

ABSTRACT

Title of Dissertation: WHAT IS BEAUTIFUL IS SAFE:
PHYSICAL ATTRACTIVENESS AND
PERCEPTIONS OF STI RISK AMONG
MEN WHO HAVE SEX WITH MEN

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Men who have sex with men (MSM) are the group most severely impacted by HIV in the United States (CDC, 2015). Many MSM, however, still engage in sex without condoms (Smith, Herbst, Zhang, & Rose, 2015). One factor influencing a lack of condom use among MSM may be an assumption of low risk of contracting HIV or another STI from physically attractive partners. This assumption may be particularly dangerous for MSM who use geosocial networking applications (GSN) to find sexual partners. Previous researchers have suggested that this assumption could be based on two theoretical mechanisms: implicit personality theory and motivated reasoning. The present study tested two hypothesized models of the associations between physical attractiveness, perceived HIV/STI risk, and condom use intentions, based on these proposed theories. Participants were 197 MSM who completed an online survey in which they viewed photos of physically attractive and unattractive men and responded to items on perception of positive partner personality characteristics,

intention to have sex with the partner, perceived risk for HIV/STIs, and condom use intentions. Results supported both theories. Specifically, physical attractiveness was negatively associated with perceived risk for HIV/STIs and condom use intentions, and these relations were mediated by intentions to have sex and positive partner personality. Implications of these findings for further research and practice are discussed.

WHAT IS BEAUTIFUL IS SAFE:
PHYSICAL ATTRACTIVENESS AND PERCEPTIONS OF STI RISK
AMONG MEN WHO HAVE SEX WITH MEN

by

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Dedication

To my family, without whose undying support I would not have reached this milestone.

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Chapter 1: Introduction

Men who have sex with men (MSM) are more severely affected by HIV than any other group in the United States (CDC, 2015). Sexual risk behaviors, particularly anal sex, account for the most HIV infections among MSM, and the most effective ways to prevent becoming infected with HIV are to take antiretroviral medications and to correctly use a condom during every instance of anal sex (CDC, 2015).

Although people are aware that condoms are a method to prevent HIV infection, many still engage in condomless sex (Smith, Herbst, Zhang, & Rose, 2015).

Preexposure prophylaxis (PrEP) is a daily pill that can reduce the risk of contracting HIV from sexual activity by up to 90% (CDC, 2016a). However, the CDC (2016a) recommends that users of PrEP continue to use condoms during sex both to further reduce HIV risk as well as to protect against other STIs, which are not preventable by taking PrEP. This is particularly important given that for MSM, STIs remain a serious concern: In 2014, MSM accounted for 83% of primary and secondary syphilis cases among males in which sex of sex partner was known (CDC, 2016b). Although condom use among MSM is generally high (e.g., only 2.5% of a sample of 14,750 MSM reported that ejaculation occurred in their own or their sexual partner's anus without a condom during most recent penile-anal intercourse; Rosenberger et al., 2012), and most do not have STIs, disproportionate rates of infection still point to a significant public health issue (CDC, 2015).

Much research has been dedicated to identifying predictors of risky sexual behavior. Meta-analyses have shown that global risk perception of vulnerability to STIs motivates preventive behavior (Sheeran, Harris, & Epton, 2004). Reisen and

Poppen (1999) suggest, however, that global risk perception, which assesses perceived level of threat without distinguishing the source of the risk, may not be appropriate for assessing personal vulnerability to HIV/STIs. This is because the perceived risk of becoming infected from a sexual partner can vary depending on characteristics of that partner, which, in turn, can cause variation in a person's condom use across partners.

Thus, Reisen and Poppen (1999) suggested a conceptualization of risk known as *partner-specific risk perception* (PSRP), which is based on the likelihood of contracting HIV or another STI from a given partner at a given time. In a longitudinal study, Reisen and Poppen (1999) found that PSRP was positively related to partner's number of previous partners and negatively related to level of commitment to the relationship. In addition, PSRP was positively related to condom use four weeks later (controlling for initial condom use level), indicating that those who perceived more risk associated with their partners were more likely to use condoms. This result illustrates not only the value of using PSRP in relation to STIs, but also that PSRP can exert an influence on behavior.

Despite the value of their work, Reisen and Poppen's (1999) conceptualization does not take into account a range of superficial partner characteristics that, although unrelated to whether or not a person has an STI, have been linked to PSRP among MSM (Gold & Skinner, 1992). The present study focuses on one such factor: beliefs about STI risk based on the physical attractiveness of a potential partner. The use of physical attractiveness as an indicator of the risk associated with a given sexual partner is particularly relevant in today's sexual

landscape, where many MSM make quick judgments regarding sexual partners based only on little more than a photo when using geosocial networking applications (GSN apps), such as *Grindr*. Zou and Fan (2016) estimated that there are tens of millions of MSM using GSN apps, which utilize the global positioning system on smartphones and other devices to allow users to identify potential sex partners nearby. Their meta-analysis of the characteristics of MSM who use GSN apps found that high-risk behavior was common, with 46.4% of app-using MSM having unprotected anal intercourse within the past 3 months. App-using MSM were also found to be more likely than non-app using MSM to have gonorrhea and chlamydia infection (Zou & Fan, 2016).

These findings, in part, could be attributed to reliance on superficial characteristics to determine that a potential partner is “safe” and thus condoms are not needed. Many GSN apps are designed to present users with a picture of potential sex partners, which they then use to decide whether or not they would like to contact them for a sexual encounter. Evaluating sexual partners in this way could make the use of physical attractiveness as an indicator of partner safety more likely than if those partners were met in person, when there might be more of an opportunity to get information about more reliable indicators of risk, such as previous number of partners or HIV/STI testing history.

Theory on the Role of Attractiveness and Perceived Risk

Scholars have theorized mechanisms that explain why people may rely on such superficial cues when judging the HIV/STI risk posed by a partner, even knowing that these cues are inaccurate indicators of HIV or STI status (Misovich,

Fisher, & Fisher, 1997; Williams et al., 1992). The present study focuses on two such mechanisms: implicit personality theory and motivated reasoning.

Implicit personality theories are assumptions people hold about how a psychological trait is expressed through behavior and how traits relate to one another (Eagly, Ashmore, Makhijani, & Longo, 1991). One well-known implicit theory is based on the halo effect: the notion that a person possessing one positive trait must generally be positive. Misovich et al. (1997) suggested that physically attractive sexual partners may elicit a halo effect involving the belief that such partners do not have HIV or other STIs and do not require sexual risk precautions.

Another proposed mechanism is motivated reasoning, which is based on the notion that people are drawn to beliefs that are consistent with personal goals—even if those beliefs are not based on rational decision making strategies (Kunda, 1990). Thus, it could be that interacting with an attractive person increases the perceiver's motivation to have sex with that person. This motivation, in turn, should lead the perceiver to develop beliefs that support the goal of sexual contact (e.g., “this person probably does not have HIV or another STI”).

Research on the Role of Attractiveness and Perceived Risk

Research on the relationship between physical attractiveness and perceptions of risk has yielded mixed findings. Some studies conducted with both heterosexual men and women, and MSM, respectively, have found that physical attractiveness is associated with estimates of lower perceived risk for STIs (Agocha & Cooper, 1999; Blanton & Gerrard, 1997; Gold & Skinner, 1992; Schmalzle, Renner, & Schupp, 2012). In their study of attractiveness, perceived HIV/STI risk, and condom use

intentions among heterosexual men and women, Agocha and Cooper (1999) found negative associations between attractiveness and both perceived risk and condom use intentions. These associations were mediated by partner desirability and intention to have sex, which appears to support the motivated reasoning perspective. Gold and Skinner (1992) conducted a study in which they interviewed gay men to ascertain the justifications they used during a time when they had anal sex without condoms in the past six months. Among the frequently reported justifications men used was, “This guy is so beautiful, he can’t possibly be infected” (Gold & Skinner, 1992, p. 1026). This finding could be viewed as supporting either the motivated reasoning or implicit personality perspectives. Motivation to have sex is likely to have been present, since these justifications were used in the context of actual sexual encounters. However, it is also possible that underlying this justification was an assumption that a “beautiful” person must have other positive qualities. Supporting this possibility are some of the other justifications reported by participants, including that the partner was healthy, clean, intelligent, and had a nice personality.

Blanton and Gerrard (1997) also found that motivation to have sex was negatively associated with perceived risk in a sample of heterosexual young men. However, this was only found for participants who were also given personality information about the targets. The authors explain these results by suggesting that motivation to have sex only undermines rational risk perception through the use of personality information to justify beliefs regarding the safety of a partner (e.g., that she is well-educated, which does not seem typical for high-risk individuals). However, Blanton and Gerrard (1997) also noted that their results were consistent

with an implicit personality theory perspective. Indeed, the participants may have used the personality information as evidence that the target had other desirable characteristics, which were then overgeneralized to conclude that she posed less risk. In support of this, the women in high sex appeal photos were seen as more likable, interesting, and similar to the participant.

Blanton and Gerrard's (1997) results could also act as evidence that the two mechanisms are not mutually exclusive, and could, in fact, influence one another, supporting a more integrated model of risk perception. Perceptions of a partner are likely to be influenced not only by cognitive processes (e.g., a halo effect), but also by motivational processes (e.g., sexual motivation to have sex leads to beliefs that they are likeable, interesting, and similar to oneself). For example, previous literature has shown that participants who were motivated to see a member of a stigmatized group (someone with schizophrenia) positively, because they expected to interact with him, reported more positive perceptions of the group (Klein & Kunda, 1992). This phenomenon has also been shown to exist for potential romantic partners, wherein participants showed a positivity bias, evaluating targets as more personable and appealing, when they expected that they would date the target (Goodwin, Fiske, Rosen, & Rosenthal, 2002). Similarly, sexual motivation is likely to be influenced not only by the attractiveness of a partner, but also by other positive characteristics of the partner, including personality (e.g., beliefs that they are likeable, interesting, and similar to oneself). Thus, perceptions of partner personality could be used, when preceded by sexual motivation, to justify lower perceptions of risk, as Blanton and Gerrard (1997) suggest; however, sexual motivation could also directly influence

perceptions of partner personality, and vice versa.

Other studies have found that physical attractiveness is associated with increased perceptions of risk. In their study with Dutch heterosexual men, Dijkstra, Buunk, and Blanton (2000) found that physical attractiveness of female targets was related to increased perceived STI risk, and this effect was mediated by perceived promiscuity. This finding appears to support neither implicit personality theory nor the motivated reasoning perspective. Gold and Skinner (1996) also found that physical attractiveness was associated with increased perceived risk for HIV in a sample of gay men, and suggested that their participants could have believed that an attractive man is more likely to have a greater number of sexual partners, thus increasing their perceptions of risk. However, men who were described as unintelligent, unhealthy, or unpleasant were all associated with increased risk, which could be viewed as evidence of the implicit personality theory perspective.

