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The Influence of Executive Functioning on the Intention-Behavior Link for Sexual Health Behavior among Young Men

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THE INFLUENCE OF EXECUTIVE FUNCTIONING ON THE INTENTION-BEHAVIOR LINK FOR SEXUAL HEALTH BEHAVIOR AMONG YOUNG MEN

by

Robert John Sawyer, II

A Dissertation

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Abstract

Sawyer, Robert John. Ph.D. The University of Memphis. August 2012. The influence of executive functioning on the intention-behavior link for sexual health behavior among young men. Major Professor: Sharon G. Horne, Ph.D.

Typically, research and interventions have relied upon social-cognitive theories like the Theory of Planned Behavior (TPB) to understand sexual health behavior. Of particular import in the TPB model is the intention-behavior link where strength of intentions to enact a particular behavior are significantly related to actual behavioral performance. Recently, investigators have sought to understand possible moderators of the intention-behavior relationship. One moderating variable examined is the common neuropsychological construct executive functioning. Executive functioning consists of skills for self-regulation, inhibition of impulsivity, organization, planning, and so forth that impact attainment of previously established goals. This study examined the possible influence of executive functioning on condom use and, in particular, whether executive functioning differences moderated the intention-behavior link. Two data collections were performed with the first assessing demographic factors, individual executive functioning, and condom use intentions for main and casual partners. The second collection occurred four-weeks later assessing condom use. It was hypothesized that no differences would emerge on important study variables between at-risk groups of young men, that intentions would continue to exhibit an influence on behavior, and that executive functioning differences would moderate the intention-behavior relationship. In the main partner context, intentions significantly influenced condom use behavior and executive functioning did not show significant influence on actual condom use. An interaction was also not observed in that context. The casual partner context showed that intentions, but

not executive functioning demonstrated a significant main effect on condom use. Executive functioning and condom use was, however, significantly and positively correlated. Conclusions are presented along with recommendations for future research and implications for clinical practice.

keywords: condom use, executive functioning, social-cognitive, TPB, moderator, sexual health behavior, young men

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Chapter 1

Introduction

Recent reports have found a rise in sexually transmitted infections (STIs) among men despite widespread health education and interventions for sexual health (Centers for Disease Control [CDC], 2009). It is remarkable that growing evidence continues to show target groups of men failing to consistently engage in safe sex practices, such as regular condom use (CDC, 2008a, 2010). The lack of engagement in safe sex practices not only adversely impacts men's health, but also the sexual health of their partners. Specifically, reports of STIs in men show that rates of chlamydia increased 45% from 2004 to 2008 (CDC, 2009). Moreover, while rates of syphilis declined 89.7% from 1990 to 2000, those gains have been lost (CDC, 2008a). From 2001 to 2007, syphilis has risen 81%, primarily attributed to new male diagnoses (CDC, 2008a). The CDC (2009) similarly reports that gonorrhea rates have failed to decline nationally among men, indicating that STIs remain a serious health issue for men.

On a favorable note, rates of HIV infections among men have declined since the early 1980s until 1990 (Holtgrave, Hall, Rhodes, & Wolitski, 2009). Rates of HIV since 1990, however, have failed to substantially decline, especially among men (Hall et al., 2008). Additionally, recent epidemiological investigations employing improved methodological strategies have also reported annual rates of HIV infections to be even higher than previously predicted in the 1990s with no real decline since 1999 (Hall et al., 2008). Men as a group continue to disproportionately represent new HIV infections (CDC, 2008b) and target groups of men such as men who have sex with men (MSM),

men of color, and young men (ages 15-29) are often most at risk for HIV transmission (CDC, 2008).

Of all these groups, current STI epidemiological reports suggest that young men are especially at risk. For example, young men ages 20-24 years of age represent the greatest number of chlamydia infections and 15 to 19 year old males have had an 11.2% rise in gonorrhea infections (CDC, 2009). Furthermore, larger increases in HIV infection rates are found with young men between 15 and 29 years of age than other male age groups when assessed during the same time period (CDC, 2010a). Young MSM and young men of color are also reported to be the especially at-risk for STI/HIV transmission (CDC, 2009, 2010b), and research is needed to understand their sexual health behavior and whether there are differences in their behavior compared to groups with lower rates of STIs.

While understanding individual differences for sexual health protective behaviors, like condom use, has traditionally been investigated from social-cognitive perspectives (Albarracin, Johnson, Fishbein, & Muellerleile, 2001; Sheeran, Abraham, & Orbell, 1999), growing evidence is suggesting executive functioning differences may be influential predictors of health protective behavior (Hall & Fong, 2007). Executive functioning is defined as a set of cognitive operations that regulate goal directed behavior, such as self-regulation, inhibition of impulsivity, and planning. This study will, primarily, examine whether individual differences in executive functioning impact young men's engagement in protective sexual health behaviors. Sexual health behaviors will be measured in the form of condom use and condom use intentions. Context of sexual behavior (e.g., main partner condom use versus casual partner(s) condom use) has been

shown to impact an individual's condom use (Carvajal, Estrada, & Estrada, 2005; van Kesteren, Hospers, van Emplen, van Breukelen, & Kok, 2007). Therefore, condom use and condom use intentions will then be assessed in those two contexts.

As a secondary question, this investigation will also assess whether groups particularly at-risk for STI transmission (e.g., sexual minorities, racial minorities) exhibit differences in protective sexual health behaviors (e.g., condom use, condom use intentions) that may explain elevated sexually transmitted infections. If there are sexual health behavior differences, then those behaviors could be targeted for intervention in those groups. First, I review what is known about health behaviors from a social-cognitive perspective, which has been the primary theoretical standpoint for exploring when and how individuals engage in protective sexual health behaviors. Then, I will address gaps in the social-cognitive literature for health behavior along with current attempts to close those gaps. Finally, I will propose that the addition of executive functioning may improve our current understanding of sexual health behavior among young men.

Social-Cognitive Models of Health Behavior

Social-cognitive approaches (Bandura, 1977, 1986, 1988) help explain differences in individual health risk and health promotion behaviors (Glanz, Rimer, & Lewis, 2002). One social-cognitive model of health behavior and behavior is the Theory of Planned Behavior (TPB; Ajzen, Albarracin, & Hornik, 2007; Ajzen & Madden, 1986), which has been especially influential in explaining individual sexual health behavior (Albarracin et al., 2001). Central to TPB's power in predicting whether an individual carries out a particular sexual health behavior is investigating their respective intentions, or motivation

level, to perform protective sexual health behaviors, like condom use (Ajzen, 1991). Research has overwhelmingly shown that the strength of one's intention to engage in a particular behavior is determinant of his or her actual behavior (Ajzen, 1991; Armitage & Conner, 2001; Sheeran, 2002). The intention-behavior link within TPB has been used to understand, predict, and change a wide variety of health-related risk and protective behaviors, especially condom use for safe sex (Albarracin et al., 2001; Conner & Sparks, 1996; Sheeran et al., 1999).

TPB has not only successfully explained protective sexual health behavior among heterosexual men and women (Gredig, Nideröst, Parpan-Blaser, 2007; Mausbach, Semple, Strathdee, & Patterson, 2009; Morrison, Rogers-Gillmore, & Baker, 1995; Sheeran et al., 1999), but also for other diverse populations. Studies focusing on notable risk groups such as young people (Armitage & Talibudeen, 2010; Richardson, Beazley, Delaney, & Langille, 1997; Schaalma, Kok, & Peters, 1993); people of color, especially African Americans and Hispanics (Jemmott, Jemmott, & Hacker, 1992; Villarruel, Jemmott, Jemmott, & Ronis, 2004); gay men and MSM (de Wit, Stroebe, De Vroome, Sandford & Van Griensven, 2000; de Wit, Teunis, Van Griensven, & Sandfort, 1994; de Wit, Van Griensven, Kok, & Fishbein, 1993; Gallois, Terry, Timmins, Kashima, & McCamish, 1994); and substance abusing men (Carvajal et al., 2005; Mauschbach et al., 2009) have shown that individuals' sexual health behavior intentions positively predict their subsequent behavioral enactment of those intentions.

Even though intentions are strongly associated with engagement in a certain safe-sex behavior, like condom use, many men still do not consistently act upon their established intentions despite knowledge about condoms and STI prevention (Warner &

Steiner, 2002). A recent meta-analysis by Webb and Sheeran (2006) examining experimental studies on the intention-behavior link found that large to medium changes in an individual's intention only lead to small to medium actual behavioral changes. They proposed that the causal relationship between intentions and behavior may have been overstated. The majority of these studies thus far were cross-sectional especially when exploring the intention-behavior link for health behaviors (e.g., condom use and physical activity). In these health studies, participants followed-through only 53% of the time with their 'strong' intentions to engage in a given behavior (Sheeran, 2002). Consequently, Webb and Sheeran (2006) suggested some factors like self-regulation may moderate the intention-behavior link and strengthen the association between intention and subsequent behavior.

The concept that self-regulation is a key moderator of the intention-behavior link is rooted in a social-cognitive perspective and helps explain individual differences in follow-through on health behavior intentions (Cameron & Leventhal, 2003; Norman, Abraham, & Conner, 2000). For example, several studies have proposed that goal-setting or devising more specific intentions that allow for greater self-regulation, planning, and inhibition of habitual behaviors improve individual follow-through for intentions and behavior (Gollwitzer, 1999; Oettingen, Pak, & Schnetter, 2001). Little attention, however, has focused on whether differences in executive functioning, such as capacities for self-regulation, planning, and inhibition, influence consistent behavioral follow-through of previously formed health behavior intentions. This is surprising as emerging investigations have found that executive functioning appears to be an important factor

explaining whether individuals act, or fail to act, upon their health behavior intentions over time (Hall, Fong, Epp, & Elias, 2008).

The processes of the brain that allow for setting goals, self-monitoring and self-regulation, planning, and inhibition of impulsivity are termed *executive functions*. These functions are neuroanatomically located in the frontal lobe, especially the prefrontal area, of the human brain (Koechlin, Ody, & Kouneiher, 2003). As executive functions are particularly pertinent for self-regulatory activities, it may be that these functions could influence or be associated with consistent, or inconsistent, implementation of sexual health behavioral intentions that are often subject to inconvenience, impulsivity, emotional control, and self-monitoring. The purpose of the current study is to investigate whether individual executive functioning moderates the intention-behavior link for protective sexual health behaviors among young men and adds to current social-cognitive explanations as to why young men fail to engage in protective sexual health behaviors. Until now, researchers have not explored the role executive functions may play in protective sexual health behaviors. If executive functions play a role in engagement in protective sexual health behaviors, then, it could be useful to design interventions improving those neurocognitive functions to prevent the spread of STIs. For instance, interventions could target poor planning before sexual behavior and the need for greater self-regulation to behave in line with sexual health goals.

Intentions and Behavior

Intentions are defined as "indications of how hard people are willing to try, of how much effort they are planning to exert, in order to perform a particular behavior" (Ajzen, 1991, p. 181). Most social-cognitive models (Bandura, 1986) of attitude-

behavior relations, health behaviors, and goal-setting theories hold that individual intentions are chiefly responsible for predicting future behavior (Abraham, Sheeran, & Johnston, 1998; Austin & Vancouver, 1996; Conner & Sparks, 1996; Gollwitzer & Moskowitz, 1996; Webb & Sheeran, 2006). One model, the Theory of Planned Behavior (TPB; Ajzen, 1991; Ajzen & Madden, 1986) proposes that attitudes toward the behavior, subjective norms or social pressure to perform or not perform the behavior, and individual self-efficacy to engage in a given behavior, simultaneously affect the formation of intentions or motivation to act (see Figure 1, Ajzen & Madden, 1986). Previously formed intentions, then, become the closest predictor of behavior with self-efficacy also independently predicting behavior, though to a lesser extent.

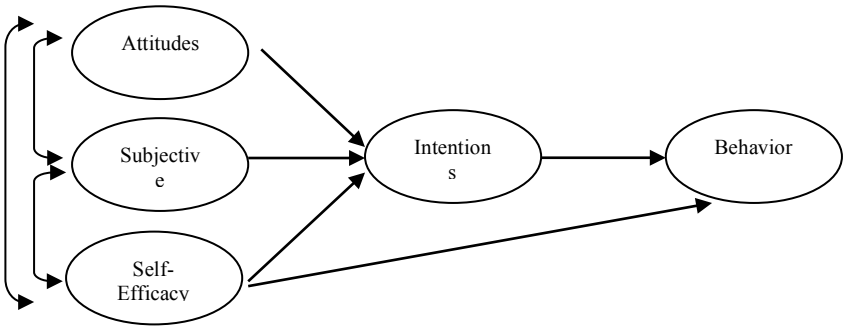

Figure 1. The Theory of Planned Behavior (TPB).

Although the causal association from intention to behavior has been questioned, leading to a need for further analysis of this relationship by examining potential moderators (Webb & Sheeran, 2006), correlational studies of TPB and the intention-behavior link have still been particularly robust. For example, in a meta-analysis of 185 studies using TPB, Armitage and Conner (2001) reported a strong correlation of .47 for

intention and behavior. Similar findings by Godin and Kok (1996) found strong associations between health behavior intentions and subsequent behavioral actions. Lastly, in a substantial meta-analysis involving 422 studies and 82,107 participants, Sheeran (2002) indicated that the intention-behavior link helps to explain 28% of variance in behavior on average. According to Cohen (1992), this is a large effect and suggests that intentions are often excellent determinants of behavior.

