*	0.97
Embarrassed	2.15*	1.07
Fear of testing positive	2.11*	1.04
Fear of being seen	2.13*	1.08
Parents	2.26*	1.20

*Note: * Indicates a single sample t-test against the scale midpoint (i.e., 3) was significant at the p<.001 level*

Summary of Results

Overall, results suggest several health behavior constructs were effective predictors of behavioral intention to get regularly tested for STIs in the future and revealed some interesting practical considerations as well. The first hypothesis posited the theory of planned behavior could explain student intentions to get an STI test. Data supported this hypothesis but demonstrated differences between students who presented for STI testing and those who did not. Consistent, however, was the fact that attitude was the strongest predictor of behavioral intention across groups, and perceived behavioral control was the second strongest predictor. This is also consistent with previous research findings. Interestingly, neither descriptive nor injunctive norms were significant predictors in the presenting population, but non-presenters were affected by descriptive norms. This suggests norms-based campaigns may not be the most fruitful avenues for the promotion of regular STI testing among college students and perhaps more individual-focused considerations like attitude and PBC should be stressed. However, the fact that descriptive norms had a significant effect on intention among non-presenters, but not injunctive norms does suggest any norms-based campaigns should focus on what healthy behaviors are being enacted, not what other approve of or think young adults should do.

Hypothesis two predicted attitudes regarding STI testing would differ between individuals presenting for STI testing and non-presenters. The data supported this hypothesis demonstrating presenters had more positive attitudes about STI testing than non-presenters, though both groups had very positive attitudes about STI testing. This is very important and positive for future campaign construction as it may demonstrate levels of stigma associated with STI testing could be waning.

Hypothesis three suggested having a close friend or personal experience with an STI would result in greater intentions to get tested. Results provide support for this hypothesis indicating higher intentions for students who had personal experience or friends with STI experience. This suggests simply sharing experiences with STIs or STI testing may help encourage regular testing among young adults. Hypothesis four posited cost would be the biggest barrier to getting an STI test and the data supported this hypothesis. Cost concerns, scheduling, transportation issues, and the potential of parents finding out were listed as the biggest barriers to regular STI testing. These barriers are all easily addressed on university campuses through free or reduced cost testing, accessible testing locations, and assurances regarding confidentiality. However, it should be noted that all barriers considered had means significantly below the scale midpoint, indicating they may not be strong impediments to testing.

Hypothesis five suggested having a partner request a STI test would be the biggest predictor of getting an STI test. Results did not support this hypothesis as students presenting for STI testing said *regular checkups, it generally seeming like a good idea, and risky sexual activity* were the primary reasons for testing. This contrasts with previous research which indicated protecting and showing respect to a partner were primary reasons for testing (Boudewyns & Paquin, 2011). This more individual focused orientation is consistent with the stronger effects of attitude and PBC over norms as well. Finally,

hypothesis six suggested having had an STI test before would increase intentions for future testing. Data supported this hypothesis as individuals who had previously engaged in STI testing were significantly more likely to intend to test again in the future. This indicates STI testing may be a habitual behavior and encouraging one-time testing may be a fruitful avenue to encourage consistent regular testing behavior.

Limitations

One main limitation of the current study is that it was confined to a single university campus that, while diverse, is certainly not be representative of all campuses or young adults. Additionally, the presenting and non-presenting samples were presumed to be distinct but further testing would be required to ascertain if these two groups had any overlap; this is possible but unlikely on a campus with tens of thousands of students. The current study also failed to report data regarding number of sexual partners, which could vary between presenters and non-presenters and influence results. The study was also quantitative in nature (i.e., limited fixed answer options) and this format may have affected results as students were unable to provide richer open-ended data that may have illuminated alternate barriers or motivations. The barriers and motivations provided in this research were based on previous work in the area (see Barth, Cook, Downs, Switzer & Fischhoff, 2002; Boudewyns & Paquin, 2011) which incorporated both qualitative and quantitative data. However, more qualitative data specific to this sample may have been useful in identifying unique barriers. Additionally, time restrictions due to the on-site testing context limited the number of items used to measure constructs of interest, which in turn may have affected measurement reliability.

Implications

The current study provides evidence to suggest several meaningful theoretical and practical applications regarding STI testing. The current study incorporated constructs from the theory of planned behavior and the health belief model; attitudes, norms, perceived behavioral control, and barriers were all tested and demonstrated varied levels of influence on behavioral intentions. This study falls in line with a growing body of work attempting to integrate these theoretical approaches (e.g., Fishbein, 2008; Yzer, 2012) but more extensive research needs to extend this process by including measures of benefits and potential cues to action, currently the most understudied construct of the health belief model (Carpenter, 2010). Though the current theoretical approach explained nearly half the variance in intention, further integration may lead to even more variance explained.