Additional studies have found no relationship between attractiveness and perceived risk for HIV/STIs (Epstein, Klinkenberg, Scandell, Faulkner, & Claus, 2007; Renner, Schmalzle, & Schupp, 2012). In their study of heterosexual and LGB men and women, Epstein et al. (2007) found that physical attractiveness was associated with increased intentions to have sex, but not to perceived risk. This also appears to support neither implicit personality theory nor motivated reasoning perspectives, but suggests that participants were engaged in a rational, unbiased assessment of risk.

Taken together, previous studies do not provide a consistent picture of the relation of physical attractiveness to perceptions of risk. There may be several

possibilities as to why this is the case. The first could be related to differences in populations being sampled. Dijkstra et al. (2000) suggested that their results could have been attributed to differences in cultural norms around sex in The Netherlands, meaning that their sample would have been more likely to use “cold calculations” (p. 1751) and rely less on biased reasoning. This raises questions regarding generalizability to MSM in the US. In addition, there are a number of methodological differences among studies that could have contributed to their varying results: correlational (e.g., Schmalzle et al., 2012) versus experimental (e.g., Epstein et al., 2007) studies; whether participants were given photos (e.g., Agocha & Cooper, 1999) or written descriptions (e.g., Gold & Skinner, 1996) as stimuli; whether information about sexual history or personality of targets was provided (e.g., Blanton & Gerrard, 1997). Finally, differing results could be attributed to the presence or absence of certain mechanisms linking physical attractiveness to decreased perception of risk, but few studies have assessed these mechanisms.

Differences among studies that may be particularly useful in interpreting discrepancies in their findings are those that relate to ecological validity. For example, viewing photos more closely approximates the experience of GSN app users than reading written descriptions. Additionally, studies have differed in the extent to which they encouraged participants to focus on the possibility of having sex with the target. Agocha and Cooper (1999) led participants to believe that they might have the opportunity to meet the target after the completion of the study; Blanton and Gerrard (1997) instructed participants to imagine having an encounter with the target in which it becomes apparent that she is interested in having sex. Epstein et al. (2007),

however, did not influence participants in any way to imagine having sex with the targets. The studies with procedures that more strongly resembled the actual experience of using GSN apps (i.e., those that use photos as stimuli and in which there is an emphasis on meeting or having sex with the target) are those that have found a negative association between attractiveness and perceived risk.

Present Study

Research to date on the relation between physical attractiveness and perceived risk has shed light on the potentially dangerous assumptions that individuals make about sex partners; however, these studies have been limited in their relevance to a population that may be at the most risk for making these assumptions: MSM who use GSN apps. Specifically, studies that have used written descriptions of attractiveness (i.e., Gold & Skinner, 1996), or have not influenced participants to think about the possibility of having sex with targets (e.g., Epstein et al., 2007), do not closely approximate the experience of MSM using these apps. Thus, the present study is conducted with MSM who are not currently in a monogamous relationship and who have used GSN apps to find sex partners. Participants viewed photos of attractive and unattractive men under the guise that they had been taken from a popular GSN app and featured available men located in their area.

Another limitation of previous research is the investigation of sexual motivation only as a function of the attractiveness of a potential partner. It is likely that MSM are motivated to use GSN apps to find sex partners when they are feeling sexually aroused. Thus, sexual motivation may not only be a product of seeing a photo of an attractive partner, but also an antecedent to the search for partners. If this

is the case, then one might expect the combination of prior sexual arousal and sexual motivation resulting from viewing an attractive photo to produce the strongest effect on risk perception. Thus, the present study manipulates attractiveness and arousal separately, and explores their interaction, to predict perceived risk and condom use intentions, increasing ecological validity and providing a more rigorous test of the motivated reasoning perspective.

An additional limitation of previous research is that few studies have examined implicit personality theory and motivated reasoning perspectives as mediators of the relation between attractiveness and perceived risk. In order to address this limitation, the present study directly examines these mechanisms by measuring indicators of motivated reasoning (i.e., intention to have sex) and implicit personality theory (i.e., positive personality characteristics of the partner).

Hypotheses

Figure 1 depicts a model of the relations among variables that would be expected based on the implicit personality theory and motivated reasoning perspectives, respectively. The first set of hypothesized relations refers to what would be expected from the implicit personality theory perspective. This perspective predicts that physical attractiveness elicits a halo effect (Eagly et al., 1991); thus, physical attractiveness was hypothesized to be positively related to positive partner personality (e.g., trustworthiness, responsibility, health). Furthermore, such perceived personality characteristics have been associated with decreased perceptions of HIV/STI risk (Gold & Skinner, 1996; Renner et al., 2012; Schmalzle et al., 2012); thus, positive partner personality was hypothesized to be negatively related to both

perceived risk and condom use intentions. Taken together, these hypothesized relations suggest that the negative association of physical attractiveness with perceived risk and condom use intentions, respectively, is mediated by positive partner personality.

The next set of hypothesized relations refers to what would be expected from the motivated reasoning perspective, which predicts that a physically attractive potential partner creates a motivation to have sex with that partner (Agocha & Cooper, 1999; Blanton & Gerrard, 1997). Thus, it was hypothesized that physical attractiveness would be positively associated with intentions to have sex. Furthermore, this motivation leads to biased reasoning that supports one's desire to have sex with the potential partner (e.g., concluding that the partner does not have HIV/STIs; Misovich et al., 1997); thus, intentions to have sex, in turn, was hypothesized to be negatively associated with perceived risk and condom use intentions. Taken together, these hypothesized relations suggest an indirect effect of physical attractiveness on perceived risk and condom use intentions through intentions to have sex.

The final set of hypothesized relations, which also reflects a motivated reasoning perspective, concerns the role of sexual arousal in risk perception and condom use intentions. Although previous research has not investigated sexual arousal as a predictor of risk perception, it is plausible that feelings of sexual arousal, independent of the physical attractiveness of a potential partner, could create a motivation to have sex. Thus, sexual arousal was hypothesized to be positively associated with intentions to have sex. Furthermore, the combination of a physically

attractive potential partner and prior feelings of sexual arousal may produce the highest level of sexual motivation. This is consistent with the results of a study conducted by Shuper and Fisher (2008), who found that HIV+ MSM indicated stronger intentions to engage in condomless sex with attractive versus unattractive partners, and that this effect of partner attractiveness was less pronounced for nonaroused MSM. Thus, it was hypothesized that the interaction between attractiveness and arousal would predict intentions to have sex. Specifically, attractiveness was hypothesized to have a stronger effect on intentions to have sex in the high sexual arousal condition than the low arousal condition. Taken together, these hypotheses suggested that the interaction between attractiveness and arousal would influence both perceived risk and condom use intentions through its effect on intentions to have sex. Finally, based on research showing that perceptions of risk are positively associated with condom use intentions (Agocha & Cooper, 1999; Reisen & Poppen, 1999), it was hypothesized that perceived risk would be positively associated with condom use intentions.

It is also possible that perceptions of positive partner personality and intention to have sex could both influence perceptions of risk simultaneously, as well as influence one another (e.g., Blanton & Gerrard, 1997). Thus, positive partner personality and intentions to have sex are hypothesized to have a positive bidirectional association.

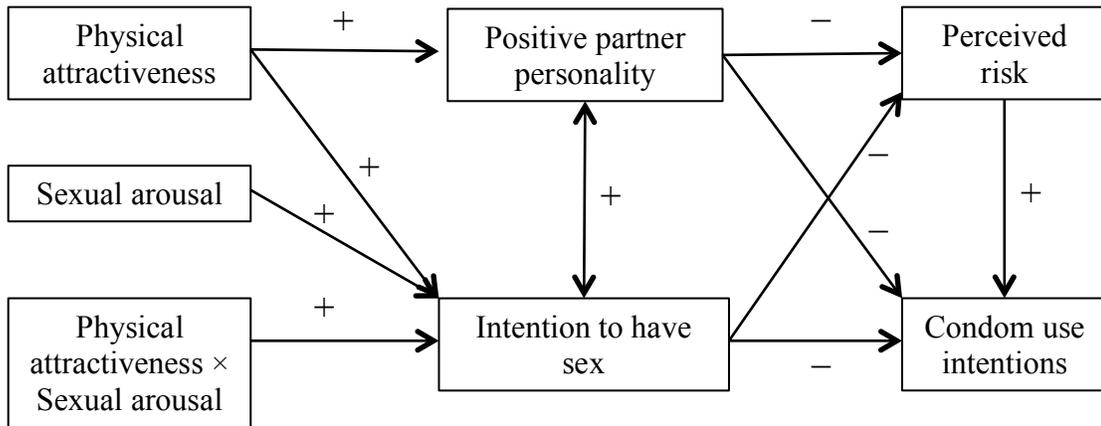


Figure 1. Hypothesized model of relations among variables. Pluses and minuses indicate hypothesized direction of effect.

Chapter 2: Method

Participants

Participants were 197 MSM who, as required by the eligibility criteria, identified as cisgender, were HIV-negative (96%) or unsure of their HIV status (4%), had used a geosocial networking (GSN) application (e.g., Grindr, Scruff) to find sexual partners, were not in a sexually exclusive relationship, and lived in the United States. The average age of participants was 28.37 years ($SD = 8.31$; range = 21 to 65 years). Participants reported living in 35 states across the United States and in the District of Columbia. Participants identified their race/ethnicity as White/European American (57.9%), Black/African American/Caribbean American (7.6%), East Asian/South Asian/Southeast Asian/Asian American/Pacific Islander (10.7%), Latino/Hispanic (9.6%), Middle Eastern (0.5%), Other (0.5%), or multiracial (by selecting some combination of the above options; 12.8%). Participants identified their sexual orientation as heterosexual (0.5%), gay (83.8%), or bisexual (15.7%). Thirty-three percent of participants reported that they were college students. Participants reported their highest level of education as high school or GED (6.1%), some college or Associate's Degree (29.9%), Bachelor's degree (35.5%), Master's degree (19.3%), or Professional degree (M.D., J.D., Ph.D.; 9.1%).

Participants reported that they were single (82.7%), had one primary partner and at least one casual relationship (9.1%), were in a committed (non-monogamous) relationship (4.1%), or were in multiple committed relationships (1.0%). Most participants (82.2%) reported that they were not currently taking PrEP. Participants reported using a variety of GSN apps to find dating or sexual partners, with

approximately 93% of participants reporting that they used more than one app ($M = 4.04$, $SD = 2.12$). The five most-used apps by participants were: Grindr (95.4%), Scruff (57.9%), Tinder (53.3%), Jack'd (39.1%), and Adam4Adam (32.5%).