Intention-Behavior and Condom Use/Safe Sex Practices

One of the most powerful correlates of protective sexual health behavior has been the intention-behavior link. In a meta-analysis of condom use correlates, Albarracin et al. (2001) found that condom use was especially related to intentions with a weighted mean correlation of $r = .45$. A similar meta-analysis of heterosexual condom use found a weighted average correlation of $r = .43$ for behavioral intentions (Sheeran et al., 1999). More at risk target groups of men, like gay men and MSM, displayed similar results. De Wit et al. (2000) found stronger condom use intention and condom use behavior among steady partners ($r = .79$) versus casual partners ($r = .29$). Finally, in a study of condom use for both heterosexual and homosexual men, intentions emerged as especially predictive of consistent condom usage (Gallois, Terry, Timmins, Kashima, & McCamish, 1994). These studies show that the intention-behavior link is an effective and reliable determinant of protective sexual health behavior for men across sexual orientation and age groups.

Despite significant contributions above substantiating the intention-behavior link, the correlational design of these studies creates several confounds when proposing intention-behavior causation. First, many of these studies relied heavily on self-report,

which may have led to an overstatement of the intention-behavior link in those investigations due to participant self-presentation biases (Budd, 1987). Webb and Sheeran (2006) also reported that non-experimental studies cannot eliminate the prospect of behavior causing intention, rather than intention causing behavior. For example, men may infer their intention to use condoms based on their previous use of condoms rather than forming intentions and then using condoms as theorized by TPB (Ajzen & Madden, 1986). These methodological problems suggest the need for more complex moderational analyses to improve our understanding of the relationship between intentions and behavior.

In order to have a better causal understanding of the intention-behavior link, Webb and Sheeran (2006) conducted a meta-analysis of experimental studies seeking to change intention and subsequent behavior in a variety of contexts, including protective sexual health behavior. Results from this meta-analysis illustrated that interventions to alter intentions created a medium-to-large effect on intention with an average weighted effect size of .66. The impact of interventions to change intention on actual behavior, however, had a small-to-medium effect on behavior with an average weighted effect size of .36. Results from this meta-analysis suggest that despite good intentions, many fail to act on those previously formed intentions (Orbell & Sheeran, 1998a). In fact, another meta-analysis of health behaviors (e.g., condom use, physical acitivty, and diet) found that individuals with 'strong' intentions to engage in a behavior only do so 53% of the time (Sheeran, 2002). More research is clearly needed to better explain why individuals fail to follow through on their previously formed intentions to perform protective sexual health intentions like consistent condom use.

Moderators of the intention-behavior link

Sheeran (2002) found that a range of social-cognitive variables possibly impact the degree to which intentions influence an individual's behavior over time. First, one's actual or perceived control over a particular behavior has been demonstrated to moderate the intention-behavior relationship and strengthen the intention-behavior link (Ajzen & Madden, 1986). This suggests that as one's perception of the ability to control a behavior increases (e.g., using a condom in a given circumstance), the likelihood that the individual's intentions will be behaviorally enacted also increases. Next, social reactions are also thought to impact intention-behavior relations (Gibbons, Gerrard, Blanton & Russell, 1998). Gibbons et al. (1998) posited that health risk behaviors like smoking and condom use, especially among younger populations, are more susceptible to social reactions and social perceptions. As such, these social reactions and perceptions are more likely to determine one's willingness to follow through with their behavioral intentions. The intention-behavior relationship is therefore weakened when performance of the behavior leads to a negative social reaction. Conversely, behaviors that engender a positive social reaction strengthen the intention-behavior link.

Third, behavioral habits also significantly attenuate the intention-behavior link. As habits represent behaviors acted on repeatedly over time in many contexts, recent investigations have established that habitual behaviors lessen the influence intentions have over behavior because it is difficult to switch from a habitual to a new behavior (Wood & Quinn, 2005; Wood, Quinn, & Kashy, 2002). Verplanken, Aarts, van Knippenberg, and Moonen (1998) reported that intentions were much less significant when an individual's habit strength was assessed to be moderate or strong. Thus, the

relevance of past behavior and moderately to strongly formed habits help to better explain why individuals may be less consistent with behavioral intentions.

Fourth, and finally, self-regulation and planning has received a substantial amount of attention as possibly strengthening the tie between intention and health behavior (Orbell & Sheeran, 1998b; Schwartzer, 1992). Self-regulation theories (Cameron & Leventhal, 2003; Norman et al., 2000) suggest that an individual needs strategies, such as plans, to mitigate individual and contextual factors that work against goal attainment. For example, prior to having sex, a young man may not have immediate access to a condom. This context will likely demand greater use of his self-regulatory abilities to pause sexual activity and secure a condom, consistent with his previously formed intentions to use condoms. According to self-regulation theories, interventions promoting greater self-regulation will increase the likelihood that individuals will be consistent with their intentions especially when faced with factors working against behavioral follow through of intentions. For condom use behavior, self-regulatory differences have been shown to explain why some individuals are more or less consistent with their use of condoms (Hynie, MacDonald, & Marques, 2006; Svenson, Östergren, Merlo, & Råstam, 2002).

One model of self-regulation, Gollwitzer's (1999) implementation intention model, holds that individuals who make plans in advance with greater specificity of individual goals and plans to achieve those goals will be more likely to act on their intended behavior. Research has confirmed that more specific and planned intentions do enhance the intention-behavior link by improving self-regulatory capacities to effectively

deal with problems that might otherwise undermine goal attainment (Gollwitzer & Brandstatter, 1997; Sheeran & Orbell, 2000).

Similarly, the Health Action Process Approach (Schwartzer, 1992) also attempts to improve upon the lack of individual consistency between intentions and health behavior. This model holds that specific planning is important to maintain a health behavior goal. For condom use among men, planning has been shown to explain differences in consistent condom use (Mak & Teng, 2010). Collectively, research into individual differences for self-regulation, planning, and inhibition of impulsivity may better explain why some people fail to translate intention into actions (i.e., consistent condom use) in the face of exigencies that adversely impact or make greater demands on self-regulation of goals.

Taken together, these studies on behavioral control, social reactions, habits, self-regulation and planning help to illuminate the positive role that social cognitive variables contribute to understanding intentions and subsequent behavior. The moderating role of individual executive functioning, however, has yet to be investigated with regard to condom use intentions and condom use behavior. This is surprising as skills for suspending habits, planning, and self-regulation are often associated with executive functions (Fuster, 2008). Consequently, the current study will explore whether global executive functioning, which includes planning, inhibition of impulsivity, and self-regulation, moderates the intention-behavior relationship for protective sexual health behavior among young men.

Executive Functioning

Social-cognitive factors (Bandura, 1977, 1986, 1988) have typically explained how and why individual behavioral intentions translate into consistent actions (Cameron & Leventhall, 2003; Gollwitzer, 1999; Orbell & Sheeran, 1998; Sheeran & Orbell, 1998). For example, Gollwitzer and Brandstätter's (1997) implementation intentions, as described above, represent a way to help individuals translate their intentions into consistent actions. Implementation intentions represent plans that enumerate when, where, and how someone will engage in a given behavior (Gollwitzer, 1999). Individuals who formulate these more explicit intentions have been shown to better self-regulate, plan, and inhibit their habitual behaviors in order to follow-through on their respective health behaviors, like condom use (Gollwitzer & Sheeran, 2006). Little research, however, has accounted for the possible role that executive functioning might have on inconsistencies between individual intentions and health behaviors.

This is curious as a long history of neurocognitive evidence supports the contention that sustaining any behavior demands continual self-regulation over time (Fuster, 1999, 2008). In particular, changing and maintaining health behaviors necessitates constant cognitive effort in the form of behavioral self-regulation and impulse inhibition (Hall & Fong, 2007), which suggests an important role for specific structures of the brain responsible for executive functioning. Those brain structures most involved in executive functions require activation of the frontal lobe of the brain and include the prefrontal cortex and the orbitofrontal, dorsolateral, medial frontal and anterior cingulate systems (Cummings, 1993; Fuster, 1999, 2008) when cognitive effort in the form of self-regulation, motivation, and inhibition of impulsivity is needed.

Executive functions are conceptualized as "top down" cognitive processes that serve to regulate behavior to achieve a certain goal (Loring, 1999). These functions require a series of cognitive operations such as planning, self-regulation, and inhibition of impulsive or prepotent (i.e., habitual) responses (Miyake et al., 2000). These cognitive operations are vital especially when faced with contextual factors, such as personal discomfort (e.g., feeling embarrassed about negotiating condom use) or inconvenience (e.g., lacking access to condoms) that make behavioral follow-through more difficult. Measurement of the multiple domains of executive functioning can be done through objective testing of specific cognitive skills (e.g., attention, cognitive flexibility, or cognitive inhibition) or through self-report instruments that measure the multi-dimensional constructs of executive functions. The literature suggests these objective measures often lack ecological validity, which calls into question whether they would accurately depict real word deficits in executive functioning as a whole (Chaytor, Schmitter-Edgecombe, & Burr, 2006; Gioia & Isquith, 2004; Manchester, Priestley, & Jackson, 2004). A single self-report measure of executive functioning abilities is arguably quite useful. This allows global executive functions to be measured at one time, especially self-regulation, planning, and inhibition of impulsivity, which have been shown to be important in sustaining any behavior over time (Fuster, 1999, 2008).

Accordingly, measuring differential executive functioning may be a potential explanatory factor as to why some people are able to better self-regulate, plan and inhibit impulsive or habitual responses in order to follow through with goal-directed behavior, like consistent condom use, even when using a condom might have negative contingencies before and during use. Preliminary findings have suggested that individual

differences for executive functioning help to better explain consistent and inconsistent health behavior despite previously formed intentions (Hall, Elias, & Crossley, 2006; Hall et al., 2008; Hall et al., 2008) and that stronger executive functioning is positively correlated with sexual health behavior in the form of increased protective sexual communication (DeFelice & Spinella, 2010)

Hall et al. (2006) conducted a preliminary investigation of executive functions and health behaviors for smoking, problem drinking, exercise, and sleeping. They found that self-regulatory capacities were strongly associated with health promoting and negatively correlated with risk behaviors. Those with greater performance on neuropsychological executive function measures were more likely to consistently engage in health promoting behaviors. In a follow-up study of the intention-behavior link, Hall, et al. (2008) discovered differences for executive functioning significantly moderated the intention-behavior relationship for exercise and dieting. Greater executive functioning was associated with greater follow-through of intentions. This helped to establish preliminary evidence suggesting that executive functions may improve upon the established intention-behavior link for health behaviors. Therefore, exploring executive functioning in the context of widely known social-cognitive models may better explain differences in sexual health behavior, like condom use in young men. Executive functioning, however, has been shown to be impacted by age, education and HIV-status, such that increased age and education are associated with greater executive functioning (Spinella, 2005), and being HIV-positive is associated with reduced executive functioning (Reger, Welsh, Razani, Martin, & Boone, 2002). Controlling for these

factors will be important in exploring the impact that executive functioning has on the intention-behavior relationship for condom use.

Based on previous research and theory showing that executive functions do moderate the intention-behavior relationship for dieting and exercise (Hall et al., 2008), it may be that executive functioning similarly moderates the intention-behavior link for condom use. For example, could better executive functioning strengthen the relationship between condom use intentions and actual condom use behavior for young men (see Figure 2)? As current epidemiological studies continue to present alarming findings on young male sexual health behavior (CDC, 2009, 2010), it is critical to examine whether variables like executive functioning may strengthen social-cognitive explanations of health behavior and whether this is true for both main and casual partners, which have different implications for risk (Sheeran, Abraham, & Orbell, 1999). Doing so may help to clarify why some young men fail to engage in consistent protective sexual health behavior, despite their good intentions to the contrary.

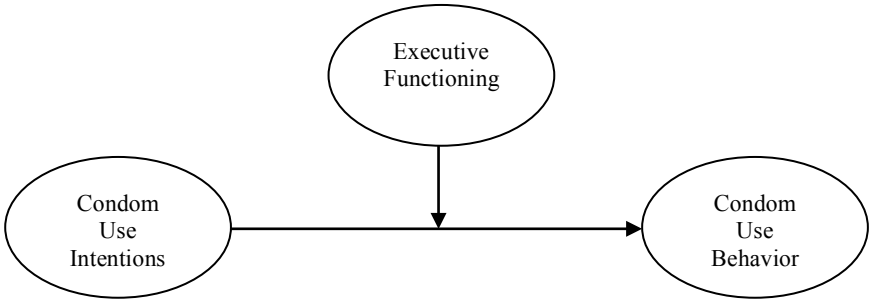

Figure 2. Proposed moderation analysis.

Research Questions and Hypotheses

The current study examined whether executive functions moderated the intention-behavior relationship for protective sexual health behavior among young men. Several research questions were proposed:

1. Are there differences in executive functioning, condom intentions and condom use for men of various STI, HIV or AIDS at-risk groups (i.e., men of color vs. Caucasian men, and gay/bisexual vs. straight men)?

2. Does the addition of executive functioning significantly contribute to meaningful variance in condom use beyond the contribution of condom use intentions and demographic factors related to executive functioning (e.g., age, education, HIV status)?