Importantly, the fact students who presented for testing had more positive attitudes about testing, and intentions to continue testing, has important practical implications. That is, even before engaging in the STI testing process, presenting individuals had very positive attitudes about the process and intended to keep testing. These results suggest that if universities can get students to come in for STI testing just one time, they may be able to set students up for a life of increased sexual health, even after they leave the university setting. This type of habitual behavior can be difficult to impart on young adults but is certainly a valuable lifelong practice.

Theoretical and practical implications regarding the influence of peers in the STI testing decision making process are less clear. Findings indicate norms are not the strongest predictors of intentions. In fact, neither descriptive nor injunctive norms were significant predictors among the presenting group, indicating STI testing may be a more personal decision. However, and descriptive norms were influential among non-presenters which may demonstrate the influence of actual peer behaviors on intentions over approval of or encouragement of behaviors. That is, young adults may not care much about what people think they should do but place more value on the actual referent group actions. This effect may be attenuated in the presenting group as their personal experience with testing overwhelms normative effects.

Additionally, individuals with personal or close friend experience were significantly more likely to get tested, which may be because a) personal and b) friend experiences cannot be extricated in the current study and the strength of personal experience may be overwhelming the friend experience, as evidenced by findings for hypothesis six. However, encouraging individuals to share about their STI testing experience with their friends may be a fruitful avenue but there may still be problematic levels of stigma associated with these types of discussion. Thus, reducing the stigma of getting tested for STIs is essential. Messaging focused on making STI testing a widely acceptable preventive health behavior like an annual check-up (which would not conjure up assumptions about promiscuity) could be helpful.

Students identified cost as the biggest barrier to getting an STI test. If possible, university health centers should offer free testing, even if only at special events. While funding to do this is always a concern, health centers should explore partnerships with local health departments to see what grants may be available or if offering testing on campus would help the local health department to meet its goal of reaching this target population. The second largest barrier to getting tested was fitting the testing into their schedule. University health centers should strive to limit those

barriers by frequently offering drop-in clinics and having flexible hours. Some campuses (e.g., Penn State, UC Berkeley) have even implemented self-testing procedures that could be valuable considering scheduling issues. Even though appointments are usually readily available for testing at college health centers, the drop-in or self-testing type of service may feel more accessible to students. Finally, students are still being reactive regarding their decision to get an STI test, with 23% of students reporting engaging in recent unsafe sex behaviors was their main reason for getting tested. Better communication about the asymptomatic nature of many STIs and the importance of regular screening is needed.

Future Research

Much of the work in this area has focused on HIV testing that, while important, fails to tell the complete story regarding STI testing patterns; more research is needed to investigate how many sexually active young adults are partaking in regular preventive sexual health screening. Data suggests young adults are at the greatest risk, but little research exists on how many young adults are regularly engaging in preventive STI screening behaviors. Just as this study extended previous research with a general college student population as well as those presenting for free testing, it may also be useful to include a third group (i.e., students who present for paid testing) to investigate any differences between this group, free testers, and non-presenters. Additionally, future research may want to employ more qualitative research techniques to allow students to express attitudes and barriers in less restrictive settings (i.e., open ended survey questions or focus groups). Overall, the current study provides insight into a novel student population (i.e., individuals presenting for free STI testing) with a standard comparison group; future research in this area should continue to extend theory and adapt to evolving situations in this important health context to help increase testing rates and lower incidence rates.

REFERENCES

Ajzen, I. (1991). The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes, 50*, 179-211. doi: 10.1016/0749-5978(91)90020-T

Ajzen, I. (2011). The Theory of Planned Behavior: Reactions and reflections. *Psychology & Health, 26*, 1113-1127. doi: 10.1080/08870446.2011.613995

Albarracín, D., Johnson, B. T., Fishbein, M., & Muellerleile, P. A. (2001). Theories of Reasoned Action and Planned Behavior as models of condom use: A meta-analysis. *Psychological Bulletin, 127*, 142-161. doi: 10.1037//0033-2909.127.1.142

Albarracín, D., Gillette, J. C., Earl, A. N., Glasman, L. R., Durantini, M. R., & Ho, M. H. (2005). A test of major assumptions about behavior change: a comprehensive look at the effects of passive and active HIV-prevention interventions since the beginning of the epidemic. *Psychological bulletin*, *131*, 856-897. doi: 10.1037/0033-2909.131.6.856

American College Health Association. (2018). *American College Health Association-National College Health Assessment, Spring 2018*. Retrieved from https://www.acha.org/NCHA/ACHA-NCHA_Data/Publications_and_Reports/NCHA/Data/Reports_ACHA-NCHAIIc.aspx

American Sexual Health Association. (2018). *Statistics*. Retrieved from http://www.ashasexualhealth.org/

Barth, K. R., Cook, R. L., Downs, J. S., Switzer, G. E., & Fischhoff, B. (2002). Social stigma and negative consequences: Factors that influence college students' decisions to seek testing for sexually transmitted infections. *Journal of American College Health, 50*, 153-159. doi: 10.1080/07448480209596021

Bontempi J.B., Mugno R., Bulmer S.M., Danvers K., Vancour M.L. (2009). Exploring gender differences in the relationship between HIV/STD testing and condom use among undergraduate college students. *American Journal of Health Education, 40*, 97–105. doi:10.1080/19325037.2009.10599084.