Stimulus Materials

Video clips

Participants in the control condition viewed one of two 6-minute non-sexual and nonviolent video clips taken from YouTube.com of segments from popular talk shows (The Ellen Show and The Tonight Show Starring Jimmy Fallon; see Appendix F). Participants in the arousal condition viewed one of two 6-minute video clips depicting sexual behavior between two men (see Appendix F). Film clips were borrowed, with permission, from the authors of a previous study that validated erotic film clips to be used for the experimental manipulation of sexual arousal among MSM (Woolf-King, Maisto, Carey, & Venable, 2010). The two arousal video clips showed good convergent validity based on average ratings of the attractiveness of the actors in the clips, as well as of the sexual arousal produced by the clips, from a sample of MSM who were not in a sexually committed relationship (Woolf-King, Maisto, Carey, & Venable, 2010).

Photos

Participants viewed five photos of men in the high attractiveness condition and five photos of men in the low attractiveness condition (see Appendix G). Photos were chosen from a pool of 114 photos of racially diverse young adult men selected from the online photo-sharing site Flickr (all under a Creative Commons license).

Photos were selected based on the following criteria (which reflect photos typically found on GSN applications; Renner et al., 2012): (1) a colored photo of (2) a single man located in the foreground (3) with face clearly visible (i.e., chest and up).

To determine a set of photos for each condition, pilot testing was conducted with a sample of 22 MSM meeting the same eligibility criteria as the present study. Pilot study participants were recruited using two methods: (a) posting the study announcement for undergraduate psychology students, and (b) advertising on the listserv for student affiliates of Division 44 (Society for the Psychological Study of Lesbian, Gay Bisexual, and Transgender Issues) of the American Psychological Association. Participants who were undergraduate psychology students were offered course credit for participating; those recruited through Division 44 were offered \$5 for their participation.

Each participant was asked to rate each photo in terms of physical attractiveness on a scale of 1 (“extremely unattractive”) to 7 (“extremely attractive”). Photos from the upper and lower 20% of mean attractiveness ratings were examined, and from those, five photos were selected for the high attractiveness group (attractiveness $M = 5.63$; $SD = .48$) and five were selected for the low attractiveness group (attractiveness $M = 2.26$; $SD = .20$) with the goal of having a racially diverse set of photos. In order to eliminate race as a potential confounding variable of physical attractiveness, both groups contained photos of two White men, one African-American/Black man, one Asian/Asian-American man, and one Latino man.

Measures

Eligibility form

Participants completed a questionnaire to determine their eligibility for the study (see Appendix C). This asked participants to report if they currently resided in the US and were 21 years of age or older, their gender identification, sex assigned at birth, current HIV status, use of GSN applications, sexual behavior, and relationship status.

Demographic form

Participants were asked to report their age, US state of residence, type of area in which they lived (i.e., urban, rural, suburban), highest level of education, whether or not they were currently a college student, their relationship status, race/ethnicity, and sexual orientation. Participants were also asked about when they were last tested for HIV, use of PrEP, general tendency to use condoms, and which GSN applications they use to find sexual partners (see Appendix E).

Manipulation checks

After watching the video clip to which they were assigned, participants rated their level of sexual arousal from 1 (“Not at all aroused”) to 9 (“Extremely aroused”; Skakoon-Sparling et al., 2015; see Appendix F). After viewing each of the ten photos, participants were asked to rate the person in the photo on overall physical attractiveness on a fully anchored scale from 1 (“Extremely unattractive”) to 7 (“Extremely attractive”; see Appendix G).

Intention to have sex

Intention to have sex was assessed using two groups of items originally used by Agocha and Cooper (1999) to assess perceived desirability and intention to have sex, respectively, with a target person. These authors opted to use a composite of these items because both variables (desirability and intention to have sex) occupied a similar causal position in their model. They also argued that compositing the measures was conceptually desirable because it broadened the scope of the construct to include both intentions to act on the desire and strength of desire, better representing the motivational forces likely to operate in a real-world situation. Thus, they were combined in the present study as well.

The perceived desirability measure includes nine items assessing the degree of the participant's interest in dating or having sexual intercourse with the target person. Sample items include: "How interested would you be in having a 'get-to-know' date with this person?" and "Overall, how sexually desirable is the person in the photo?" Participants responded on a scale from 1 ("Not at all desirable/interested") to 7 ("Extremely desirable/interested"). The intention to have sex measure includes seven items assessing the intention to have sex with the target person under various conditions. Sample items include: "How likely is it that you would have a one-night stand with this person?" and "How likely is it that you would have sex in the first six months of dating this person?" Participants responded on a scale from 0% ("not at all likely") to 100% ("absolutely likely").

Agocha and Cooper (1999) found that scores on the two measures showed strong reliability in a sample of heterosexual men and women ($\alpha = .96$ for perceived

desirability; $\alpha = .95$ for intention to have sex). Epstein et al. (2007) also found good reliability for perceived desirability ($\alpha = .97$) and intention to have sex ($\alpha = .94$) in their sample of heterosexual and LGB men and women. A limitation of these measures is that no formal validation studies have been conducted with them; however, positive correlations between perceived desirability and intention to have sex, as well as between both measures and a measure of willingness to exchange information with the target person, provide some evidence of convergent validity (Agocha & Cooper, 1999).

These measures were developed for a heterosexual sample assumed to be meeting potential partners via in-person methods; thus, an additional concern regarding the validity of these items involves their use with MSM as a measure of the desirability of a sex partner found through a GSN application. Certain items, such as “How interested would you be in exchanging phone numbers with this person?” and “How interested would you be in having a casual dating relationship that does not involve sex with this person?” may not be relevant for MSM looking for partners through these sex-oriented apps. To address these concerns, the 22 MSM who participated in pilot testing were presented with these 16 items and asked to indicate how relevant each question seemed in the context of looking at profiles of potential dating/sexual partners when using an app like Grindr or Scruff. Relevance of each item was rated on a scale from 1 (“Not at all relevant”) to 3 (“Very relevant”). Mean relevance scores were calculated for each of the sixteen items, and items whose mean relevance scores were above the median relevance score across all items (2.24) were retained (see Appendix H). Items were standardized and composited into a single

score for intention to have sex, with higher scores indicating greater intentions to have sex with the partner. The eight-item measure of intentions to have sex used in the present study had a mean relevance score of 2.5, which provides some evidence of face validity, and a strong positive correlation with physical attractiveness ($r = .67$), which provides some evidence of convergent validity. Scores showed good reliability in the present study ($\alpha = .98$).

Positive partner personality

Participants were asked to rate their impressions of the man in each photo on eight personality attributes, selected based on previous research on traits that have been associated with HIV/STI risk perception (Blanton & Gerrard, 1997; Gold & Skinner, 1996; Renner et al., 2012; see Appendix I). All attributes were rated on scales ranging from 1 (e.g., “Very unlikeable”) to 7 (e.g., “Very likeable”), with higher scores indicating a more positive view of the target on the given personality characteristic. Previous researchers assessing a halo effect in relation to physical attractiveness have used similar methodology to assess personality characteristics of interest (e.g., Wade, Fuller, Bresnan, Schaefer, & Mlynarski, 2007; Zebrowitz & Franklin, 2014). Cronbach’s alpha in the present sample was .89. In the present study, positive partner personality was positively correlated with both physical attractiveness and intentions to have sex, which provide some evidence of convergent validity.

Perceived risk

Perceived risk was also measured using items originally developed by Agocha

and Cooper (1999; see Appendix J). Six items assess the perceived likelihood of getting HIV or another STI from the target person, to which participants respond on a 0% to 100% scale. An additional item assesses the overall risk for HIV associated with the target person on a scale from 1 (“not at all risky”) to 7 (“extremely risky”). Items were standardized and averaged into a single score for perceived risk, with higher scores indicating that the person is perceived as imposing more risk for HIV and other STIs. Scores on the perceived risk measure showed good reliability in Agocha and Cooper’s (1999) sample ($\alpha = .94$), Epstein et al.’s (2007) sample ($\alpha = .93$), and the present study sample ($\alpha = .93$). Agocha and Cooper (1999) found negative correlations between perceived risk and perceived desirability, willingness to exchange information, and intention to have sex, respectively, which provides some evidence of convergent validity (Agocha & Cooper, 1999). In the present study, perceived risk was negatively correlated with intention to have sex, and positively correlated with condom use intentions, providing additional evidence of convergent validity.

Condom use intentions

Condom use intentions were measured using five items developed by Agocha and Cooper (1999) that assess the likelihood of using condoms if intercourse were to occur (see Appendix K). Participants responded on the same 0% to 100% scale as that for the measure of perceived risk. Items were composited into a single score for condom use intentions, with higher scores indicating a greater likelihood that condoms would be used if sex with the target person were to occur. The measure of condom use intentions showed good reliability in Agocha and Cooper’s (1999)

sample ($\alpha = .87$), Epstein et al.'s (2007) sample ($\alpha = .92$), and the present study sample ($\alpha = .90$). Agocha and Cooper (1999) found a positive correlation between condom use intentions and perceived risk, which provides some convergent validity evidence; this correlation was found in the present study as well.

Control variables

We assessed and tested potential covariates to control for extraneous variance in outcome variables. Overall tendency to use condoms during anal sex was assessed to control for the possibility that general tendency to use condoms could weaken the relations between physical attractiveness, perceived risk, and condom use intentions. Participants were asked, "Of the last ten (10) times you had anal sex, how many times did you use a condom?" Participants answered by selecting one number, "0" through "10." Higher mean scores on this variable indicated greater general tendency to use condoms during anal sex.

Use of pre-exposure prophylaxis (PrEP) was also assessed to control the possibility that taking PrEP could mean that condoms are generally less likely to be used, which could weaken relations between physical attractiveness, perceived risk, and condom use intentions. Participants were asked, "Are you currently taking pre-exposure prophylaxis (PrEP), also known as Truvada®?" (0 = No; 1 = Yes). Both of these covariates are between-person variables, and thus were only assessed for hypothesized between-person relations among variables.

Data check

Participants were asked three questions, distributed evenly throughout the survey, to assess whether they were taking the survey in an attentive manner (see Appendix L). At the end of the survey, participants were asked to complete three items to assess the integrity of their data to ensure that they took the survey under conditions of quiet and privacy to maximize the effect of the manipulations (e.g., “I was somewhere quiet enough for me to focus on the survey”). Data from participants who responded to any of the questions in a way that indicated they were taking the survey inattentively were not included in study analyses.