3. Do executive functions (as assessed by self-reported executive functioning) moderate the intention-behavior relationship for young male sexual health behaviors (as assessed by self-reported use of condoms during sexual behaviors)?

First, I hypothesize that there will be no mean differences for executive functioning, condom use intentions, and condom use behavior based on group differences. Second, executive functions should also contribute a meaningful amount of variance in condom use behavior after accounting for the variance explained by intentions on behavior and other factors related to at-risk STI health behaviors. Finally, it is expected that executive functioning will moderate the intention-behavior link so that that this relationship will be stronger for individuals with greater executive functioning.

Definition of Terms

The following terms are used in this dissertation and are defined here for clarity.

Executive Functioning. Executive functioning refers to a subset of behavioral functions associated with brain structures located in the frontal lobe and, specifically, the prefrontal cortex of the human brain. These functions are important for self-regulation, inhibition of impulsivity or habits, planning, and organization that impact attainment of behavioral goals (Fuster, 2008). In this study, those executive functions are measured globally by the executive function index (EFI; Spinella, 2005).

Protective Sexual Health Behaviors. Protective sexual health behaviors includes engaging in regular and consistent behavior such as condom use that protects one from sexually transmitted diseases like syphilis and HIV. Condom use is one of the most reliable methods of engaging in protective sexual health behaviors (Carey et al., 1994; Wald et al., 2001) and so will be the protective sexual health behavior measured.

Intentions. This refers to "indications of how hard people are willing to try, of how much effort they are planning to exert, in order to perform a particular behavior" (Ajzen, 1991, p. 181).

Self-Regulation. Self-regulation is "any state-or trait-like factor that affects an individual's capacity to effortfully regulate their own behavior" (Hall & Fong, 2007, p. 15).

Prepotent Response. A prepotent response is a response or reaction that has priority over another response someone might make (Barkley, 1997).

Young Men. These young adult men are defined as ranging in age from 18 to 29 for the purposes of the study.

Chapter 2

Literature Review

Protective Sexual Health Behavior

The U.S. Department of Health and Human Services (DHHS) formulates a national plan for improving health promotion and disease prevention and treatment every 10 years called the Healthy People Initiative. Currently called Healthy People 2010, this national health program was devised in 2000 (DHHS, 2000) to be sensitive to, and focused on, current health concerns. Healthy People 2010 set national health priorities and formulated ways to enhance public health and assess whether improvements are being made. Ten major health indicators were outlined by Healthy People 2010 that highlight how complex biological, behavioral, and social factors significantly influence health. Of the leading health indicators, five are impacted by behavioral choices such as physical activity, obesity, tobacco use, substance abuse, and protective sexual health behavior (DHHS, 2000).

Targeting behavioral choices regarding health are of special importance because the leading causes of death among individuals in the United States often are from diseases associated with behavioral choices like unprotected sex (Mokdad, Marks, Stroup, & Gerberding, 2004). High rates of sexual risk behavior, especially among young men, in the US and other developed countries are remarkable in light of widespread knowledge about the dangers of risky sexual behaviors (CDC, 2010; World Health Organization [WHO], 2002). Aside from risk behavior, young men have also been shown to engage in less consistent protective sexual health behavior. A 9-year longitudinal study of protective sexual health behavior among men found that young men

were more inconsistent with their condom use, when compared to older men (DiFranceiso, Ostrow, Adib, Chmiel, & Hoffmann, 1999). So, while it is clear that engaging in consistent health protective behaviors over time substantially reduces young men's risk for disease, it is also clear that a multitude of those same men fail to engage in the necessary sexual health behaviors consistently enough to prevent disease transmission (CDC, 2008a, 2009, 2010b).

Condom use as one method of protective sexual health behavior. One important health behavior is the use of condoms to prevent sexually transmitted infections (STIs) and the human immunodeficiency virus (HIV). Correct and consistent condom use has been established to be an effective means of guarding against transmitting an STI or becoming infected (Carey et al., 1994; Hatcher et al., 2009). In an earlier study of HIV transmission and condom use, using a condom afforded one 10,000 times more protection than not using a condom at all (Carey et al., 1994). Within heterosexual relationships in which the male partner was positive for HIV, significantly lower to non-existent transmission of HIV occurred when condoms were used consistently during sexual intercourse (Saracco et al., 1993). Despite the knowledge that condom use effectively guards against STI transmission, alarming numbers of men fail to engage in protective sexual health behavior by using condoms.

Sexual health among men. **R**eports of STIs in men indicate that chlamydia rates have risen 45% from 2004 to 2008 (CDC, 2009). Moreover, while rates of primary and secondary syphilis declined 89.7% from 1990 to 2000, those gains have been effectively lost due to increased transmissions (CDC, 2009). From 2001 to 2007, syphilis rose 81% and new male diagnoses were a substantial cause of that rise (CDC, 2009). The

CDC (2009) similarly reported that gonorrhea rates have failed to decline nationally among men indicating an ongoing male public health concern. HIV rates follow a similar trend in which male infections have consistently declined since the early 1980s (Holtgrave et al., 2009). However, new evidence has reported that HIV diagnoses have been underestimated in the last 10 years and failed to substantially decline since 1991 (Hall et al., 2008). Additionally, men continue to disproportionately represent new HIV infections (CDC, 2008a) and focal groups of men such as men who have sex with men (MSM), men of color, and young men (ages 15-29) are still most at risk for HIV transmission (CDC, 2008b, 2009, 2010a). Since STI rates are especially associated with inconsistent condom use, the increases in STIs suggest public health campaigns have been less effective at changing sexual risk-taking behavior.

Sexual health and young men. The sexual health behavior for men 15 to 29 years of age is especially concerning. Chlamydia cases were highest among men aged 20-24 years of age (CDC, 2009). Similarly, gonorrhea infections were most elevated for 20-24 year old men (CDC, 2009) with males 15 to 19 years of age showing an 11.2% rise in gonorrheal infections (CDC, 2009). While HIV infections continue to be high among men between 30 to 40 years of age, rates of new HIV infections in this age group have declined or leveled off from 2005 to 2008 (CDC, 2010a). However, young men between 15 and 29 years of age have seen precipitous increases in their rates of HIV (CDC, 2010a) during the same time period. It is evident, then that many young men are failing to engage in consistent protective sexual health behaviors, such as condom use.

When considering demographic factors for young male sexual behavior, significant differences emerge within subgroups of young men. Young MSM of color

(African American and Hispanic) between the ages of 13 to 29 are most severely affected by HIV, whereas white MSM between the ages of 30 to 39 have higher HIV transmission rates (CDC, 2010b). On the whole, however, young MSM of across racial groups are at significant risk for HIV transmission (CDC, 2010b). More specifically, two target male groups, white MSM and MSM of color, are most severely affected by HIV (CDC, 2010b). Risks for other STI transmission include chlamydia, gonorrhea, and syphilis and are unacceptably high for young men of color (particularly African American men) regardless of sexual behavior (CDC, 2009).

Complex factors impact protective sexual health behavior. While consistent protected sexual intercourse (e.g., condom use) represents the single greatest protective factor (aside from abstinence) against transmission of an STI/HIV (Vittinghoff et al., 1999; Wald et al., 2001; Wald et al., 2005; Warner et al., 2004, Weller & Davis-Beaty, 2001), many young men, as evidenced by epidemiological data presented above, are still failing to effectively guard against STI/HIV transmission. Several factors are important determinants of condom use irrespective of age, gender, sexual orientation, or sexual behavior.

First, information about the risks of STIs and how to engage in protective sexual behavior is especially important in improving the likelihood of condom use (Fisher, Fisher, Misovich, Kimble, & Malloy, 1996). Greater individual motivation to enact protective sexual behavior, such as condom use, shows a strong association with actual condom use (de Wit et al., 1993; de Wit et al., 1994; de Wit et al., 2000; Fisher et al., 1996). An individual's positive attitude toward condom use, group social norms surrounding condom use, and one's perceived ability to use a condom regardless of the

situation is also especially predictive of subsequent condom use during sexual intercourse (Albarracin et al., 2001; Gallois et al., 1994; Sheeran et al., 1999). Sheeran et al.'s (1999) meta-analysis found that individual attitudes toward condom use, intentions or motivation to engage in consistent condom use, and communication about condoms most influenced subsequent protective sexual behavior or use of condoms. Similarly, another meta-analysis of sexual behavior (Albarracin et al., 2001) showed the utility of attitudes, social norms, behavioral control, and intentions to influence condom use. However, these authors also noted that past behavior appeared especially significant.

Group differences for gender, sexual behavior, race, and age have emerged with respect to predictors of condom use in recent research. In one study, men appear to be most influenced by social norms and self-efficacy (behavioral control) whereas females are more influenced to use condoms depending on their condom use attitudes (Muñoz-Silva, Garcia, Hunes, & Martins, 2007). In the same study, females were also shown to request condom use less than males. Studies on condom use in primary sexual relationships and casual sexual relationships among heterosexuals have found that condom use was related to enjoyment of condom use, supportive condom use social norms, and discussion of condom use (Catania, Coates, & Kegles, 1994).

Among MSM, a high risk group for HIV transmission, descriptive norms (e.g., what one's social group is actually doing), personal norms (e.g., individual moral obligation), and anticipated regret are also predictive of condom use (Kok, Hospers, Harterink, & de Zwart, 2007). HIV-Positive MSM also reported more condom use when personal norms about the moral obligation of condom use were especially high for those individuals, regardless of casual versus steady sex partners (van Kesteren et al., 2007).

Age was found to be negatively correlated with long-term maintenance of condom use as younger MSM were less likely to engage in consistent condom use (DiFranceisco et al., 1999). Younger individuals with HIV, irrespective of gender or sexual orientation, have also exhibited decreased motivation for condom use, less supportive social norms of protective sexual behavior, and lower self-efficacy for condom use (Outlaw, Naar-King, Janisse, & Parsons, 2010). Nevertheless, a younger age has also been shown to be indicative of more condom use (Sheeran et al., 1999). However, this finding is typically explained by relationship status (casual versus steady). For instance, older individuals in a long-term monogamous relationship tend to use condoms less as that relational context affords less risk (Sheeran et al., 1999).

Racial similarities and differences have also added to our understanding of protective sexual behavior for different groups of men. Latino male intravenous drug users also were more likely to engage in condom use when they had positive attitudes about condoms, supportive social norms, greater self-efficacy, and subsequently, higher intentions to use condoms (Carvajal et al., 2005). For young African American MSM, social norms that support condom use were especially predictive of subsequent condom use (Peterson, Rothenberg, Kraft, Beeker, & Trotter, 2009), along with greater self-esteem and less homophobia (Stokes & Peterson, 2004).

Collectively, most major investigations of condom use predictors have demonstrated that the social-cognitive variables of attitudes, social norms, self-efficacy, and intention commonly associated with the Theory of Planned Behavior (TPB; Ajzen, 1991) are especially useful in differentiating those who do and do not consistently use condoms. Other investigations for special populations such as younger men, MSM, and

men of color have found other variables such as personal norms, self-esteem, and homophobia to be predictive of protective sexual behavior. Nevertheless, TPB variables consistently predict individual variations in condom use across diverse groups of men.

Theory of Reasoned Action and Planned Behavior

The Theory of Reasoned Action (TRA; Fishbein & Ajzen, 1975) suggested that the most proximal determinant of human behavior was an individual's intention or motivation to engage in the respective behavior (Ajzen & Madden, 1986; Triandis, 1980). Before a person develops an intention to enact a certain behavior, however, TRA held that two variables directly influence the strength of one's behavioral intention. First, one must have a positive attitude regarding the behavior at hand. Second, one's subjective social norms that exact social pressure on someone to act or not act also influence the level of intention to perform a given behavior. Accordingly, individual attitudes and group subjective social norms directly influence that individual's intention or motivation to engage in a behavior.

TRA, however, accounted for behaviors in which people have a good deal of control over the behavioral enactment of their intentions. Liska (1984) identified many behaviors that require less individual control and demand other resources such as skills, opportunity, and social cooperation that could constrain intentions. For instance, condom use requires more skill and social cooperation between sexual partners and these variables impact the strength of the intention-behavior link. As such, Ajzen and Madden (1986) and Ajzen (1991) reformulated TRA into the Theory of Planned Behavior (TPB), which accounted for differences in volitional control over a particular behavior. The model added perceived behavioral control or self-efficacy (Bandura, 1989) to account for

individual differences in control over certain behaviors. TPB holds that attitudes and subjective norms interact with one another and directly influence behavioral intentions, but perceived behavioral control behaved differently in the model. Not only did perceived behavioral control interact with attitudes and subjective norms to influence intentions, this variable had a unique direct influence on subsequent behavior and moderated the relationship between intentions and behavior (Sheeran et al., 2003).