Boudewyns, V. & Paquin, R. S. (2011). Intentions and beliefs about getting tested for STDs: Implications for communication interventions. *Health Communication, 26*, 701-711. doi: 10.1080/10410236.2011.563353

Campo, S., Brossard, D., & Frazer, M. S. (2003). Are social norms campaigns really magic bullets? Assessing the effects of students' misperceptions on drinking behavior. *Health Communication, 15*, 481-497. doi: 10.1207/S15327027HC1504_06

Carpenter, C. (2010). A meta-analysis of the effectiveness of health belief model variables in predicting behaviors. *Health Communication, 25*, 661-669. doi: 10.1080/10410236.2010.521906

Centers for Disease Control and Prevention. (2018). *Sexually transmitted disease surveillance, 2017*. Retrieved from http://www.cdc.gov/std/stats17/

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An Introduction to Theory and Research. Reading*, MA: Addison-Wesley.

Fishbein, M. (2008). A reasoned action approach to health promotion. *Medical Decision Making, 28,* 834-844. doi: 10.1177/0272989x08326092

Fisher, J. D., & Fisher, W. A. (2000). Theoretical approaches to individual-level change in HIV risk behavior. In J. L. Peterson & R. J. DiClemente (Eds.), *Handbook of HIV prevention* (3-55). New York, NY: Kluwer Academic/ Plenum Publishers. doi: 10.1007/978-1-4615-4137-0_1

Fisher, W. A., Kohut, T., Salisbury, C. M. A., & Salvadori, M. I. (2013). Understanding Human Papillomavirus vaccination intentions: Comparative utility of the Theory of Reasoned Action and the Theory of Planned Behavior in vaccine target age women and men. *The Journal of Sexual Medicine, 10*, 2455-2464. doi: 10.1111/jsm.12211

Janz, N. K., & Becker, M. H. (1984). The Health Belief Model: A decade later. *Health Education and Behavior, 11*, 1-47. doi: 10.1177/109019818401100101

Park, H.E. & Smith, S. W. (2007). Distinctiveness and influence of subjective norms, personal descriptive and injunctive norms, and societal descriptive and injunctive norms on behavioral intent: A case of two behaviors critical to organ donation. *Human Communication Research, 33*, 194-218. doi: doi:10.1111/j.1468-2958.2007.00296.x

Plotnikoff, R.C., Lubans, D. R., Costigan, S. A. & McCargar, L. (2013). A test of the Theory of Planned Behavior to predict physical activity in an overweight/obese population sample of adolescents from Alberta, Canada. *Health Education & Behavior, 40*, 415-425. doi: 10.1177/1090198112455642

Povey, R., Conner, M., Sparks, P., James, R., & Shepherd, R. (2000). Application of the Theory of Planned Behaviour to two dietary behaviours: Roles of perceived control and self-efficacy. *British Journal of Health Psychology, 5*, 121-139. doi: 10.1348/135910700168810

Ouellette, J. A., & Wood, W. (1998). Habit and intention in everyday life: the multiple processes by which past behavior predicts future behavior. *Psychological Bulletin, 124*, 54-74. doi: 10.1037/0033-2909.124.1.54

Rivis, A. & Sheeran, P. (2003). Descriptive norms as an additional predictor in the Theory of Planned Behaviour: A meta-analysis. *Current Psychology: Developmental, Learning, Personality, Social, 22*, 218-233. doi: 10.1007/s12144-003-1018-2

Rosenstock, I. M. (1966). Why people use health services. *Milbank Memorial Fund Quarterly, 83*, 1-32. doi: 10.1111/j.1468-0009.2005.00425.x

Rosenstock, I. M. (1974). Historical origins of the health belief model. *Health Education Monographs, 2*, 328-335. doi: 10.1177/109019817400200403

Weinhardt, L. S., Carey, M. P., Johnson, B. T., & Bickham, N. L. (1999). Effects of HIV counseling and testing on sexual risk behavior: a meta-analytic review of published research, 1985-1997. *American Journal of Public Health*, *89*, 1397-1405. doi: 10.2105/AJPH.89.9.1397

Wombacher, K., Dai, M., Matig, J. & Harrington, N. (2018). Using the integrative model of behavioral prediction to understand college students' STI testing beliefs, intentions, and behaviors. *Journal of American College Health,* doi: 10.1080/07448481.2018.1454928

Yzer, M. (2012). The integrative model of behavioral prediction as a tool for designing health messages. In: Cho H ed. *Health Communication Message Design: Theory and Practice* Los Angeles: Sage; 21–40

Zimmerman, R. S., & Vernberg, D. (1994). Models of preventive health behavior: Comparison, critique, and meta-analysis. In G. Albrecht (Ed.), *Advances in Medical Sociology, Volume 4: Health Behavior Models: A Reformulation*. Greenwich, CT: JAI Press.

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