Procedure

Participants were recruited by using two methods: (a) posting advertisements on Grindr and Scruff (Washington, DC area only), two popular GSN applications used by MSM to find dating or sexual partners ($N = 75$); and (b) emailing or posting announcements containing a link to the online survey to community organization listservs and online message boards directed toward MSM or LGBT individuals ($N = 122$). Men recruited while using Grindr and Scruff were presented with an advertisement describing an opportunity to earn \$10 for participating in an online survey on first impressions of dating or sexual partners met through phone apps (see Appendix B). Administrators of listservs for community organizations and moderators of online message boards were contacted with a request to email/post a link to the online survey on how first impressions are formed of dating or sexual partners met through phone apps (see Appendix B). The study announcement was emailed to the members of three listservs of community organizations for gay and

bisexual men in the Washington, D.C. area and posted to five message boards geared toward gay and bisexual men or LGBT people more broadly on Reddit.com.

By clicking on the advertisement or link, participants were redirected to an Internet page that welcomed them to the online survey and prompted them to complete the eligibility survey (see Appendix C). Individuals who did not meet eligibility criteria were informed of this and thanked for their interest in the study. Those who were eligible to participate were directed to a page with the informed consent information (see Appendix D). Participants were next presented with the demographic form (see Appendix E). Upon completing this section, participants were randomly assigned to one of two conditions: the control condition or the experimental (i.e., sexual arousal) condition. For those assigned to the control condition, participants were randomly assigned to view one of the two 6-minute control video clips (see Appendix F). For those assigned to the experimental condition, participants were randomly assigned to view one of two 6-minute video clips to induce sexual arousal (see Appendix F). After viewing their assigned video, participants answered a sexual arousal manipulation check question.

Minor deception was used in the instructions for the next part of the survey; specifically, participants were told that they would be shown photos of men located in their area that were taken from a phone dating application (which is untrue). The use of deception was based on previous research indicating that ecological validity was stronger when participants were led to believe that the photos were of individuals they could possibly meet or date following the study (Agocha & Cooper, 1999; Epstein et al., 2007). Participants were instructed that they would be asked to answer

questions regarding their impressions of the men in the photos. Participants in both groups then viewed the 10 photos of men, one at a time. As they viewed each photo, participants rated the man's physical attractiveness (manipulation check), followed by measures assessing intentions to have sex, positive partner personality, perceived risk, and condom use intentions. Participants were presented with each of the 10 photos in randomized order, followed by the measures of the two mediator variables, presented in randomized blocks, and the measures of the two outcome variables, also presented in randomized blocks. All randomization was masked from both participants and researchers. In addition, at three points at regular intervals throughout the survey, participants were presented with a data validity check question intended to assess whether they were responding to the survey in an attentive manner.

At the end of the survey, participants were asked three questions to assess their impressions of the integrity of their data, debriefed regarding the deceptive information about the photos (see Appendix M), given information about the hypotheses and purposes of the study, and thanked for their participation. Participants were then directed to a separate survey page, not linked in any way to their data, to choose their preferred method of compensation (cash or Amazon e-gift card; see Appendix N). If participants chose the cash payment option, they were asked to enter their name and mailing address for incentive processing and their email for contact purposes. If participants chose the \$10 Amazon e-gift card option, they were asked for their email to send the payment.

Data Analysis

Statistical analysis for this study was complicated by the multilevel structure

of the data, wherein ratings of photos on most variables were nested within participants. Attractiveness was a within-person factor with two levels (low, high), whereas arousal is a between-groups factor with two levels (low, high). Thus, the effects of attractiveness, both direct and indirect, will occur at the within-person level of analysis. In contrast, the effects of arousal, both direct and indirect, will occur at the between-person level of analysis.

I tested the direct and indirect effects suggested by the implicit personality and motivated reasoning models with multilevel path analysis using Mplus software (Version 7.1; Muthén & Muthén, 1998–2012). Specifically, I used a multilevel latent covariate model that has been shown to offer higher power to detect a variety of effects relative to more traditional multilevel regression models (Lüdtke et al., 2008; Zhang, Zyphur, & Preacher, 2009). This model partitions predictors measured at Level 1 into latent within-cluster and between-cluster components. Because the model can accommodate complex structural relations among variables, it is sometimes referred to as multilevel structural equation modeling (MSEM; Preacher, Zyphur, & Zhang, 2010). It is this feature of the model that makes MSEM particularly attractive for mediation analysis. Interpretation of path coefficients is virtually identical to that of fixed effects in traditional multilevel models. Mplus does not provide standardized path coefficients in multilevel models with random slopes. To generate standardized coefficients, all of the main analyses were conducted twice: first with the raw data (which generated unstandardized coefficients) and second with variables that had standardized prior to analysis (which generated standardized coefficients).

All variables were grand-mean centered in the main analyses, except for condom use intentions (i.e., the ultimate outcome variable in each model). Exogenous variables were allowed to covary. Within-person slopes were initially permitted to vary randomly across participants. These random slope components were dropped from the model if deviance tests indicated that doing so did not significantly impact model fit ($p > .05$). The hypothesized indirect effects were estimated with 95% confidence intervals (CIs) using the Monte Carlo method, which has been found to perform comparably with other methods (e.g., nonparametric bootstrap, distribution of product) and—in contrast with other methods—is easily executed with multilevel data (Preacher & Selig, 2012). I computed these CIs using the online utility developed by Selig and Preacher (2008). Support for a hypothesized indirect effect was inferred from a CI that does not contain zero.

As indicated in Figure 1, I originally intended to test the hypotheses based on implicit personality theory and motivated reasoning perspectives in a single, integrated model, in order to also test the hypothesis that the two mediators would have a positive bidirectional association. I tested models that included a bidirectional association between the two mediators, that allowed the mediator variables to be correlated, and that allowed the errors of the mediator variables to be correlated. Results of each of these models included at least one relation where the sign differed both from that of the corresponding bivariate relation and from what was hypothesized (e.g., negative associations between perceived risk and condom use intentions, and between attractiveness and positive partner personality, respectively; a positive association between intentions to have sex and perceived risk). Because these

implausible relations were difficult to explain or interpret, I decided to test hypotheses in two separate models: one that included hypotheses based what would be expected from the implicit personality theory perspective, and another that included hypotheses based on what would be expected from the motivated reasoning perspective. This did, however, mean that it was not possible to examine the relations between the two mediator variables, other than their correlation (see Table 1).

Chapter 3: Results

Data Management

The online survey link was clicked a total of 856 times, via both clicks on advertisements on GSN apps and links distributed through listervs and online message boards. Of those, 416 people completed the eligibility survey and consented to participate. A total of 227 participants completed the full survey. Of these, data from 30 participants were removed due to concerns regarding the integrity of the data (i.e., data validity questions were answered incorrectly, the survey was taken multiple times from the same IP address, or the survey was taken from an IP address outside of the United States, despite responding to the eligibility question indicating that they were located within the United States). This yielded a final sample size of 197 participants.

Manipulation Checks

Examination of the ratings of sexual arousal and physical attractiveness indicated that both manipulations were effective. Specifically, there was a significant difference in the scores for arousal between the control group ($M = 1.90$, $SD = 1.69$) and experimental group ($M = 4.85$, $SD = 2.26$); $t(195) = 10.40$, $p = .000$, $d = 1.48$. There was also a significant within-person difference in scores for physical attractiveness between the attractive group ($M = 5.50$, $SD = .72$) and unattractive group ($M = 2.55$, $SD = .87$); $t(196) = 45.75$, $p = .000$, $d = 3.69$.

Examining Within- and Between-Person Variability

The intraclass correlation coefficient (ICC) was estimated for the main

continuous variables. The ICC can be interpreted as the proportion of variance due to differences between people (or, alternatively, to consistency within persons). Conversely, $(1 - \text{ICC})$ can be interpreted as the proportion of variance due to differences within a person (plus error). As indicated in Table 1, the ICCs for intentions to have sex and positive partner personality, .03 and .17, respectively, indicated that a larger proportion of the variance was due to differences within a person than between persons. These within-person differences represented variance that could potentially be explained by differences in physical attractiveness of each photo. The ICCs for the outcome variables, perceived risk and condom use intentions, were .56 and .70, respectively, indicating that more than half the variance was due to differences between persons.

The relatively high ICC of condom use intentions could be attributed to the general likelihood of each participant to use condoms with sexual partners, which, for the men in this sample, tended to be relatively high: participants reported using condoms an average of 6.81 times in their last 10 instances of anal sex. The ICC for perceived risk, however, is somewhat unexpected, given that perception of risk is hypothesized in this study to be caused by differences within a person (i.e., by differences in attractiveness of potential sexual partners). Perceived risk may also be influenced by between-person variables unaccounted for by this study; for example, previous researchers have shown that risk perception can be influenced by affect (Isen, 2000; Johnson & Tversky, 1983).

Table 1
Intraclass Correlations of and Correlations among Mediator and Outcome Variables

Variable	1	2	3	4
1. Intentions to have sex	.03	.59	-.13	-.49
2. Positive partner personality	.60	.17	-.41	-.38
3. Perceived risk	-.12	-.11	.56	.26
4. Condom use intentions	.09	-.02	.28	.70

Note. Within-person correlations are above the diagonal; between-person correlations are below the diagonal. Intraclass correlations are on the diagonal.

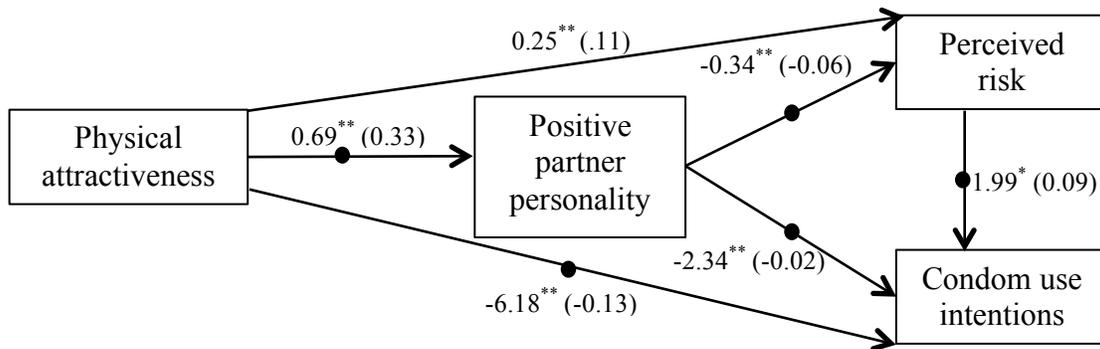
Testing the Implicit Personality Theory Model

As a first step in investigating the implicit personality model, deviance tests were used to determine whether model fit was improved by allowing the within-person slopes to vary randomly across participants. All within-person associations were found to vary significantly across participants, with the exception of the association between physical attractiveness and perceived risk, $\chi^2(9, N = 197) = 6.17$ ($p = .723$). Thus, aside from this exception, all within-person slopes were allowed to vary randomly across participants. These slopes were allowed to covary with one another and with other components of the between-person model.