TPB, as a model for understanding and changing health behavior is especially powerful when considering the theorized intention-behavior link. In a meta-analysis of 185 studies designed to explain variance in behavior (especially health behavior), Armitage and Conner (2001) found that intentions explained 27% of the variance in behavior. Additionally, the three variables influencing the intention-behavior link (attitudes, subjective norms, and perceived behavioral control) explained 39% of the variance in intentions. For condom use, Albarracin, Johnson, Fishbein, and Muellerleile (2001) examined 94 investigations involving over 22,000 participants finding a .45 weighted mean correlation between intentions and behavior. The intention-behavior link was, thus, particularly useful in explaining differences for individual condom use among diverse populations, including young men, such that higher condom use intentions correlated with a greater likelihood of condom use behavior. Another study exploring general correlates to heterosexual condom use (Sheeran et al., 1999) reported that intentions were one of the strongest behavioral predictors of condom use. Clearly, this link between intentions and behavior is a powerful determinant helping to explain condom use. Several individual studies of younger gay men and MSM (de Wit et al., 1993; de Wit et al., 1994; de Wit et al., 2000; Gallois et al., 1994), younger heterosexual

men (Armitage & Talibudeen, 2010; Gredig, Nideröst, Parpan-Blaser, 2007; Richardson et al., 1997; Schaalma et al., 1993), and younger men of color (Jemmott, Jemmott, & Hacker, 1992; Villarruel, Jemmott, & Jemmott, 2004) reported findings similar to the meta-analyses for condom use described above with condom use intentions positively correlated with condom use behavior.

Despite these positive results for the intention-behavior link, the reported studies typically relied on correlational or non-experimental designs, which are inherently more limiting when studying causal relationships. In order to have a better understanding of the intention-behavior causal link, Webb and Sheeran (2006) conducted a meta-analysis of experimental studies aimed at altering intention and, subsequently behavior in multiple contexts, including condom use. This meta-analysis illustrated that interventions led to a medium-to-large effect on change in intention with an average weighted effect size of .66. The impact of the changed intention on behavior, however, had a weighted effect size of .36, which was small-to-medium. This suggests that despite good intentions, many fail to act on those previously formed intentions (Orbell & Sheeran, 1998a). More research is needed to better explain why individuals fail to follow through on their previously formed intentions, like consistent condom use when risk for contracting life-threatening STIs is high. To better explain individual variability for follow-through of behavioral intentions, health behavior research has moved to investigating possible moderating factors of the intention-behavior link (Webb & Sheeran, 2006).

Intention-Behavior Moderators. A persistent problem for public health officials and behavioral health researchers is the lack of consistency between intentions to act a certain way (e.g., using a condom) and a failure to act on those intentions (Orbell &

Sheeran, 1998a, 1998b). Two areas of research, behavioral habits and self-regulation, have been found to offer explanations as to why many individuals fail to act on their good health behavioral intentions. They also have been found to make significant demands on executive functioning (Fuster, 2008).

Behavioral habits or prepotent responses are behaviors that individuals perform repeatedly in relatively secure contexts causing that behavior to become almost automatic even in the face of cues that promote an alternative behavior (Ouellette & Wood, 1998). Generally, social-cognitive models of health behavior have studied habits or prepotent responses finding that they significantly attenuate the intention-behavior link when they differ from the intended behavior (Wood & Quinn, 2005; Wood et al., 2003) because they appear to make it difficult for individuals to suspend a habitual behavior in favor of another behavior, like a health protective behavior. Individually, then, behavioral habits can complicate individual behavior change and the subsequent maintenance of that change. In order to understand why some individuals change their habitual behaviors or prepotent responses and maintain newer behaviors, research has generally focused on social-cognitive frameworks of self-regulation (Ouellete & Wood, 1998).

Self-regulation has received a substantial amount of research as possibly strengthening that tie between intention and health behavior (Cameron & Leventhal, 2003; Norman, Abraham, & Conner, 2000; Orbell & Sheeran, 1998b). Self-regulation theories posit (Cameron & Leventhal, 2003; Norman et al., 2000) that constant self-regulation and impulse inhibition is needed as individual (e.g., habits) and contextual factors (e.g., social reactions) work against behavioral performance even when intentions to act are high. It is thought that interventions promoting greater self-regulation will

increase the likelihood that individuals will be consistent with their respective intentions or goals.

One model of self-regulation, Gollwitzer's (1999) implementation intention model, holds that individuals who make plans in advance with greater specificity of individual goals and plans to achieve those goals will be more likely to act on their intended behavior. Research has confirmed that these more specific and planned intentions do enhance the intention-behavior link by improving self-regulatory capacities to effectively deal with problems that might otherwise undermine goal attainment, such as habits previously mentioned (Gollwitzer & Brandstatter, 1997; Sheeran & Orbell, 2000). For protective sexual behavioral goals, self-regulation has been shown to explain variability in condom use (Hynie et al., 2006; Svenson et al., 2002). Collectively, research into self-regulation seems to be providing explanations as to why some young men are less consistent with their condom use behaviors when compared to other young men.

Even though investigations are exploring sexual health behavior differences from self-regulatory perspectives, they are largely doing so from social cognitive (Hynie et al., 2006; Svenson et al., 2002) models that are failing to account for neurocognitive variables. Given the long standing relationship between self-regulation, planning, and suspension of prepotent or habitual behaviors and specific structures of the brain responsible for "executive functioning," it is remarkable that most health promotion and behavior models have largely ignored the moderating role of executive functioning on the consistency between health intentions and health behavior (Hall & Fong, 2007). A long history of neurocognitive evidence supports the contention that sustaining any behavior

demands continual self-regulation over time (Fuster, 1999, 2008). In particular, changing and maintaining health behaviors necessitate continual cognitive effort in the form of self-regulation, planning, and impulse inhibition (Hall & Fong, 2007).

Neurocognitive Functions

Possible intention-behavior moderators have been generally rooted in social-cognitive (Bandura, 1977, 1986, 1988) explanations of self-regulation in order to better account for how and why individual behavioral intentions fail to translate into consistent actions (Cameron & Leventhall, 2003; Gollwitzer, 1999; Orbell & Sheeran, 1998; Sheeran & Orbell, 1998). Little attention, however, has been given to neurocognitive sources for individual inconsistency between intention and health behavior. Neurocognitive functions represent specific cognitive processes that can be structurally associated with anatomical regions in the human brain (Kolb & Wishaw, 1996). It is unusual that neurocognitive variables have received such modest attention as substantial evidence supports the contention that sustaining any behavior demands effortful self-regulation over a period of time, which makes demands on certain neurocognitive functions (Baumeister & Vohs, 2004; Fuster, 2008). In particular, changing and maintaining health behaviors necessitate specific cognitive effort in the form of self-regulation and impulse inhibition (Hall & Fong, 2007), suggesting neurocognitive variables associated with specific structures of the brain are responsible for executive functioning. Those structures most involved in executive functions result in activation of the frontal lobe of the brain inclusive of the prefrontal cortex consisting of the orbitofrontal, dorsolateral, and medial frontal regions and the anterior cingulate system (Cummings, 1993; Fuster, 1999, 2008).

Prefrontal Cortex. The prefrontal cortex is located anterior to the premotor cortex and comprises between one quarter and one third of the entire human cortex (Fuster, 2008). Its neuroanatomical functions typically involve executive functions such as working memory, selective attention, planning action, and goal directed complex behaviors (Stuss & Night, 2002). Impaired functioning of or damage to the prefrontal cortex and associated regions often leads to executive dysfunction such as impulsivity and lack of self-regulation to achieve goal directed behavior (Barkley, 1997; Duncan, 1986; Mostofsky, Cooper, Kates, Denckla, & Kaufmann, 2002; Sullivan & Brake, 2003). Particular regions of the pre-frontal cortex involve more specific aspects of executive functioning. The orbitofrontal region has been found to control self-inhibition, social comportment, affect responses or empathy, and decision making skills (Happaney, Zelazo, & Stuss, 2004; Malloy et al., 1993). Conceptual or abstract reasoning, cognitive flexibility, planning ahead, and working memory are typically located in the dorsolateral regions, whereas feeling motivated to initiate and persist with a given behavior is associated with the medial frontal region (Kolb & Wishaw, 1996; Stuss & Levine, 2002; Tekin & Cummings, 2002).

Review of these brain-behavior relationships suggest that executive functions rely upon specific brain structures (Fuster, 2008; Koechlin et al., 2003) that are critical for suspending habitual behaviors, planning, and self-regulation of behavior. These neurocognitive abilities are often necessary when engaging in health promoting behaviors like condom use and exercise that generally have short terms costs (e.g., discomfort, fatigue, frustration) and more long term rewards (e.g., disease prevention) that impact behavioral consistency. For instance, McClure, Liabson, Loewenstein, and Cohen (2004)

found that self-regulating for later rewards rather than earlier rewards invoked frontal areas of the brain typically associated with executive functioning. Also, another study by Mak and Teng (2010) found that planning was essential to consistency of condom use. It is possible, then, that protective sexual behavior similarly invokes the need for executive functioning in order to better self-regulate one's goal directed behavior to use condoms.

Executive Functioning and Health Behavior. Executive functions have been defined as "top down" cognitive processes that serve to regulate behavior to achieve a certain goal (Loring, 1999). They especially include attention, self-regulation, and inhibition of prepotent (i.e., habitual or impulsive) response. When individuals are faced with immediate cues such as discomfort and inconvenience that can induce non-performance of health behavior goals, these functions are especially needed in order to better regulate one's behavior. Differential executive abilities may be a potential explanatory factor as to why some people are able to better self-regulate and inhibit habitual responses even when confronted with negative contingencies in order to follow through with goal-directed behavior, like consistent condom use.

Global neurocognitive functioning, such as intelligence, is especially associated with healthy behaviors and longevity. Several longitudinal studies have found a strong relationship, even when controlling for demographic factors, between cognitive functioning and mortality end points involving health behaviors (e.g., cardiovascular diseases, diabetes, motor vehicle accidents; Deary, Whiteman, Starr, Whalley, & Fox, 2004; Hart et al., 2003). Those with greater global cognitive functioning quit smoking earlier, engage in healthier behaviors, and, ultimately, live longer, according to those authors. However, preliminary studies have shown that specific areas of cognitive

functioning, namely executive functioning, may be the most important neurocognitive factors explaining these health behavior differences. Recently several studies have shown individual executive function differences better explain why some fail to consistently engage in protective health behavior, even when they are motivated or intend to do so (Hall et al., 2006; Hall et al., 2008; Hall et al., 2008).

Hall et al. (2006) conducted a preliminary investigation of executive function and health behaviors for smoking, problem drinking, exercise, and sleeping. Over three years, they recruited 217 adults (20 to 100 years of age) in community settings that met inclusion criteria. Participants were given a battery of tests including one objective executive functioning measure called the Stroop Color and Word Task that is particularly sensitive to executive functioning abilities. After controlling for demographics, education, and IQ, they found that executive function capacities for self-regulation were strongly associated with health promoting and risk behaviors. Those with greater performance on the Stroop Color and Word Task were more likely to consistently engage in health promoting behaviors.

In a lengthier follow up study, Hall et al. (2008) sought to improve on the established intention-behavior link for health promoting behavior. In study 1, they recruited 64 undergraduates at a local university and administered to each a well-known computerized executive functioning measure (Go-No-Go task) along with questionnaires about their physical activity intentions over the course of a week. After that week, participants then returned and filled out a questionnaire inquiring about their physical activity behaviors. Students with high executive function abilities and strong physical activity intentions were much more likely to engage in physical activity whereas those

with similarly strong physical activity intentions, but lower executive functioning abilities were significantly less likely to follow through on their intentions.

In study 2, Hall et al. (2008) used the same procedures, but students were asked about their dietary intentions and one week later asked about their dietary behavior. Similar results were found. Students with strong healthy diet intentions and strong executive functions were much more likely to enact their dietary intentions when compared to students with comparably strong intentions, but weaker executive functioning. Ultimately, these authors concluded that differences for executive functioning significantly moderated the intention-behavior relationship for exercise and dieting. Adding executive functioning to TPB's (Ajzen, 1991) intention-behavior model helped to nearly double the explained variance typically shown with TPB (Sheeran, 2002). Collectively, greater executive functioning was associated with greater follow-through of intentions.

This research helped to establish preliminary evidence and need for further exploration of the moderating role that executive functions may have in widely disseminated social-cognitive and rational decision making models of health behavior like TPB (Ajzen, 1991, 2007). However, no research to date has investigated whether protective sexual health behavior, such as consistent condom use, follows a similar trend with respect to executive functioning and consistency of intentions and behavior. While physical activity and dietary behavior require executive function abilities to translate intention into behavior over time, those behaviors are typically less complex than condom use. There are multiple contextual factors associated with condom use or non-use (i.e., involving a partner, negotiating safe-sex). So, it may be that executive

functioning differences do not help to improve the intention-behavior link when investigating more complex behaviors like protective sexual health behavior. On the other hand, consistent condom use may function in the same way by invoking the need for self-regulatory executive functions when immediate factors may be working to influence non-compliance with previously formed condom use goals. DeFelice and Spinella (2010) did find that that greater executive functioning was associated with protective sexual communication, such as inquiring about STD status. However, that previous study did not assess condom use nor did it investigate the widely disseminated intention-behavior link. This study aims to contribute to the literature described above, by exploring the role of executive functions in understanding intentions and behaviors related to condom use.

Chapter 3

Methods

This study consisted of two data collections investigating the possible moderating role of executive functioning on the intention-behavior relationship for protective sexual health behavior among young men. Executive functions were defined as a global set of cognitive abilities controlling goal directed behavior through self-regulation, inhibition of impulsivity, and planning. Intentions consisted of the likelihood or degree to which young men intended to use condoms during sexual intercourse with main and/or casual partners over a four-week period. Executive functioning and condom use intentions were measured in the first collection. During the second data collection, condom use behavior was measured through young men's retrospective self-report of condom use during their sexual behavior for the previous four weeks. Young men with greater self-reported executive function abilities should have more consistency between their intentions to use condoms and subsequent condom use behavior when compared to young men with similar condom use intentions, but weaker executive functioning.

Participants

Participants were a sample of young men between the ages of 18 and 29 living in 33 U.S. states and the District of Columbia. A sample diverse in race, sexual orientation, educational attainment, and socio-economic status was recruited to adequately represent young men in the United States. For the first data collection, 447 completed the online questionnaire with 337 (75.4%) consenting to the 4-week follow-up survey and providing e-mails. Four weeks after the first survey, 227 participants completed the follow-up

questionnaire with a response rate of 67.4%. The 227 participants who completed study measures for both collections served as the sample for analysis.

Participants had a mean age of 23 years (*SD* = 3.5 years) and all identified as male gender except one transgender individual. Most men identified as heterosexual (*N* = 148, 65.2%) with a sizeable minority of gay men, bisexual men, and MSM (*N* = 79, 34.8%). Racial characteristics were fairly diverse with 176 being Caucasian or white (77.5%), 21 African American or black (9.3%), 12 Latino/Hispanic (5.3%), 9 Asian American (4%), 3 biracial or multiracial (1.3%), 3 as other (1.3%), 2 Pacific Islanders (0.9%), and 1 American Indian (0.4%). Men of color, then, represented 22.5% of our sample. The sample was somewhat skewed toward those with greater educational attainment with 105 reporting some college (46.3%), 60 possessing a college degree (26.4%), 31 having an advanced degree (13.7%), 16 with a high-school diploma (7%), 13 had an associate's degree or some form of vocational/technical school (5.8%), 1 person indicated other, and 1 other reported only up to 8th grade. Income distribution was the following: Under $15,000 (*N* = 66, 29.1%), $15,001 to $25,000 (*N* = 30, 13.2%), $25,001 to $35,000 (*N* = 26, 11.5%), $35,001 to $45,000 (*N* = 18, 7.9%), $45,001 to $55,000 (*N* = 18, 7.9%), $55,001 to $65,000 (*N* = 15, 6.6%), $65,001 to $80,000 (*N* = 13, 5.7%), $80,001 to $100,000 (*N* = 14, 6.2%), and $100,001 and up (*N* = 24, 10.6%). Individuals reported individual income for themselves unless they were supported by their family and, then, reported household income. This was done to ensure an accurate reflection of the economic background for this younger population who may still be financially dependent on families and other support. Further demographic characteristics are listed below in Table 1.

Table 1
Demographic Variables (*N* = 227)

	N	%	*M*	*SD*	Range
Employment status					
FT* Student	88	38.80			
FT Employed/PT** Employed	51	22.50			
FT Student/FT Employed	16	7.00			
FT Employed	48	21.10			
PT Employed	8	3.50			
Disabled and Unemployed	2	0.90			
Unemployed	8	3.50			
Other/Not Listed	6	2.60			
Relationship status (Main partner)					
In a relationship	121	53.30			
No relationship	97	42.70			
Unsure	9	4.00			
Length of Relationship					
< 6 months	31	23.70			
6 months to 12 months	14	10.70			
1 year to 2 years	34	26.0			
3 years to 5 years	38	29.0			
5 years to 8 years	11	8.40			
> 8 years	3	2.30			
Partnership status					
Legally married	14	10.20			
Civil partnership	1	0.70			
Personal commitment	41	29.90			
Dating	52	38.0			
Other/not listed	29	21.20			
Gender of main sexual partner					
Male	52	35.90			
Female	93	64.10			
Gender of casual sexual partner(s)					
Men	39	32.50			
Women	74	61.70			
Both men and women	7	5.80			
Number of sexual partners last year					
None	41	18.10			
Only my main partner	81	35.70			
1, a casual or new partner	20	8.80			
2 to 4	61	26.90			
5 to 8	13	5.70			
8 to 15	3	1.30			
15 to 30	4	1.80			
30 or more	4	1.90			
Expected number of sexual partner(s) over the next 4-weeks			1.19	2.31	0 - 20

* FT = Full time ** PT = Part time

(table continues)

Table 1 (continued)
Demographic Variables (*N* =227)

	N	%	*M*	*SD*	Range
Main partner STD knowledge					
Yes, I know their STD status	131	59.0			
No, I am unsure of their STD status	21	9.50			
No main partner	70	31.50			
Casual partner STD knowledge					
Unaware of casual partners' status	48	21.50			
Aware of a few casual partners' status	9	4.00			
Aware of most casual partners' status	17	7.60			
Aware of all casual partners' status	35	15.70			
No casual partner(s)	114	51.10			
Main partner condom use habits					
Never use a condom	53	23.70			
Sometimes use a condom	32	14.30			
Generally use a condom	30	13.40			
Always use a condom	49	21.90			
No main partner	60	26.80			
Casual partner condom use habits					
Never use a condom	5	2.20			
Sometimes use a condom	12	5.30			
Generally use a condom	33	14.50			
Always use a condom	65	28.60			
No casual partner(s)	112	49.30			
Have you had an STI test?					
Yes	108	48.00			
No	117	52.00			
STI history					
No STI	153	67.40			
Unsure	30	13.20			
Yes					
Herpes	2	0.90			
Gonorrhea	9	4.00			
Chlamydia	9	4.00			
Syphilis	3	1.30			
HPV	7	3.10			
Hepatitis A	1	0.40			
Hepatitis B	1	0.40			
Hepatitis C	1	0.40			
Current STI/STD					
No	186	81.90			
Yes					
HIV	3	1.30			
Herpes	1	0.40			
HPV	5	2.20			

A-priori sample size analysis was conducted using multiple regression methodological conventions from Cohen (1992) by entering parameters into an online power calculator (see Frazier, Tix, & Barron, 2004; Soper, 2010). Using a conservative alpha of .01, a moderate anticipated effect size of $f^2 = .15$, and a standard power of .80, the recommended sample size was 99.

Demographic Questions and Control Variables

Participants were asked their gender, sexual orientation, age, race, educational status, income (described above), employment status, state of residence, relationship status, duration of current relationship, partnership status, sex of main sexual partner, sex of casual sexual partner(s), number of sexual partners in the past year, previous STD testing, and past and present STD status, and condom use habits (see Table 1). As age and education (Spinella, 2005), as well as HIV status (Reger, Welsh, Razani, Martin, & Boone, 2002), have been found to be correlated with differential executive functioning, they were controlled for in the study.

Independent Variables/Measures

Executive Function Index (EFI; Spinella, 2005). Executive functioning abilities were measured with a 27 item, 5-point Likert scale instrument. Items asked participants to rate how well each of the 27 statements described them. The EFI is scored so that a higher score indicates better executive functioning and for the purposes of this study the total score was used. Items were summed; several items were reverse scored with total scores ranging from 27 to 135. An example of an item is, "I take risks, sometimes for fun." This measure was normed on 701 participants in community samples (440 women, 260 male, 1 unidentified) with a mean age of 29 (*SD = 12.3*) ranging from 15 to 83 and a

mean educational level of 14.6 years (*SD=1.6*) ranging from 9 to 20. The EFI consists of 5 subscales: Motivational Drive, Organization, Planning, Impulse Control, and Empathy. Cronbach's alpha for the subscales range from .69 to .76 with an overall alpha of .82. Scores for the EFI were normally distributed (Kolmogorov-Smirnov $Z = .88$, $p = .42$). Secondary factor analysis revealed a three-factor solution corresponding to mental abilities in the prefrontal cortex responsible for executive functioning (Cummings, 1993). Collectively, the three factors accounted for 77.2% of the variance. The EFI has also demonstrated significant convergent validity (Spinella, 2005) with other well validated self-report executive function measures such as the Frontal Systems Behavior Scale (FrSBe; Grace & Malloy, 2003) and the Barratt Impulsiveness Scale (BIS; Patton, Stanford, & Barratt, 1995). Alpha reliability for the EFI in this study was .74.

Condom use intentions. Behavioral intentions were measured with a 2- item, 4-point Likert scale measure ranging from Very Unlikely = 1 to Very Likely = 4. Items asked participants to indicate how likely they would use a condom during a given sexual behavior over the course of four weeks. Items also allowed participants to indicate whether a particular sexual behavior applied to them. Typically, intentions are measured by asking participants how strongly they intend to engage in a particular behavior over a fixed period of time (Ajzen, 1991; Armitage & Conner, 2001). However, Sheppard, Hartwick, and Warshaw's (1988) examination of TRA suggested that statements of self-prediction (e.g., 'How likely is that you will engage in a particular behavior?') allowed for better predictions of behavior because they tend to account for facilitating and inhibiting factors that impede behavioral performance (e.g., competing behavioral choices) in comparison to strength of intention. Their analysis confirmed this hypothesis,

finding that self-prediction (e.g., likelihood of engaging in the behavior) statements resulted in stronger intention-behavior relationships (r = .57) when compared to intention statements (r = .49). Based on previous research and theory, intentions were measured with self-prediction statements.

Items for the condom use intentions measure were drawn from previous reliable measures of condom intentions (alpha > .80) (Carvajal et al., 2005; de Wit et al., 2000; van Kesteren et al., 2007). Methodologically, intentions were assessed with main partner and casual partner condom intention questions for inclusion in the regression models. The reason for this is that prior studies (Carvajal et al., 2005; van Kesteren et al., 2007) identified the importance of accounting for the relational context of the sexual partner (main versus casual/new). Participants endorsing a main partner condom use intention were explored in Model 1 and casual partner(s) condom use intentions were explored in Model 2.

For main sexual partners: "In the next month, how likely is it that you will use a condom when having sex with your main partner?" [very likely, somewhat likely, somewhat unlikely, very unlikely, no main partner]. For casual sexual partner(s): "In the next month, how likely is it that you will use a condom when having sex with a casual or new partner?" [very likely, somewhat likely, somewhat unlikely, very unlikely, no casual partner]. Participants were given a condom use intentions score (Very Unlikely = 1 to Very Likely = 4) for both main and casual partners. Items were coded on a continuum with very unlikely signifying the weakest intention to use a condom to very likely representing the strongest intention for condom use for the identified behavior.

Dependent Variable/Measure

Because there is no standard of assessment of safe sex behavior (Jaccard, McDonald, Wan, Dittus, & Quinlan, 2002), items measuring protected/unprotected sex were investigator designed or adapted from previous studies. When assessing the correspondence between intentions and behavior, behavioral items must correspond to the previously assessed behavioral intentions (P.A. Hall, personal communication, July, 11, 2010; Hall et al., 2008) as this is the most rigorous measure of the intention-behavior relationship (Courneya, 1994).

Taking this into account, 2-items for main and casual partner condom use were adapted from Carvajal et al. (2005) and van Kesteren et al. (2007) and were matched to the condom use intention questions. For main sexual partner condom use: "Did you use a condom when having sexual intercourse with your main partner?" [Never, Rarely, less than 10% of the time, Occasionally, about 30% of the time, Sometimes, about 50% of the time, Frequently, about 70% of the time, Usually, about 90% of the time, Always, 100% of the time, No Main Partner/Not Applicable]. For casual or new sexual partner(s): "Did you use a condom when having sexual intercourse with casual or new sexual partner(s)?"[Never, Rarely, less than 10% of the time, Occasionally, about 30% of the time, Sometimes, about 50% of the time, Frequently, about 70% of the time, Usually, about 90% of the time, Always, 100% of the time, No Casual Partners/Not Applicable].

These behavior questions corresponded with the condom use intentions questions. Condom use behavior was measured continuously on a 7-point Likert scale with response anchors modified from Vagias (2006). Responses range from Never = 1 to Always, 100% of the time = 7. The longer Likert scale for the outcome variable was used

following recommendations from Frazier et al. (2004) for moderation analysis. Participants endorsing sexual behavior in the last month for a main partner received a condom use score for main partners. Also, participants endorsing sexual behavior in the last month for casual sexual partner(s) similarly received a condom use score for casual partner(s).

Procedure

After approval from the Institutional Review Board, participants were recruited through social network sites (e.g., www.facebook.com), listservs targeting young men, community centers, locales attracting young men, email, and through the snowball effect. The variety of approaches should have reduced sampling bias and improved sample generalizability. Efforts were made to recruit a diverse sample by targeting locales, social networking sites, and listservs that target young men of color, gay men and MSM, and men of diverse educational and socioeconomic levels. Recruitment literature specified that the study was for young men between the ages of 18 and 29 and explored their sexual health behavior.

If a participant decided to participate, they clicked a hyperlink to the online survey where a webpage described the study and gave informed consent. The page identified qualifications to participate. Participants were told that no harm is likely to result, but that they may experience some mild discomfort when answering questions about their sexual behavior or STI status. They were told the study was anonymous and asked for no identifying information, however, if they chose to participate in the follow-up survey four weeks later their email address will be treated confidentially and be stored separately from their data. The researchers' name and contact information were given in

case participants had questions about the study. Informed consent also supplied the Institutional Review Board contact information. Potential participants were told that the study should take around 10 minutes to complete. After participants clicked on "I agree," they were directed to the online questionnaire hosted on www.surveygizmo.com. Each web page displayed their progression on the survey.