Hypotheses for the implicit personality model were limited to the within-person portion of the model, given the focus on direct and indirect effects of attractiveness. As indicated in Figure 3, the hypothesized within-person relations were found among all model variables. Specifically, physical attractiveness was positively associated with positive partner personality, which was negatively associated with both perceived risk and condom use intentions. In addition, as hypothesized, perceived risk was positively associated with condom use intentions. The direct effects of attractiveness on both perceived risk and condom use were also examined, and results indicated that both relations were significant. Attractiveness was positively associated with perceived risk and negatively associated with condom use intentions. Only one statistically significant association was found at the between-person level: Perceived risk was positively related to condom use intentions.

Indirect effects were investigated to test the hypothesis that physical attractiveness indirectly influences within-person variation in perceived risk and

condom use intentions through its impact on perceptions of positive partner personality. Two indirect effects were estimated at the within-person level, based on one predictor (physical attractiveness), one mediator (positive partner personality), and two outcomes (perceived risk and condom use intentions). Indirect effects were estimated with 95% confidence intervals (CIs) using the Monte Carlo method. Results suggested that both indirect effects were nonzero (see Table 2). Specifically, at the within-person level, attractiveness was associated with greater perception of positive partner personality, which, in turn, was linked with decreased perception of risk for HIV/STIs and decreased intentions to use condoms.



Within-Person (Level 1)

Between-Person (Level 2)

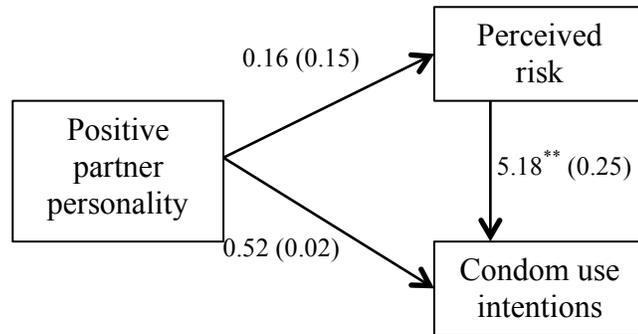


Figure 2. Multilevel path analysis results for the implicit personality model. Path coefficients are unstandardized (standardized coefficients in parentheses). Black circles indicate within-person slopes that were allowed to vary randomly across participants.

* $p < .05$. ** $p < .001$.

Table 2

Within-Person Indirect Effects of Attractiveness on Perceived Risk and Condom Use

Predictor	Mediator	Outcome	95% CI for indirect effect
Physical attractiveness	Positive partner personality	Perceived risk	[-0.30, -0.18] ^a
Physical attractiveness	Positive partner personality	Condom use intentions	[-2.33, -0.99] ^a
Physical attractiveness	Intentions to have sex	Perceived risk	[-0.30, -0.13] ^a
Physical attractiveness	Intentions to have sex	Condom use intentions	[-9.01, -5.80] ^a

Note. CI = Confidence interval. ^a CI does not include zero, indicating a significant indirect effect.

Testing the Motivated Reasoning Model

As a first step in investigating the implicit personality model, deviance tests were used to determine whether model fit was improved by allowing the within-person slopes to vary randomly across participants. All but two of the within-person associations were found to vary significantly across participants. The association between physical attractiveness and condom use intentions was not found to vary randomly across participants, $\chi^2(7, N = 197) = 0.91$ ($p = .996$). After removing this random effect, the association between physical attractiveness and perceived risk was also found not to vary randomly across participants, $\chi^2(7, N = 197) = .995$, $p = .891$. Aside from these two within-person slopes, all within-person slopes were allowed to vary randomly across participants. These slopes were allowed to covary with one another.

The within-person model testing the motivated reasoning perspective was similar to that for the implicit personality perspective, except the mediator was intentions to have sex rather than perceived personality (see Figure 4). The between-person structural model, however, differed from that for the implicit personality perspective because it included two additional main variables (sexual arousal; the within-person slope between attractiveness and intention to have sex) and two covariates (use of PrEP; number of times condoms were used in the last 10 instances of anal sex). Sexual arousal was modeled as a predictor of all other main variables, including the within-person slope between physical attractiveness and intention to have sex (which corresponded to the hypothesis that physical attractiveness would most strongly increase intention to have sex when the person was sexually aroused).

The within-person slope between attractiveness and intention to have sex, in turn, was included as a predictor of the remaining person-level variables. The two covariates were included as predictors of all variables except for the sexual arousal experimental condition variable.

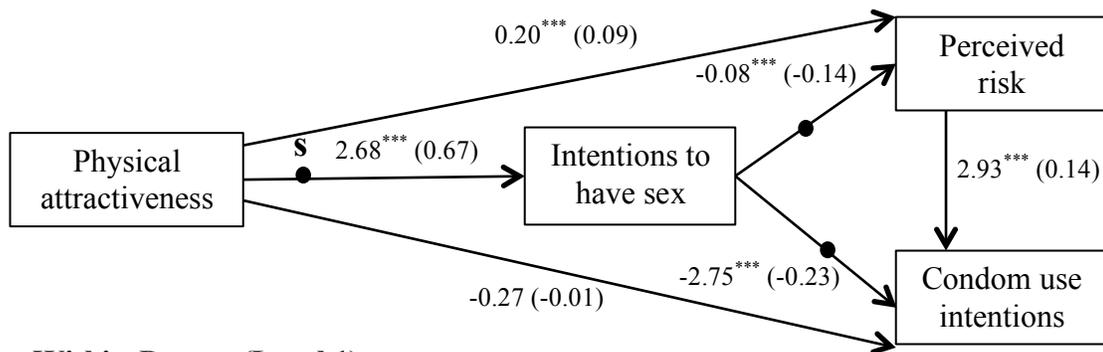
As indicated in Figure 4, hypothesized relations at the within-person level were found among all model variables. Specifically, physical attractiveness was positively associated with intentions to have sex, which was negatively associated with both perceived risk and condom use intentions. In addition, as hypothesized, perceived risk was positively associated with condom use intentions. Direct relations between attractiveness and both outcome variables were also examined, although not hypothesized. Results indicated that physical attractiveness increased perceived risk, as in the implicit personality theory model. However, in contrast to the implicit personality theory model, attractiveness was not found to directly impact condom use intentions. This difference suggested that the effect of perceived physical attractiveness on condom use intentions was fully explained in the motivated reasoning model but not the implicit personality theory model.

The hypothesis that sexual arousal would be positively associated with intentions to have sex was not supported, nor was support found for the hypothesis that arousal would increase the strength of the association between attractiveness and intentions to have sex (see Figure 4). The strength of the within-person association between attractiveness and intention to have sex, however, was positively associated with person-level intention to have sex. Thus, intention to have sex was generally higher among participants whose intention was most strongly impacted by perceived

physical attractiveness. Direct relations between arousal and both outcome variables were also examined. The relation between arousal and perceived risk was not significant; however, arousal was found to positively predict condom use intentions.

Indirect effects were investigated to test the hypothesis that, based on motivated reasoning, physical attractiveness indirectly influences within-person variation in perceived risk and condom use intentions through its impact on intentions to have sex. Two indirect effects were estimated at the within-person level, based on one predictor (physical attractiveness), one mediator (intentions to have sex), and two outcomes (perceived risk and condom use intentions). Indirect effects were estimated with 95% confidence intervals (CIs) using the Monte Carlo method. Results suggested that both indirect effects were nonzero (see Table 2). Specifically, at the within-person level, attractiveness was associated with greater intentions to have sex, which, in turn, was linked with decreased perception of risk for HIV/STIs and decreased intentions to use condoms.

Two covariates were included in this model: use of PrEP, and number of reported instances of anal sex in which condoms were used out of the last 10 instances of anal sex. Although these did not influence results, those who did not use PrEP were more likely to report that they intended to use condoms ($B = 11.76, p = .001; \beta = 0.19$), as were those who reported more instances of anal sex using condoms out of the last 10 times ($B = 2.42, p < .001; \beta = 0.38$). No other associations were found between the covariates and the main variables.



Within-Person (Level 1)

Between-Person (Level 2)

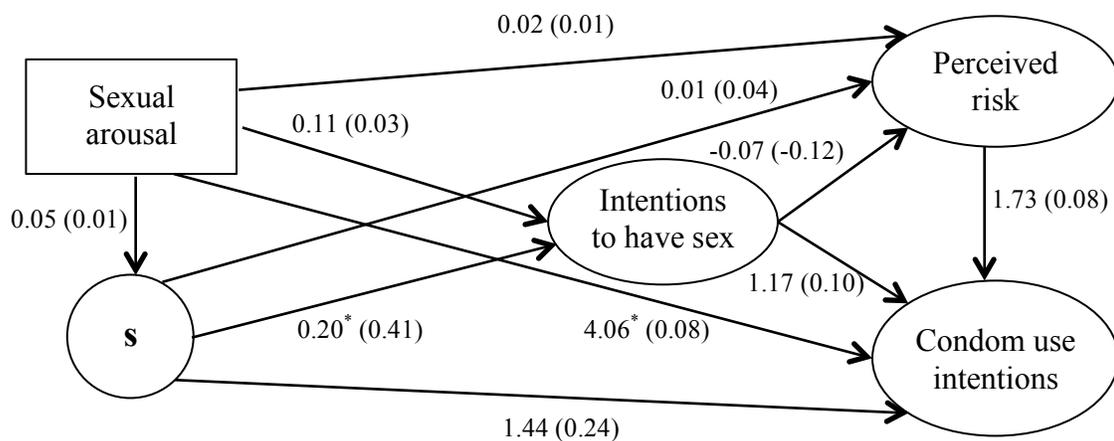


Figure 3. Multilevel path analysis results for the motivated reasoning model. Path coefficients are unstandardized, standardized coefficients are in parentheses. Black circles indicate within-person slopes that were allowed to vary randomly across participants. *s* = within-person slope between partner physical attractiveness and intentions to have sex. For clarity of presentation, covariates are not featured in this figure.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Chapter 4: Discussion

The present study aimed to investigate relations among physical attractiveness, perceived HIV/STI risk, and condom use intentions among MSM, as well as mediators that could indicate the presence of two possible theoretical explanations for these associations: implicit personality theory and motivated reasoning. Another goal of this study was to increase ecological validity to a population that may be at the most risk for making these assumptions: MSM who use GSN apps.