They survey began by asking demographic and sexual health information followed by the Executive Function Index and the Condom-Use Intentions measure. The final page of the survey informed them of the follow-up survey 4 weeks later. Potential participants in the follow-up survey were offered a chance to win one of four $50.00 gift cards. If they chose to participate, they were asked to provide their email so the link to the follow-up survey could be sent. Information about the security of the email address during the study and the subsequent destruction of their email address following the study were presented to participants on the webpage.

Four weeks later an email was sent with a link for the second survey to those participants who offered their email for the follow-up survey. Participants were asked to respond to the condom use behavior questions based on the previous four weeks. They were asked to click "I agree" in order to take the survey. If a participant did not respond to the follow-up request in two days, another email was sent. Participants then had two more days to respond. If they did not, another reminder email was sent. A third and final email was sent 2 more days later reminding participants that they must take the survey within 2 days. If participants took the survey following the two-day window after the third reminder, their responses were not included in order to ensure that responses were all close to the four-week intention-behavior period.

Data Analysis

For the research questions, the following data analyses were conducted:

1. In order to conduct group comparisons, separate One-way ANOVAs were conducted to explore differences between groups at-risk for transmission of STIs for condom use intentions, executive functioning and condom use behavior. These comparisons included Caucasian men and men of color; men with an STI and men without an STI; and sexual minority men and heterosexual men.

2. In order to test questions two and three, two separate models were conducted because condom use has been found to vary depending on partnership status (Sheeran et al., 1999). Model 1 considered main sexual partners and consisted of 107 men. Model 2 accounted for casual or new sexual partners and consisted of 38 men. Only men who reported both intentions and sexual behaviors at follow-up were included in these models. The item created for the intention variable in Model 1 was: "In the next month, how likely is it that you will use a condom when having sex with your main partner" [very likely, somewhat likely, somewhat unlikely, very unlikely, no main partner]. A new variable was created so that all men who reported intentions for a main partner had a main partner condom-use intentions score. The same procedure was employed for casual partners. Participants' intentions to use a condom with a main and casual/new sexual partner(s) were regressed against their behavior (condom use) score. To create the condom use behavior variable, responses to the condom use behavior items for both main and casual partner(s) were recoded into a new variable. Each participant who reported sexual behavior for main and/or casual partner(s) at the follow-up survey received a

condom use behavior score. Both intentions and condom use variables were centered according to recommendations from Frazier, Tix, and Barron (2004).

Hierarchical multiple regressions were used according to moderator analysis conventions proposed by Aiken and West (1991) in the same way for both Main Partner and Casual Partner Models. The control variables were entered at Step 1, the independent/moderator variable was entered at Step 2, and the condom use intention x executive functioning was entered at Step 3. The *F* and *p* values were inspected to determine if a significant amount of variance was explained by the variables in the models. The R^2 was used to determine the amount of potential variance explained by the control variables and the main variables (condom use intentions and executive functioning) independently. For question 3, the two-way interaction (condom use intention x executive functioning) would have been examined. Moderation of the intention-behavior relationship with executive functioning would have been identified by a significant *F* value for the increment in R^2 and beta weight at step three.

Finally, if a significant interaction between executive functioning and condom use intention was found in either of the two models predicting condom use behavior (main and casual), a moderation analysis was proposed to understand the interaction. Following the guidelines of Aiken and West (1991), the sample would have been divided into high and low executive functioning groups (overall EFI score of +/- 1 *SD*) in Model 1 and Model 2. The regression slope predicting casual and main partner condom use behavior from condom use intention for both high and low executive functioning groups would have then been tested for significance and examined. Overall, it was hypothesized that condom use intentions would have much more predictive power on condom use behavior

for the high executive functioning group when compared to the low executive functioning group with comparable condom use intentions, irrespective of main versus casual sex partners.

Chapter 4

Results

Preliminary Statistics

Preliminary analyses were conducted to assess statistical assumptions and possible outliers. Beginning with the ANOVA analyses, variance inflation factors (VIF) were not greater than 2.0, suggesting no problems with multicollinearity. Assumptions of linearity and normality were assessed with scatterplots. The assumption of homogeneity of variance was tested using Levene's Test. These assumptions were met for the ANOVA analyses. In terms of the regression analyses, multicollinearity was also not a concern (VIF's were less than 2.0). Assumptions of linearity and normality were also assessed with scatterplots. The Durbin-Watson statistic assessed independence and revealed normal values around 2.0 (Field, 2009). Finally, heteroschedasticity was investigated with another scatterplot of the standardized residuals and the predicted values and showed no concerns.

Potential influential outliers were investigated within both main and casual sexual partner models using Cook's D conventions from Bollen and Jackman (1990). For main partners, a cutoff of $d = .04$ identified four possible outliers. Results from regression analyses with and without outliers yielded no meaningful change in results so the outliers were not removed. For casual sexual partners, similar Cook's D procedures described above ($d = .105$) were employed and two outliers were identified. After running analyses before and after the outliers were removed, no meaningful differences emerged so the possible outliers remained in the data analysis. Sample means, standard deviations, and correlations of study variables are all presented in Table 2.

At-Risk Group Differences

Question one explored whether there were significant group differences for the main variables: executive functioning, condom use intentions, and actual condom use over a four-week period between discrete groups of at-risk young men. One-way ANOVAs were conducted for these analyses. The first analysis compared heterosexual men with sexual minority men, the second compared Caucasian men with men of color, and, finally, the third ANOVA compared men with a self-reported history of at least one STI and men without an STI history. See ANOVA results in Table 3.

For executive functioning, the first ANOVA showed no main effect (F (1, 225) = 0.20, p = 0.66) between Caucasian men and men of color suggesting no differences in executive functioning scores for race or ethnicity. A second ANOVA exploring sexual identity groups showed no significant main effect (F (1, 225) = .049, p = 0.83) between heterosexual men and sexual minority men for executive functioning. The final analysis for executive functioning investigated whether scores differed between men with an STI history and men without an STI history. No significant main effect (F (1,171) = 0.68, p = 0.41) was observed between the two groups.

Group differences were also examined for main partner and casual partner(s) condom use intentions. No significant main effect was observed for main partner condom use intentions (F (1, 150) = 1.29, p = 0.26) between Caucasian men and men of color. When comparing casual partner condom use intentions, again, no significant differences were observed (F (1, 88) = 0.085, p = 0.77) for Caucasian men and men of color. Heterosexual and sexual minority men did not report significantly different condom use intentions for their main partners (F (1, 150) = 0.37, p = 0.54). The same

was the case for casual partner(s) condom use intentions (F (1, 88) = 0.31, p = 0.58) between heterosexual and sexual minority men. When comparing men with an STI history and men without an STI history, a significant main effect was observed (F (1, 119) = 5.253, $p < .05$, partial η^2=0.042) for main partner condom use intentions. Pairwise comparisons revealed that men without an STI history reported greater condom use intentions with main partners (M = 2.72, SD = 1.34) when contrasted with men reporting a lifetime STI (M = 1.87, SD = 1.36). No main effect was observed, however, for casual condom use intentions (F (1, 75) = 0.847, p = 0.36) between men with and without an STI history.

Finally, potential group variation in actual condom use for main and casual partners at the four-week follow-up was also examined with the same ANOVA procedures. Caucasian men and men of color did not exhibit significant differences (F (1, 109) = 2.94, p = 0.09) for main partner condom use. Reported casual condom use (F (1, 42) = 0.003, p = 0.96) was similar and non-significant for Caucasian men and men of color. No significant main effect was found for main partner condom use (F (1, 109) = .001, p = 0.98) for heterosexual and sexual minority men. No difference was found for heterosexual and sexual minority men for condom use with casual partners (F (1, 42) = .02, p = 0.90). No difference for condom use behavior was found between men with an STI history and men without such a history within a main partner context (F (1, 91) = .013, p = 0.91). Lastly, no condom use differences were observed between men with an STI and men without an STI for casual partners (F (1, 36) = 0.23, p = 0.63).

Condom Use Intentions and Executive Functioning

Question 2 addressed whether self-reported executive functioning (e.g., self-regulation, planning, inhibition of impulsivity) predicted a significant portion of variance in condom use after controlling for factors that relate to executive functioning (i.e., age and education). Although HIV status is an important background factor related to executive functioning, there were no HIV positive individuals who reported follow-up sexual behavior and therefore HIV status was not included in the regressions. Hierarchical multiple regressions were conducted separately for those reporting main partner condom use and casual partner(s) condom use because relational status has been found to impact condom use. The sample including participants with main partners consisted of 107 men reporting main partner condom use intentions and main partner sexual behavior during the four weeks prior to the second survey.

Following the procedures described by Aiken and West (1991) for the regression exploring actual condom use with main partner in the previous month, age and education level were first entered as control variables at Step 1. Next, main partner condom use intentions (centered according to Frazier et al., 2004) and executive functioning scores (centered) were entered in Step 2, and then, intentions (centered) x executive functioning (centered) were entered at Step 3. Means, standard deviations, and correlations for main partners are shown in Table 3. Results from the hierarchical regression are presented in Table 4. Overall, the model for main partners explained 66.7% of the variance in main partner condom use. Examination of the unique predictors for the entire model showed that intentions ($\beta = 0.80$) significantly predicted main condom use behavior with intentions explaining the greatest amount of variance in condom use ($R^2 = .667$) among

main partners. Intentions to use condoms were a significant positive predictor of the use of a condom with a main partner. Executive functioning was not a significant predictor of main partner condom use behavior and the interaction between intentions and executive functioning was also not significant.

Executive functioning was also examined in relationship to individuals reporting condom use with casual sexual partners during the follow-up survey. The sample consisted of 38 men who reported casual partner condom use intentions and casual partner sexual encounters. The same hierarchical regression procedures were employed with means, standard deviations, and correlations for casual partners displayed in Table 5. Results from the hierarchical regression are presented in Table 6. The overall model was significant and accounted for 41.5% of variance explained. In terms of unique predictors, only intentions to use condoms with casual partners predicted ($\beta = 0.585$) casual partner condom use behavior. Executive functioning did not significantly explain casual partner condom use. However, executive functioning was significantly and positively correlated with casual partner condom use ($r = .288$). The interaction between intentions and executive functioning was similarly not significant. A closer inspection, however, of the data at step three revealed a high beta weight for the interaction ($\beta = -0.418$), possibly indicating that the low sample size prohibited a statistically significant finding. Results are discussed below in the context of the literature and analysis.

Table 2
Means, standard deviations, and correlations for males.

	Variable	*M*	*SD*	1	2	3	4	5	6	7	8
1	Age	23.00	3.50	--							
2	Sexual Orientation	1.64	1.24	0.08	--						
3	Race	2.98	1.05	0.13	0.27**	--					
4	Education	5.78	6.47	0.17*	0.05	0.022	--				
5	EFI Total	97.80	9.23	0.01	-0.07	-0.24**	-0.06	--			
6	Main partner condom use intentions	2.68	1.36	-0.30**	0.06	0.03	0.00	0.06	--		
7	Casual partner condom use intentions	3.62	0.76	-0.10	0.03	-0.08	-0.11	0.19	0.50**	--	
8	Main partner condom use	3.58	2.7	-0.25**	0.09	0.09	0.10	0.05	0.81**	0.41*	--
9	Casual partner condom use	5.59	1.97	0.80	0.02	-0.15	0.04	0.24	0.03	0.60**	-0.12

Note: EFI = Executive Functioning Index
*$p < .05$. **$p < .01$.

Table 3
ANOVAs for STI At-Risk Groups.

	EF		MP INT		CP INT		MP CU		CP CU	
At-Risk Groups	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Race										
Caucasian	97.66	8.99	2.61	1.37	3.64	0.72	3.37	2.64	5.58	1.84
Men of Color	98.31	10.07	2.91	1.36	3.58	0.88	4.47	2.82	5.62	2.32
Sexual Orientation										
Heterosexual	97.91	9.05	2.73	1.39	3.67	0.64	3.58	2.67	5.55	2.03
Sexual Minority	97.61	9.6	2.59	1.33	3.58	0.87	3.57	2.78	5.63	1.95
STI Status										
STI History	96.25	10.48	1.87*	1.36	3.61	0.72	3.46	2.7	5.5	2.06
No STI History	98.07	9.16	2.72*	1.34	3.38	1.12	3.36	2.91	5.88	1.36

EF = Executive Functioning, MP INT = Main Partner Condom Use Intentions, CP INT = Casual Partner Condom Use Intentions, MP CU = Main Partner Condom Use, CP CU = Casual Partner Condom Use.

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

Table 4

Means, standard deviations, and correlations for main partner (MP) hierarchical regression (N = 107).

Variable	*M*	*SD*	1	2	3	4
1. MP Condom Use	3.56	2.68	1			
2. Age	6.51	3.42	-0.30**	1		
3. Education	6.43	9.21	0.10	0.09	1	
4. MP Condom Use Intentions†	-0.14	1.40	0.81**	-0.34**	0.001	1
5. Executive Functioning†	0.26	9.08	0.03	0.08	-0.12	0.05

† = centered value, *p = .05. **p < .01.

Table 5

Hierarchical regression analysis for main partner (MP) condom use, condom use intentions, and executive functioning (*N* = 107)

	Step 1			Step 2			Step 3		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Age	-0.237	0.073	-0.302*	-0.024	0.048	-0.03	-0.024	0.048	-0.034
Education	0.038	0.027	0.13	0.031	0.017	0.105	0.031	0.017	0.107
MP Intentions				1.536	0.116	0.799**	1.532	0.117	0.798**
EF				0.002	0.017	0.008	0.004	0.017	0.014
MP Intentions x EF							0.01	0.012	0.045
R^2		0.101			0.667			0.669	

Note: EF = Executive Functioning

*p <.01. **p < .001.