Both the implicit personality theory model and the motivated reasoning model were largely supported, which appears to indicate the presence of both a halo effect as well as motivated reasoning in explaining how physical attractiveness may reduce perceived partner risk and condom use intentions. Thus, physically attractive sexual partners could elicit a halo effect involving the belief that such partners do not have HIV or other STIs, and do not require condoms to be used. In addition, seeing an attractive person could increase motivation to have sex with that person, which leads to the belief that the person probably does not have HIV or another STI, and decreases motivation to use condoms. These results could act as a potential explanation for evidence of higher rates of condomless anal sex (CAS) and gonorrhea and chlamydia infection among GSN app-using MSM (Zou & Fan, 2016), who may be more likely than non-app-using MSM to make judgments about their sexual partners based on attractiveness when they look at photos of men while using the app.

One interesting result found in both models was that attractiveness had a positive direct effect on perceived risk, after accounting for both mediators. This

result appears more consistent with Dijkstra et al.'s (2000) finding that physical attractiveness of female targets was related to increased perceived STI risk, which was mediated by perceived promiscuity, among Dutch heterosexual men. Gold and Skinner (1996) also found that physical attractiveness was associated with increased perceived risk for HIV in a sample of gay men. Although Gold and Skinner (1996) did not measure perceived promiscuity as a mediator, they also suggested that their participants could have believed that an attractive man is more likely to have a greater number of sexual partners, thus increasing their perceptions of risk. The results of the present study indicate that attractiveness can influence risk perceptions through multiple pathways simultaneously: halo effect, motivated reasoning, and perceptions of number of sexual partners. In fact, when the total relation between attractiveness and both outcomes was examined, attractiveness was negatively related to condom use intentions ($B = -8.29, p < .001$), but *unrelated* to risk perception ($B = -.03, p = .571$). Thus, these opposing mechanisms effectively cancel each other out, and render the total effect nonsignificant. This highlights the importance for future researchers to measure mediators of this association, because otherwise, one might miss attractiveness' multi-faceted influence on perception of risk, which, in turn, can influence intentions to use condoms. This type of cancelling out did not occur for condom use intentions, meaning that overall, attractiveness decreases intentions to use condoms with a partner.

One difference between the models was the finding that attractiveness had a significant direct negative effect on condom use intentions in the implicit personality theory model, but no significant direct effect on this outcome in the motivated

reasoning model. Thus, it appears that the relation between attractiveness and condom use intentions was fully mediated by intentions to have sex, but only partially mediated by positive partner personality. These results would have been more easily interpreted had both mediator variables been tested in a single model, as originally planned. Future research could investigate a more comprehensive model that not only takes into account the core components of these two theoretical mechanisms, but also the more nuanced ways in which they can influence one another.

Hypotheses regarding the influence of sexual arousal on intentions to have sex, and the relation between attractiveness and intentions to have sex, were not supported. Although the within-person association between attractiveness and intention to have sex supports the presence of motivated reasoning, these results raise questions about the role of arousal in motivation. It was hypothesized that motivation to have sex could be influenced by prior sexual arousal, because those who are feeling sexually aroused would be more motivated to have sex with *any* potential partner, regardless of their physical attractiveness. Results appear, in contrast, to highlight the significance of the role of person perception in sexual motivation, because attractiveness predicted intentions to have sex, and arousal did not. Thus, it appears that motivated reasoning is more influenced by the attractiveness of the partner than arousal of the perceiver. A model of risk perception that incorporates other possible aspects of person perception (e.g., partner personality characteristics) could even more accurately predict sexual motivation.

These results could also have been related to a limitation in the design of the study, which was that sexual arousal was manipulated, and the manipulation check

was performed, relatively early in the completion of the online survey. Thus, although the manipulation check indicated a strong effect of the experimental videos on sexual arousal, it could be that this effect decreased as participants continued taking the survey, which took them anywhere from 25 minutes to an hour to complete. Shuper and Fisher (2008) utilized two video clips to manipulate sexual arousal in their participants, one at the outset of their study and a second half way through the completion of the study. This methodological difference could explain why their results indicated a stronger effect of arousal. It is also possible that the influence of arousal would have been stronger had participants had an option to pursue sex with the men in the photos at the time (e.g., by contacting them). Future research could address this possibility by incorporating an option to contact potential partners into an experimental design, or conducting observational research on partners contacted through GSN apps.

However, this does not explain the direct positive relation between arousal and condom use intentions. This finding is inconsistent with several studies that have found that increased sexual arousal predicts CAS, or intentions to engage in CAS, among both HIV-positive and HIV-negative MSM (Hays, Paul, Ekstrand, Kegeles, Stall, & Coates, 1997; Shuper & Fisher, 2008; Strong, Bancroft, Carnes, Davis, & Kennedy, 2005). In addition to motivated reasoning processes as an explanation for the positive relation between arousal and CAS, authors have also proposed that rational decision-making processes become impaired when individuals are sexually aroused (Bancroft, 2000), or that aroused individuals engage in cognitive processes that involves reliance on heuristics that are not always accurate (Gold, 1993, 2000).

Bancroft (2000) also suggested that people will inhibit their feelings of sexual arousal when they perceive risk in order to avoid risky behavior, but that some people lack this ability, and ignore risk when experiencing sexual arousal. This prediction was supported by findings that HIV-positive and HIV-negative MSM, as well as heterosexual men, who had low inhibition of sexual arousal when faced with risk showed elevated levels of CAS (Bancroft et al., 2003, 2004). Although previous researchers have proposed various cognitive processes (or lack thereof) as underlying the relation between arousal and intention to engage in CAS, they have not directly measured indicators of these processes (e.g., intention to have sex), making direct comparison with the present study's results somewhat difficult.

It is possible that those who were in the sexual arousal condition reported higher condom use intentions because were more able to realistically imagine themselves having sex with the men presented in the photos. The men in this sample reported generally high numbers of times in which condoms were used out of the last 10 instances of anal sex ($M = 6.81$); this could mean that if, ultimately, participants were to have sex with the men in the photos, they would use condoms, because this is consistent with their typical use. In contrast, the men in Shuper and Fisher's (2008) sample reported relatively high rates of condomless anal and oral sex in the previous three months, with 80.1% of all reported sexual acts not involving condom use. This could act as another potential explanation for their differing results for the effects of arousal on intention to engage in condomless anal sex.

Limitations and Future Research Directions

The results of this study should be interpreted in light of some limitations.

Although this study was designed to increase ecological validity to GSN-app-using MSM, its experimental nature makes it inherently somewhat limited in its ability to replicate the experience MSM have of finding partners using these apps in the real world. For example, although deception was used in which participants were told that the photos of men they would view were taken from a GSN app and depicted men in their area, it is possible that not all participants believed this to be the case. This could mean that their responses would not have reflected their responses were they viewing photos in the context of app use. In addition, GSN apps contain information in each profile other than a photo that could influence the viewer's perception of risk (e.g., disclosure of PrEP use, or achieving an undetectable viral load among HIV-positive persons; Newcomb, Mongrella, Weis, McMillen, & Mustanski, 2016). Finally, although condom use intentions were used as a proxy for actual condom use behavior among GSN-app using MSM in this study, it is unclear how this would translate into behavior in the real world.

Additional observational research is needed, therefore, to further support the results found in the present study. Future research could also be used to investigate which mechanisms (i.e., halo effect, motivated reasoning, perceptions of previous partners) have the strongest impact on the relation between attractiveness and perceived risk—and under what conditions (e.g., while under the influence of alcohol, with different types of relationships). It would also be useful to explore whether assumptions about perceived HIV/STI risk based on physical attractiveness are actually more likely among GSN-app-using MSM compared to MSM who meet sexual partners in other ways. Observational research of GSN-app using MSM could

incorporate methodology such as ecological momentary assessment (EMA), which has the potential to provide a unique view of how sexual behavior occurs in the real world and can impart more detailed information about aspects of decision-making, antecedents, and consequences (Wray, Kahler, & Monti, 2016). In a study to assess the acceptability and feasibility of a 30 day, intensive EMA procedure among MSM, Wray et al. (2016) found support for the acceptability, feasibility, and utility of using EMA to understand sexual risk events among high-risk MSM, and that EMA and other intensive longitudinal assessment approaches could yield more accurate data about sex events.

Results of this study also have potential to contribute to interventions geared toward decreasing CAS among MSM who use GSN-apps. Zou and Fan (2016) pointed out in their meta-analysis that GSN apps could be a very effective way to disseminate information intended to increase the sexual health of their customers. For example, Scruff has a Health section that includes information on physical and mental health services, HIV/AIDS prevention, care, and advocacy, and hepatitis A and B vaccinations. Czarny and Broaddus (2017) conducted a survey to assess acceptability of types, methods, and frequency of delivery of HIV prevention information through GSN apps and found that all types of information (e.g., locations and hours of nearby HIV testing facilities, negotiating condom use with potential partners, reducing risk of contracting HIV) were found acceptable. For method of delivery, “Sexual health section within the app that you must open to receive information” was found most acceptable, and for frequency of delivery, “Only when you actively seek the information” and receiving information “Once per week (alert)” were both

significantly more acceptable than neutral. This study's findings could inform an intervention delivered through GSN apps in a section on sexual health potentially including psychoeducation related to assumptions one might unknowingly be making about potential partners, and how this could be influencing behavior.

It is important to note when interpreting these study's results that they are likely generalizable across all gender and sexual orientation groups, and are not intended to represent phenomena unique to MSM. Sawyer, Smith, and Benotsch (2017) found that nearly 40% of their sample of heterosexual cisgender college students used cell phone-based dating applications to find sexual partners, and that those who did use dating apps had higher rates of sexual risk behaviors in the past 3 months (e.g., sex after using drugs or alcohol, anal or vaginal sex without condoms, and more lifetime sexual partners). In addition, research has shown that attractiveness is related to perceptions of STI risk among heterosexual men and women (Agocha & Cooper, 1999; Blanton & Gerrard, 1997; Dijkstra et al., 2000; Renner et al., 2012). Thus, it would behoove future researchers to replicate the results of this study among diverse gender and sexual orientation populations.

Appendices

Appendix A: Extended Literature Review

Men who have sex with men (MSM) are more severely affected by HIV than any other group in the United States, representing 65% of all HIV diagnoses in 2013 (CDC, 2015). The large percentage of MSM living with HIV means that, as a group, they have an increased chance of being exposed to HIV (CDC, 2015). Sexual risk behaviors, particularly anal sex, account for the most HIV infections among MSM, and the most effective ways to prevent becoming infected with HIV are to take antiretroviral medications and to correctly use a condom during every instance of anal sex (CDC, 2015).

Although research has shown that people are aware that HIV is sexually transmitted and that condoms are a method to prevent becoming infected with HIV and other STIs, many still engage in sex without condoms (Ford & Norris, 1993; Gold & Skinner, 1992; Hays & Peterson, 1994; Jemmott & Jemmott, 1994; Keller, 1993; Kitzinger, 1991; Renner et al., 2012; Thomas & Hodges, 1991; Thompson, Anderson, Freedman, & Swan, 1996; Wierson & Bright, 1996). In a study conducted with 219 gay men, all participants reported having instances of anal sex without condoms in the previous six months, and 83.6% reported knowing that anal sex without condoms was a high-risk activity (Gold & Skinner, 1992). Other studies have found that percentages of those who report using condoms every time they have intercourse are low among gay men (11%) and heterosexual college students (2.5%; Thompson, Kent, Thomas, & Vrungos, 1999). An additional study conducted with heterosexual adults found that although 60% of participants indicated that they used

condoms less than 75% of the time, only 38% of those participants rated themselves as having more than a 50% chance of contracting an STI/HIV within the next year if they did not use a condom (Masaro, Dahinten, Johnson, Ogilvie, & Patrick, 2008). Finally, a recent study conducted by the CDC found that only 16% of MSM reported consistent condom use during anal sex with male partners of any HIV status over the entire observation period (Smith, Herbst, Zhang, & Rose, 2015).

Preexposure prophylaxis (PrEP) is a daily pill that has recently been introduced as a way to prevent HIV infection. For those who are at high risk for HIV, PrEP has been shown to reduce the risk of contracting HIV from sexual activity by up to 90% (CDC, 2016a). Although this has been suggested as a method of risk reduction for those who do not regularly use condoms, its effectiveness is greatly reduced if not taken consistently (CDC, 2016a). In addition, the CDC (2016a) recommends that users of PrEP continue to use condoms during sex both to further reduce HIV risk as well as to protect against STIs, which are not preventable by taking PrEP. This is particularly important given that for MSM, STIs remain a serious concern: in 2014, MSM accounted for 83% of primary and secondary syphilis cases among males in which sex of sex partner was known (CDC, 2016b). The CDC (2016b) also warns that having another STI makes one more likely to become infected with HIV, as well as more likely to pass HIV to another person, than someone who is STI-free.

In response to this alarming disparity in knowledge about HIV prevention and HIV prevention behaviors, much research has been dedicated to gaining a better understanding of how to predict condomless sexual behavior. Much of this research

has been dedicated to testing theoretical models that have been developed around health-related behaviors, such as the Health Belief Model (Janz & Becker, 1984). What many of these models have in common is a component related to perceptions of personal vulnerability to health hazards (Gerrard, Gibbons, & Bushman, 1996). Taken together, these models appear to indicate that perceptions of personal vulnerability act as a motivation for preventative behavior, which Gerrard et al. (1996) referred to as the *motivational hypothesis*. However, Gerrard et al. (1996) did not find support for the motivational hypothesis in their meta-analysis. This could be attributed to the fact that none of the studies included were experimental or longitudinal, making it impossible to make any causal inferences. Another meta-analysis conducted by Sheeran, Harris, and Epton (2004) that included only experimental studies did find support for the positive relation between risk appraisal and behavior.

It is important to note that these meta-analyses conceptualized risk perception as an individual's assessment of the overall level of vulnerability to a specified threat (Harrison, Mullen, & Green, 1992; Janz & Becker, 1984). This is known as *global risk perception*, because it assesses overall perceived level of threat without distinguishing the source of the risk (Reisen & Poppen, 1999). Reisen and Poppen (1999) suggest, however, that global risk perception may not be appropriate for assessing personal vulnerability to STIs, because the perceived risk of becoming infected from a sexual partner can vary depending on characteristics of that partner. This perception, in turn, can cause variation in preventative behavior, such as using condoms. Thus, Reisen and Poppen (1999) suggested a conceptualization of risk known as *partner-specific risk perception* (PSRP), which is based on the likelihood of

contracting HIV or an STI from a given partner at a given time. The authors hypothesized that PSRP would be influenced by factors relating to sexual history (i.e., number of casual partners, total number of partners), specific relationships (i.e., length of relationship and commitment level in the relationship), and global risk perception (i.e., how likely an individual believes it is that they will become infected with HIV in the next five years).

In their first study of PSRP, Reisen and Poppen (1999) measured PSRP by asking participants how great of a risk for transmission of HIV and STIs they thought that their partners posed for them. The researchers predicted that PSRP would influence self-protective behavior in the form of both condom use and relationship safety (i.e., a situation with uninfected partners, determined by HIV testing, who agree to use monogamy as a method of self-protection). Results indicated that all three predictors were significantly related to PSRP in a sample of heterosexual male and female college students. However, PSRP was not significantly related to condom use, and had the opposite association with relationship safety than hypothesized: Participants who perceived greater risk were less likely to have practiced safer sex. The authors explained this result as being an indication that the relationship between PSRP and relationship safety was in the opposite direction of influence than hypothesized: People who engaged in safe practices tended to perceive their risk of HIV/STI transmission from their partners as lower than those who did not engage in those practices (Reisen & Poppen, 1999). The authors also proposed that this result could have been due to the cross-sectional nature of their data, and so conducted a follow-up longitudinal study to test the hypothesis that PSRP at Time 1 would predict

condom use at Time 2; this hypothesis was supported.

Despite the value of Reisen and Poppen's (1999) nuanced conceptualization of risk perception, PSRP may also be influenced by additional factors not considered by these scholars, such as superficial cues based on stereotypes regarding who is less likely to have HIV/STIs. One such stereotype that has been investigated in the literature involves assumptions around physical attractiveness. Some scholars have found that partners who are physically attractive are assumed to be less likely to be infected with HIV/STIs (Agocha & Cooper, 1999; Blanton & Gerrard, 1997, Gold & Skinner, 1992; Offir, Fisher, Williams, & Fisher, 1993; Schmalzle, Renner, & Schupp, 2012), which could mean that condoms are less likely to be used. Other scholars, however, have found that partners who are physically attractive are assumed to be more likely to have HIV/STIs, based on an assumption that those who are more attractive are likely to have had more sexual partners (Dijkstra, Buunk, & Blanton, 2000; Gold & Skinner, 1996). Additional research has shown that physical attractiveness of partners is not associated with perceived risk (Epstein et al., 2007; Renner, Schmalzle, & Schupp, 2012).

The use of physical attractiveness as a cue for the risk associated with a given sexual partner is particularly relevant in today's sexual landscape. MSM make quick judgments regarding sexual partners based only on a photo when using geosocial networking (GSN) applications, such as *Grindr*, which utilize the global positioning system on smartphones and other devices to allow users to identify potential sex partners nearby. Zou and Fan (2016) estimated that there are tens of millions of MSM using GSN apps to socialize and find sex partners. However, using these applications

to locate sexual partners carries with it a certain level of risk. A meta-analysis of the characteristics of MSM who use GSN apps found that high-risk behavior was common (Zou & Fan, 2016). App-using MSM had an average of between 29–80 sex partners in their lifetime, 9–10 in the past year, and 2 in the past month. Only 8.3 % had exclusively regular partners and 46.4 % had unprotected anal intercourse (UAI) with all partners in the past 3 months. Only about half of app-using MSM always inquired a new partner’s HIV status. In addition, app-using MSM appeared to be largely unaware of their level of risk. Those who reported UAI and/or no recent HIV testing thought they were either HIV negative or at low risk for HIV infection. For example, in one study, 70% of those reporting UAI also reported low perception of HIV risk (Landovitz et al., 2013). Furthermore, non-app-using MSM had fewer sexual behaviors that put them at risk for HIV transmission compared to app-using MSM. For example, 59.8% of app-using MSM versus only 27.0% of non-app-using MSM had 5 or more partners in the past 12 months (Landovitz et al., 2013).

These findings, in part, could be attributed to reliance on superficial cues to determine that a potential partner is “safe” and thus condoms are not needed. Many GSN apps are designed to present users with only a picture of potential sex partners, which they then use to decide whether or not they would like to contact them for a sexual encounter. Evaluating sexual partners in this way could make the use of physical attractiveness as an indicator of partner safety more likely than if those partners were met in person, when there might be more of an opportunity to get information about more reliable indicators of risk, such as sexual history. Furthermore, GSN apps are specifically designed to aid its users in finding casual sex

partners, suggesting its users may often use them when sexually aroused and less inclined to carefully evaluate risk. These superficial cues are “at best imperfect indicators of actual partner serostatus” (Hong et al., 2006, p. 157), and reliance on them provides a false sense of security (Thompson, Kent, Thomas, & Vrungos, 1999).

The mechanisms whereby people rely on these superficial cues, despite acknowledging that they are inaccurate indicators of HIV/STI status have been discussed in theoretical literature (Gold & Skinner, 1992, 1996; Misovich, Fisher, & Fisher, 1997; Williams et al., 1992) but have rarely been empirically studied. Implicit personality theories, for example, are assumptions people hold about how a psychological trait is expressed through behavior and how traits relate to one another (Eagly, Ashmore, Makhijani, & Longo, 1991). One well-known implicit theory is based on the halo effect: the notion that a person possessing one positive trait must generally be positive. Misovich et al. (1997) suggested that physically attractive sexual partners may elicit a halo effect involving the belief that such partners do not have HIV/STIs and do not require sexual risk precautions.

Motivated reasoning, another proposed mechanism underlying reliance on unreliable cues of HIV/STI status, is based on the notion that people are drawn to beliefs that are consistent with personal goals—even if those beliefs are not based on rational decision-making strategies (Kunda, 1990). Thus, it could be that interacting with an attractive person increases the perceiver’s motivation to have sex with that person. This motivation, in turn, should lead the perceiver to develop beliefs that support the goal of sexual contact (e.g., “this person is probably HIV negative”).

The present study aims to investigate the relationship between physical attractiveness and perceptions of risk associated with a potential sexual partner, as well as intentions to use condoms with that partner, and test two potential mediators of that relationship: global positive perceptions of the partner, which could indicate the use of implicit personality theory, and the desirability of and intentions to have sex with the partner, which could indicate presence of motivated reasoning. In addition, the present study will manipulate sexual arousal, both to improve ecological validity to situations in which MSM choose to use GSN apps because they are aroused, as well as to provide a stronger test of the motivated reasoning theory.

The literature review that follows begins with a summary of research on theoretical models of risky sexual behavior. This is followed by a summary of evidence that stereotypes about who is most likely to have HIV/STIs are likely to be used when making decisions about condom use with potential partners, and that reliance on these stereotypes can increase the likelihood of risky sexual behavior. Next, the section on the specific stereotypes related to physical attractiveness summarizes research on the relationship between physical attractiveness and perceptions of HIV/STI infection among heterosexual and sexual minority participants. Finally, mechanisms that have been proposed to mediate this relationship, including those drawn from theories of implicit personality and motivational reasoning, are discussed.