Table 6

Means, standard deviations, and correlations for casual partner (CP) hierarchical regression (*N* = 38)

Variable	*M*	*SD*	1	2	3	4
1. CP Condom Use	6	1.542	1			
2. Age	6.526	3.577	-0.054	1		
3.Education	8.053	15.247	-0.01	0.042	1	
4. CP Condom Use Intentions†	0.036	0.669	0.603**	-0.002	-0.178	1
5. Executive Functioning†	-2.859	8.275	0.288*	-0.069	-0.163	0.295

† = centered value, *p = .05. **p < .01.

Table 7

Hierarchical regression analysis for casual partner (CP) condom use, condom use intentions, and executive functioning (*N* = 38)

	Step 1			Step 2			Step 3		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Age	-0.023	0.073	-0.054	-0.021	0.058	-0.049	-0.037	0.055	-0.085
Education	-0.001	0.017	-0.008	0.012	0.014	0.117	0.012	0.014	0.118
CP Intentions				1.348	0.331	0.585**	0.744	0.025	0.323
EF				0.025	0.027	0.132	0.022	0.025	0.117
CP Intentions x EF							-0.073	0.029	-0.418
R^2		0.003			0.318			0.415	

Note: EF = Executive Functioning

*p <.01. **p < .001.

Chapter 5

Discussion

The following chapter presents the results of this study within the context of the existing body of literature. First, possible differences in executive functioning, condom use intentions, and condom use behavior between discrete at-risk groups will be discussed. Next, the role of control variables (age and education), condom use intentions, and executive functioning differences on condom use will be presented. Limitations and positive aspects of the study, implications for clinical practice, and directions for future research will also be highlighted.

At-risk Group Differences

In support of my hypothesis, executive functioning did not significantly differ between Caucasian men and men of color, across sexual orientations, and for those with a history of an STI and those without a lifetime STI. Results from this study are consistent with the original Executive Functioning Index study (Spinella, 2005), as these factors did not impact executive functioning scores. While not surprising, these results suggest that background differences such as race, ethnicity, sexual orientation, and having an STI do not play an important role in level of executive functioning abilities such as self-regulation, inhibition of impulsivity, and planning.

Next, racial and sexual orientation group differences for main and casual partner condom use intentions were examined. My hypothesis was confirmed; there were no significant differences between Caucasian men and men of color nor between heterosexual men and sexual minority men across condom use intentions regardless of sexual partner context (e.g., main versus casual). Despite elevated STI rates among

minorities (CDC, 2008a, 2009, 2010b), men of color and sexual minority male participants in this sample reported similar intentions or motivation levels to engage in condom use when compared to their Caucasian or heterosexual counterparts who generally are at much lower risk levels. Since condom use intentions have been shown to be a positive predictor of actual condom use behavior (Albarracin et al., 2001), and with the high risk for STIs among sexual minority men and men of color (CDC, 2008a, 2009, 2010), this finding highlights the need for further investigation into why these minority groups continue to show high rates of STIs despite similar condom use intentions.

A different pattern emerged when comparing condom use intentions between those reporting an STI history and those without an STI history. For casual sexual partner condom use intentions, no differences were evidenced between the two STI history groups substantiating my hypothesis. Men in the casual partner sexual context, despite divergent STI histories, both show equivalent condom use intentions. Initially, this may seem unusual as men with an STI history might be assumed to report lower casual partner condom use intentions since this sexual context has a higher risk for sexually transmitted infections. Because these men report a lifetime STI, this finding may suggest that transmitting an infection through sexual contact could have improved the motivation levels for future casual partner condom use so as to lower future STI risk.

In terms of main partner condom use intentions, however, men without a lifetime STI history indicated greater condom use intentions as opposed to those men reporting a lifetime STI. This conflicted with my hypothesis, which predicted similar intention levels. Although there could be several explanations for this result, it should be acknowledged that the sample of those reporting a lifetime STI ($N = 15$) was relatively

small in comparison to those not indicating an STI history ($N = 106$). After examining this particular group for skewness and distribution, it was found that two-thirds of the 15 men reported a main-condom use intention of "very unlikely." This resulted in an uneven distribution for this particular sub-group. It is possible that this small group of men with a lifetime STI included an unusually high number of individuals who reported no intention to use a condom with a main partner and may not be representative of men who have had STIs.

Lastly, condom use behavior over a four-week period was examined for group differences. No differences were observed between Caucasian men and men of color, heterosexual and sexual minority men, and those with an STI history and without an STI history. These results support my hypothesis and further confirm that demographic-related differences do not appear to influence differential condom use behavior. As with condom use intentions, condom use behavior is also an important variable in guarding against STIs. Yet, despite reporting equivalent condom use behavior, the CDC (2008, 2009, 2010) continues to show elevated STI risks among young male ethnic and sexual minorities. Findings here parallel other studies (Millett, Flores, Peterson, & Bakeman, 2007; Peterson et al., 2009) also showing that ethnic and sexual minorities do not engage in more or less condom use. Results such as these advocate for continued research to understand why these minority groups continue to show elevated STI risk.

Condom Use Intentions and Executive Functioning

Two models of condom use were created to account for the sexual context differences between main and casual sexual partners. The main sexual partner model showed that both age and condom use intentions significantly influenced condom use

behavior among young men when assessed at follow-up. As for executive functioning, age, and education level, these variables did not exert a significant influence on actual condom use behavior in the full model. Not surprisingly, main partner condom use intentions exhibited robust correlations (r = .81) with main partner condom use and explained a substantial portion (66.67%) of individual variability in actual condom use. Again, this finding supports the relationship of condom use intentions as proximal to condom use behavior (Armitage & Conner, 2001; Gallois et al., 1994; Gredig et al., 2007; Sheeran et al., 1999). Results suggest that interventions promoting condom use within main partner sexual relationships should continue to promote greater intentions or motivation to use condoms.

Executive functioning processes, such as self-regulation, inhibition of impulsivity, and planning, did not significantly impact actual main partner condom use behavior within this sample of young men. Nor did executive functioning interact with main partner condom use intentions. When thought of in the context of what executive functions serve to do, namely to self-regulate in order to achieve a particular goal or desired behavior (Fuster, 1999, 2008; Koechlin et al., 2003), main partner condom use may be less of a desired behavior in light of decreased risk for STI transmission and possible reliance on other methods of birth control to avert pregnancies. When informally comparing the mean condom use scores for main partners (M = 3.56, SD = 2.68) to casual partners (M = 6.00, SD = 1.54), it illustrates a stronger report of condom use with casual partners as opposed to main partners. Despite a multitude of explanations for this finding, it could be the case that men in main partner relationships view condom use as less of a desired or goal-directed behavior. By extension, then, executive function

abilities may be less likely to be invoked and, so, could be non-significant in this sexual context.

Turning to the casual sexual partner model, it revealed that age and education played no significant role in condom use associated with this sexual context. Background factors, such as age and educational level, do not appear to factor significantly in young men's condom use when having casual sex. As expected, young men's established condom use intentions played an important role in their actual casual sex condom use. Results such as this continue to parallel multiple research studies in casual condom use variability (Armitage & Conner, 2001; Carvajal et al., 2005; Mausbach et al., 2009; Sheeran et al., 1999).

Despite individual intentions' influence on casual sex condom use, the variance explained by those intentions was less when compared to the main partner group (37.3% versus 56.6%). This reduction in explained variance likely means other factors may be playing a role in the divergent condom use patterns of young men during casual sex or the small sample size restricted the range of variance explained. Executive functioning differences were investigated, as a part of this study, to see if those differences influenced casual sex condom use aside from the established role of individual intentions. Unexpectedly, results did not support my hypothesis with executive functioning failing to explain significant variability in condom use with this sample nor did it moderate the intention-behavior relationship by a significant interaction. However, executive functioning differences were significantly and positively correlated with casual partner condom use (r = .288). This suggests that executive functioning does appear to have a relationship with condom use, but how exactly executive functioning relates to casual

partner condom use and whether executive functioning actually influences individual condom use with casual partners needs further exploration. Some possible explanations for executive functioning's lack of significance on casual partner condom use is presented next.

Many reasons may account for executive functioning's lack of influence on casual partner condom use. First, the sample size was fairly small ($N = 38$) and statistical power may have been too weak to detect a significant relationship. Investigation of the beta at Step 3 revealed a large beta weight value of -0.418. This may indicate that sample size and statistical power are likely explanations for an absence of a significant interaction. Gathering a larger sample size may allow for detection of significance or ruling out the possibility of a Type II error altogether. Second, assessing executive functioning processes such as self-regulation, inhibition of impulsivity, and planning via self-report may not capture those processes as well as other studies that utilized more objective assessments. Moreover, this study utilized a global measure of self-reported executive functioning. It could be that self-presentation bias influenced scores and hampered a true estimation of the sample's executive differences. Using specific objective measures of individual executive functions (e.g., self-regulation, planning, organization, impulsivity) could also be a more effective measure. This improved measurement could show that particular executive function abilities do moderate the intention-behavior association for young men's condom use.

Third, this study measured intentions with self-prediction statements. This was done because research has shown that probability statements by individuals more accurately capture intentions (Sheppard, Hartwick, & Warshaw, 1988). It could be that

using this type of intention measure influenced the overall model in a different way when compared to simply using the word intention. Fourth, previous studies examining whether executive functions influence important health behaviors did so by studying healthy eating and exercise (Hall et al., 2006; Hall et al., 2008). It may be that executive functions feature more prominently in these behaviors and that other variables are more significant when studying sexual health behaviors, such as condom use. Finally, a substantial portion of participants did not have casual sex over the 4-week period prior to follow-up survey. It may be that recruiting participants who are more sexually active or surveying participant's sexual activity over longer intervals may lead to greater casual sexual behavior. Doing this could also yield different results from our findings.

Future Research

Findings from this study advocate for several avenues of inquiry to further investigate the public health priorities surrounding sexual health and sexually transmitted infections. The significant personal and social costs due to STIs necessitate this work. One finding of this investigation showed that young men of color do not differ from their Caucasian counterparts on self-reported condom use intentions and actual condom use irrespective of sexual partner context. This finding begs the question of how young men of color continue to exhibit higher rates of STIs. A similar finding showed that sexual minority men reported comparable condom use intentions and condom use with both their main and casual partners. In the same way, questions arise as to why these young men exhibit greater rates of STIs when compared to their heterosexual counterparts. While public health priorities continue to highlight this disparity among sexual

minorities, further research needs to continue to press forward and elucidate why the disparities exist and how to ameliorate them.

One example of furthering this work may be examining how sexual networks contribute to elevated STI risk among sexual and racial minorities (Millett et al., 2007; Peterson et al., 2009). Sexual networks refer to the social networks in which individuals have sex. Individuals who are having sex in networks with higher rates of STI are at a greater initial risk simply because of the level of STIs within that group. By comparison, individuals in a sexual network with lower rates of STIs are a lower risk of STI transmission simply by being in that network. Despite equivalent sexual health behaviors found in this other studies (Millett et al., 2007; Petereson et al., 2009), sexual and racial minorities will continue to exhibit higher STI rates by the very nature of having sex in their social network. This research line strongly suggests that at-risk groups need to be particularly consistent – more consistent than less at-risk groups – with condom use and other sexual health behaviors in order to avoid STIs. Future studies should continue to investigate how to improve consistency of intentions in order to lower STIs among these communities.

Another result illustrated the continued importance of intentions, or the motivation to engage in a given behavior, on condom use. However, few studies have examined if there are factors that may contribute to the weakening of condom use intentions. Finding possible factors that attenuate the intention-behavior relationship may help to further understand why individuals fail to use condoms despite the significant consequences for non-use. As an example, our study showed that intentions to use a condom when having casual sex explained much less of the variance when compared to

main partner sex. Looking for reasons why intentions could be less stable for casual partners as opposed to main partners may be promising both in terms of research and intervention strategies. The research shows that these variables include motivation (de Wit et al., 1993; de Wit et al., 1994; de Wit et al., 2000; Fisher et al., 1996), attitudes (Albarracin et al., 2001; Sheeran et al., 1999; Gallois et al., 1994), social norms (Albarracin et al., 2001; Catania et al., 1994; Kok et al., 2007), self efficacy (Muñoz-Silva, Sanchez-Garcia, Nunes, & Martins, 2007), moral norms (van Kesteren et al., 2007).

In the same vein, executive functioning was explored in order to see if those processes helped to explain why some men fail to follow-through on their condom use intentions. However, a non-significant result emerged. Prospective research may want to employ other measures of executive functioning, such as objective tests of executive functions. Using this type of measure will lessen the impact of self-report bias, possibly present a clearer picture of individual executive functioning, and yield different results from this study.

Finally, our demographic variables revealed two important avenues of future research. First, over 50% of the young men in this sample have never been screened for an STI. This result is startling. Other investigations might want to examine why some young men do not get tested for STIs. Second, a large portion of our sample was less sexually active over the four-week period prior to our follow-up questionnaire. Other research could investigate more sexually active individuals over a longer period of time to see if executive function processes influence condom use.

Limitations

While the sample was fairly diverse in race and ethnicity and quite diverse in sexual orientation, most participants were either in college or had a college degree. This is less reflective of the general American public and limits generalizability. Next, there were fewer participants in the casual sex model, which limited our data analysis. Although considerable efforts were made to reach more sexually active individuals, it seems these participants were either not reached as effectively or decided not to participate in our study. Self-report measures of sexual behavior and protective sexual health behavior were solely utilized and have inherent problems with self-presentation bias.

Also, participants were asked to recall their condom use after a 4-week period rather than reporting weekly condom use. This design was chosen in order to reduce participant burden, but relying on participant's longer-term memory also introduces problems of reliable reporting. Executive function processes (e.g., self-regulation, inhibition of impulsivity, and planning) were measured via self-report. Relying on a more objective measure of executive functions may have resulted in a more accurate picture of our participants' actual executive function skills. While the ANOVAs used did find similar patterns of sexual health behaviors between target groups of young, we did not control for education or other factors that might have produced a different result. Finally, analyses were calculated with multiple regressions, which does not allow for causal statements about the presented results.

Clinical Implications

This study highlights the need for greater understanding of STIs in young men within the field of counseling psychology. Primarily, our study continues to demonstrate the widely established importance of motivational factors, namely behavioral intentions, on this sample of young men's condom use. Counseling psychologists should continue to spend time developing and enhancing internal motivations to protect oneself through condom use during sexual activities. Further, counseling psychologists may also want to help individuals maintain their motivation to use condoms – as appropriate. For instance, use of motivational strategies such as Motivational Interviewing has effectively improved condom use intentions and condom use among a variety of populations (Kuyper, de Wit, Heijman, Fennema, van Bergen, & Vanwesenbeeck, 2009; LaBrie, Pedersen, Thompson, & Earleywine, 2008).

Despite the continued robustness of intentions, the multiple at-risk group comparisons showed few differences on measures of condom use intentions and actual condom use with both main and casual sexual partners. While counseling psychologists should certainly continue to emphasize and improve the motivational and behavioral factors associated with condom use, they should also consider other avenues when promoting protective sexual health practices. This is recommended in light of the above and continued evidence (Millett et al., 2007; Peterson et al., 2009) that at-risk young men may not necessarily be failing to use condoms or be less motivated to use them. Particularly established avenues for psychologists include helping to improve attitudes toward condom use, changing group social norms about condoms, building condom use self-efficacy, and calling to mind the moral obligations of not transmitting diseases to others

(Albarracin et al., 2001; Kok et al., 2007; Muñoz-Silva et al., 2007). Additionally, substance use has been found to be a factor in non-condom use (Schroeder, Johnson, & Wiebe, 2009). In counseling psychologists' work with these individuals, they may also want to discuss how alcohol and drugs adversely impact condom use.

Summary and Conclusions

Multiple comparisons between at-risk groups generally showed no differences in condom use intentions, executive functioning scores, and actual condom use between main and casual sexual partners. Executive functioning did not exhibit significant influence on main partner condom use. Divergent and parallel results emerged among those with casual sexual partners. Background variables were not important with regard to condom use, but intentions, again, demonstrated significant unique influence on casual partner condom use. While executive functioning did not significantly influence condom use, it was positively correlated with casual partner condom use. This study shows that continued research is needed to investigate why target groups of at-risk young men (e.g., men of color, men with an STI history, MSM) have disproportionately large rates of STI despite having condom use intentions and condom use behavior that is relatively similar to less at-risk groups of young men (e.g., heterosexual men, Caucasian men). Self-reported executive functioning did not exhibit a significant effect on main or casual partner condom use. A significant correlation, however, between executive functioning and casual partner condom use may suggest that the relationship needs further exploration. Ultimately, though, behavioral intention continues to show a robust relationship with condom use reiterating its importance in condom use and sexual health among young men. As STIs fail to decrease in these at-risk groups of young men, the

field of counseling psychology would do well to further explore mechanisms to improve their engagement and consistency of protective sexual health behavior.

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Appendix A

Informed Consent

Principal Investigator: R. John Sawyer, II, MS

Description of the study:

Participants in this study will be asked to complete an online survey that will require approximately 10-15 minutes. They will also be asked if they would like to volunteer for follow-up questionnaire one month after the original data collection that will take approximately 5 minutes to complete. Participants will be asked to include their email address which will be securely stored separately from the data file and connected only through a code name that only the PI and Co-PI will have access to. The email file will be destroyed upon completion of the study and access will only be given to investigators of the study. The purpose of the study is to explore male sexual risk behaviors.

Qualifications:

To participate in this study, participants must be at least 18-29 years of age, be living in the United States, and be of the male gender.

Risks:
There are no foreseeable risks to individuals for participating in this study. Individuals may feel mildly uncomfortable by being asked some questions about their sexual behaviors.

Benefits:
Participants will be contributing to scientific research that seeks to investigate important questions and improve pressing social problems. Participants finishing survey two will be eligible for one of four $50.00 gift cards!

Confidentiality:
Participation will be confidential within the limits allowed by law. Volunteers who elect to participate in the follow-up study will be asked to provide an email contact at the conclusion of the first survey. After four weeks or so, those participants will be sent the follow-up survey and if they respond, they will be eligible for one of the four $50.00 gift cards. No other identifying information will be collected. This email will be securely stored in a separate file and destroyed following completion of the study. The email address will be used exclusively for the purpose of this research study.

Questions:
If there are any questions or concerns about this study, the principal investigator, Sharon Horne, Ph.D. at (901) 678-1413, or co-investigator, John Sawyer (901) 678-2841 may be contacted. Questions about rights as a research participant may also be directed to the

Chair of the Committee for the Protection of Human Research Participants of the University of Memphis at (901) 678-2533.

Terminating the study:
Participation in this study is entirely voluntary. Beginning the survey in no way obligates participants to complete the survey. Participants may quit the study at any time with no consequences.

Concluding Statement:
By completing the survey participants acknowledge that they are at least 18 years of age and not older than 29, and they have read and understood the statements above.

Appendix B

Demographics

This will be given to participants in the first survey.

1. Gender
    a. Male
    b. Transgendered
    c. Intersex
    d. FTM Transgender
    e. Two Spirit
    f. Other:_____
2. Sexual Identity
    a. Straight
    b. Gay
    c. Same Gender Loving
    d. Queer
    e. Bisexual
    f. Questioning
    g. I choose not to identify, but have sex with men.
3. Age: _____
4. Race
    a. African American, Black
    b. Asian American
    c. Caucasian, White
    d. Latino, Hispanic
    e. Native American,
    f. Pacific Islander
    g. Biracial, Multiracial
    h. Other:_____
5. Educational Attainment
    a. Up to 8th Grade
    b. Up to 11th Grade
    c. HS Diploma
    d. Some College
    e. Associates Degree
    f. Vocational/Technical School
    g. College Degree
    h. Master's Degree
    i. Doctoral / Professional Degree
6. Employment
    a. Full Time Student
    b. Full Time Student, Part Time Employed
    c. Full Time Student, Full Time Employed
    d. Full Time Employed

    e. Part Time Employed
    f. Disabled
    g. Unemployed
7. Income Level
    a. Under $15,000
    b. $15,001 to $25,000
    c. $25,001 to $35,000
    d. $35,001 to $45,000
    e. $45,001 to $55,000
    f. $55,001 to $65,000
    g. $65,001 to $80,000
    h. $80,001 to $100,000
    i. $100,001 +
    j. No Income, Student
8. Have you ever been tested for an STD?
    a. Yes
    b. No
9. Previously, have you been diagnosed with an STD? Check all that apply:
    a. No
    b. Herpes
    c. Gonorrhea
    d. Chlamydia
    e. Syphilis
    f. HPV
    g. Hepatitis A
    h. Hepatitis B
    i. Hepatitis C
10. Currently, are you positive for HIV/AIDS or another STD? Check all that apply.
    a. Unsure
    b. No
    c. HIV
    d. AIDS
    e. Herpes
    f. Gonorrhea
    g. Chlamydia
    h. Syphilis
    i. HPV
    j. Hepatitis A
    k. Hepatitis B
    l. Hepatitis C
11. State of Primary Residence
12. Are you currently in an intimate relationship?
    a. Yes
    b. No
13. If you are in an intimate relationship, how long have you been with your current partner?
    a. Less than 6 months

b. 6 months to 12 months
c. 1 year to 2 years
d. 3 years to 5 years
e. 5 years to 8 years
f. Greater than 8 years

14. What is your partnership status:
    a. Legally Married
    b. Civil Partnership
    c. Personal Commitment
    d. None of the above
    e. Not applicable, not in a committed relationship
15. If you have a main sexual partner, are they:
    a. a Man
    b. a Woman
    c. I have no main partner
16. If you have casual or new sexual partner(s), are they:
    a. Men
    b. Women
    c. Both Men and Women
    d. I have no casual sexual partner(s)
17. In the past year how many sexual partners have you been involved with
    a. None
    b. Only my main partner
    c. 1, a casual or new partner
    d. 2 to 4
    e. 5 to 8
    f. 8 to 15
    g. 15 to 30
    h. 30 or more
18. Over the next four weeks or so, how many sexual partners do you expect to have?
    a. _____
19. If you have a primary sexual partner, do you know their HIV/AIDS/STD status?
    a. Yes
    b. No
20. If you have had sex with someone who is not your primary partner in the last year, were you aware of <u>each</u> of your sexual partners' HIV/AIDS or STD status?
    a. Yes, all
    b. Yes, most
    c. Yes, a few
    d. No, none of them
21. How often do you use condoms when having sexual intercourse with your main partner?
    a. Always use a condom
    b. Generally use a condom
    c. Sometimes use a condom
    d. Never use a condom
    e. No Main Partner

22. How often do you use condoms when having sexual intercourse with a new or casual sexual partner(s)?
    a. Always use a condom
    b. Generally use a condom
    c. Sometimes use a condom
    d. Never use a condom
    e. No casual sex partner(s)

Appendix C

Executive Functioning

This measure will be given during the first online survey.

	Rate how well each of the following statements describes you.	Not at all		Somewhat		Very much
1	I have a lot of enthusiasm to do things.	1	2	3	4	5
2	When doing several things in a row, I mix up the sequence	1	2	3	4	5
3	I try to plan for the future	1	2	3	4	5
4	I can sit and do nothing for hours.	1	2	3	4	5
5	I take risks, sometimes for fun.	1	2	3	4	5
6	I have trouble when doing two things at once, multi-tasking	1	2	3	4	5
7	I'm interested in doing new things.	1	2	3	4	5
8	I have a lot of concern for the well being of other people.	1	2	3	4	5
9	I'm an organized person.	1	2	3	4	5
10	I save money on a regular basis.	1	2	3	4	5
11	I do or say things that others find embarrassing.	1	2	3	4	5
12	People who are foolish enough to be taken advantage of deserve it.	1	2	3	4	5
13	I only have to make a mistake once in order to learn from it.	1	2	3	4	5
14	I tend to be an energetic person.	1	2	3	4	5
15	I make inappropriate sexual advances or flirtatious comments.	1	2	3	4	5
16	When someone is in trouble, I feel the need to help them.	1	2	3	4	5
17	I sometimes I lose track of what I'm doing.	1	2	3	4	5
18	I feel protective towards a friend who is being treated badly.	1	2	3	4	5
19	I think about the consequences of an action before I do it.	1	2	3	4	5
20	I lose my temper when I get upset.	1	2	3	4	5
21	I take other people's feelings into account when I do something.	1	2	3	4	5
22	I have trouble summing up information in order to make a decision with it.	1	2	3	4	5
23	I start things, but then lose interest and do something else.	1	2	3	4	5
24	I swear/use obscenities.	1	2	3	4	5

25	I don’t like it if my actions or words hurt someone else	1	2	3	4	5
26	I use strategies to remember things.	1	2	3	4	5
27	I monitor myself so that I can catch any mistakes.	1	2	3	4	5

Appendix D

Condom Use Intentions

This measure will be given during the first online survey.

Consider the next month when responding to these questions:

1. In the next month, how likely is it that you will use a condom when having sex with your main partner?
Very Likely Somewhat Likely Somewhat Unlikely Very Unlikely
No Main Partner

2. In the next month, how likely is it that you will use a condom when having sex with a casual or new partner(s)?
Very Likely Somewhat Likely Somewhat Unlikely Very Unlikely
No Casual Partner

Appendix E

Condom Use Behavior

This measure will be given to participants at the follow-up questionnaire 4 weeks later. Questions 1 and 3 are considered screening questions and questions 2 and 4 are the continuous dependent variable.

Consider the previous month when responding to this question:

1. In the past month, have you had sex with your main partner?
Yes No No Main Partner

2. If you did have sex with your main partner, did you use a condom?
Never
Rarely, less than 10% of the time
Occasionally, about 30% of the time
Sometimes, about 50% of the time
Frequently, about 70% of the time
Usually, about 90% of the time
Always, 100% of the time
Not Applicable, No Main Partner

3. In the past month, have you had sex with a casual or new partner(s)?
Yes No No Casual Partner

4. If you did have sex with casual or new partner(s) did you use a condom?
Never
Rarely, less than 10% of the time
Occasionally, about 30% of the time
Sometimes, about 50% of the time
Frequently, about 70% of the time
Usually, about 90% of the time
Always, 100% of the time
No Casual Partner(s) (or Not Applicable)