Risk Perception and Sexual Risk-taking

It has been hypothesized that when one's global risk perception, i.e., perception of one's personal vulnerability to a health-related risk, increases, that

engagement in preventative behaviors would also increase. This hypothesis has been supported for a variety of health-related outcomes (Sheeran et al., 2004). The following section of the literature review will focus on findings related to whether this hypothesis can be supported in regard to HIV/STI risk perception and preventative behaviors.

Global risk perception and sexual risk-taking. A large body of literature has been dedicated to predicting unsafe sexual behavior; much of this literature utilizes models that have been developed to explain why people choose to (or not to) comply with various preventative health behaviors. The following section will discuss the ways in which these models have conceptualized the relation between global risk perception and sexual risk-taking behavior, as well as review empirical research conducted to test these relations.

The health belief model (HBM; Janz & Becker, 1984; Rosenstock, 1966) consists of several components or “ingredients” that are proposed to promote (or inhibit) health-relevant actions. These basic components include subjective perceptions of (a) vulnerability to the negative event, (b) severity of the negative event, (c) benefits of specific preventive actions, and (d) barriers to performing preventive actions. The first of these components, perceived vulnerability to the negative event, is usually depicted as a motivator of precautionary behaviors. Janz and Becker (1984) conducted a meta-analysis of the validity of the HBM and found evidence of associations between perceived vulnerability and preventative behaviors (e.g., flu shots, blood-pressure screenings). However, most of the studies reviewed by the authors were retrospective and correlational in nature, providing no evidence of a

causal relationship between perceived vulnerability and subsequent preventative behaviors. Indeed, another meta-analysis conducted using only longitudinal studies, and thus with more power to make causal inferences among variables, found that the relationship between perception of vulnerability and subsequent preventative behavior was “almost always near zero” (Carpenter, 2010, p. 666).

However, one study on the HBM with HIV risk behavior specifically found that those who had increased perceptions of vulnerability and worry about HIV infection actually practiced *fewer* HIV prevention behaviors (Brunswick & Banaszak-Holl, 1996). Due to the cross-sectional nature of their study, the authors are unable to draw conclusions regarding a causal relationship between perceptions of vulnerability and HIV prevention behaviors. They suggest, however, that their results could indicate a reverse causal direction than is proposed by the HBM. In other words, although the HBM would predict that increased perceptions of vulnerability would motivate HIV prevention behaviors, their results appear to indicate that a lack of prevention behaviors leads to increased perceptions of vulnerability to and concern about HIV infection. Other studies have found no association between perceptions of vulnerability and condom use or intentions to use condoms, leading authors to conclude that this component of the HBM is not useful in predicting risky sexual behavior (Montanaro & Bryan, 2014; Winfield & Whaley, 2002; Zak-Place & Stern, 2004).

The protection motivation theory (Rogers, 1975) also proposes a relationship between perceived vulnerability to a health hazard and subsequent protective behaviors. This model suggests that being exposed to information about a health

hazard stimulates a cognitive appraisal of one's personal vulnerability to the negative event; this appraisal, in turn, arouses motivation to protect oneself. In his review of the literature, Rogers (1983) concluded that research supports the major elements of the model, particularly the role of subjective estimates of vulnerability as a cognitive mediator of precautionary behavior. A meta-analysis found that, across 15 studies and a total of 2,434 participants, threat vulnerability was found to significantly influence protective intentions or behaviors with a small effect size ($d = .21$; Floyd, Prentice-Dunn, & Rogers, 2000). The authors measured methodological quality using a nine-item scale for evaluating study quality. Each item was rated from 1 (*poor*) to 5 (*excellent*), and the average rating across all studies included in the meta-analysis was 4.2, leading the authors to conclude, "the studies showed fairly good methodological properties" (Floyd et al., 2000, p. 414). However, it is not clear how many studies used cross-sectional methods and how many used experimental or longitudinal methods, making it difficult to evaluate the authors' ability to make conclusions regarding direction of influence among variables.

Van der Velde and Van der Pligt (1991) conducted a study to investigate the relationships proposed by the protection motivation theory among heterosexual and homosexual participants, particularly that between vulnerability to HIV (operationalized as the estimated chance of personally being infected with HIV in the future) and intentions to use condoms in the future. The results from the heterosexual participants indicated a positive relationship between vulnerability and behavioral intentions, and results from the homosexual participants revealed a negative relationship between vulnerability and behavioral intentions. Due to the cross-

sectional nature of the study, it is unclear if or how vulnerability and behavioral intentions were causally related. Participants were asked about both variables in the future, and thus presumably were not assessing their current level of personal vulnerability based on past behaviors, as was suggested by Brunswick and Banaszak-Holl (1996). It could be that, for the homosexual participants, low intentions to use condoms in the future resulted in beliefs that their vulnerability to HIV would be high as a result.

Two additional models focus on AIDS risk specifically, rather than on health-related risk in general: the AIDS Risk Reduction Model (ARRM; Catania, Kegeles, & Coates, 1990) and the Information-Motivation-Behavioral Model (IMB; Fisher & Fisher, 1992). The ARRM is a three-stage model of behavior change: (1) Labeling, or recognizing and accurately identifying one's sexual behavior as putting one at risk for contracting HIV; (2) Commitment, which represents a conscious decision to reduce high risk sexual behavior and substitute lower risk sexual behavior; and (3) Enactment, which encompasses the acts of seeking solutions and practicing new behaviors to reduce risk for HIV. Stage 1 of the model hypothesizes that perceived risk is a fundamental precondition for changing risky sexual behavior (Catania, Coates, Kegeles, 1994). In a study testing the ARRM, Catania, Coates, and Kegeles (1994) found that, contrary to hypothesis, no Stage 1 predictors were correlated with condom use.

The IMB (Fisher & Fisher, 1992), much like the HBM, proposes several essential "ingredients" necessary to engage in AIDS preventative behaviors. These three components, as the name suggests, are: information, or specific knowledge

regarding means of AIDS transmission and prevention, motivation to engage in AIDS prevention, and behavioral skills for performing specific AIDS-preventative acts (e.g., verbal and nonverbal abilities to communicate about and negotiate safer sex with one's partner, to refuse to have unsafe sex, to properly use a condom, and to exit the situation if safer sex is not possible). Motivation is proposed to be a function of two variables: one's attitudes towards the AIDS-preventative act, and relevant subjective norms regarding the AIDS-preventative act. Fisher, Fisher, Williams, and Malloy (1994) add that additional variables that may affect motivation to engage in AIDS-preventative acts could be influenced by perceived vulnerability to HIV.

A study testing the IMB model to predict UAI among MSM at high risk for HIV transmission measured both behavioral change intentions and perceived risk (Kalichman, Picciano, & Roffman, 2008). Results indicated that, contrary to hypothesis, perceived risk was positively correlated with UAI. When included in the final IMB model, perceived risk had both a direct and indirect positive effect (via HIV risk reduction self-efficacy) on UAI at four-month follow-up. Thus, the authors conclude: "Perceived risk is not a motivating factor at all and actually taps a self-assessment of risk without intention to reduce risk. In fact, our data show that the greater one perceives their risk the less they endorse intentions to change" (Kalichman et al., 2008, p. 687). These results are consistent with those reported by Brunswick and Banaszak-Holl (1996) and Van der Velde and Van der Pligt (1991) that those who engage in risky sexual behaviors (or fewer HIV-preventative behaviors) perceive a greater level of personal risk for becoming infected with HIV; they do not appear to support theories that propose that increased perception of risk

motivates people to engage in fewer sexual risk behaviors (or more HIV-preventative behaviors).

Based on these models, Gerrard, Gibbons, and Bushman (1996) conducted a meta-analysis to test what they term the *motivational hypothesis*, based on the overarching conclusion that perceptions of personal vulnerability act as a motivation for preventative behavior. In their meta-analysis, the authors wished to test the following hypotheses which are implicit to their motivational hypothesis: (a) Most people who have engaged in risky behaviors will report (accurately) that they are vulnerable to the negative consequences associated with those behaviors, (b) those who have practiced effective precautionary measures or avoided risk behaviors will report (accurately) that they are not vulnerable, and (c) individuals who change their risk or precautionary behavior will subsequently alter their perceptions of vulnerability. Data was analyzed from 32 studies with a total of 15,440 participants. All studies had some variation of the question “What is the likelihood that you will contract HIV?” and self-reports of one or more sexual risk behaviors or condom use.

Three types of studies were included: cross-sectional, prospective, and retrospective. In cross-sectional studies, perception of risk and risky or preventative behaviors were assessed concurrently. In the prospective studies, participants reported precautionary behavior and perceptions of risk at one time, followed by a subsequent report of precautionary behavior. Finally, in the retrospective studies, participants’ reports of changes in risk behavior in the recent past are compared to current perceptions of risk. The results of the meta-analysis provided only weak support for the hypothesis that risky or precautionary behaviors influence perceptions of risk, and

no support for the hypothesis that perceptions of risk motivate subsequent precautionary sexual behavior. The authors suggested several possible explanations for their null results. First, it could be that high-risk groups, when compared to low-risk groups, do not fully acknowledge the relation between their behavior and their risk, due either to ignorance or denial. If so, it is unlikely that risk perceptions will motivate precautionary behavior in high-risk groups. Second, even if the link between behavior and risk is acknowledged, it may be that people in high-risk groups are convinced that they cannot change their behavior.

Sheeran, Harris, and Epton (2004) conducted a similar meta-analysis on the relation between risk appraisal and behavior with the consideration that the only way that causal relations can be established between heightened risk perception and intentions or behaviors is by using experimental methods. Studies included in Gerrard et al.'s (1996) meta-analysis were not experimental, which could be another potential explanation for their lack of evidence for the influence of risk perception on preventative behaviors. Thus, Sheeran et al. (2004) included only studies that experimentally manipulated risk appraisal in their meta-analysis, and found that risk perception did influence intentions and behaviors, but that effect sizes were small ($d = .36$ for intentions; $d = .25$ for behaviors). They also assessed the influence of risk perception on sexual intentions and behaviors specifically, and found evidence to support this relation, also with small effect sizes ($d = .23$ for intentions; $d = .26$ for behaviors).

The studies examined in Gerrard et al.'s (1996) and Sheeran et al.'s (2004) meta-analyses are based on theoretical models that conceptualize risk perception as

an individual's assessment of the overall level of vulnerability to a specified threat (Harrison, Mullen, & Green, 1992; Janz & Becker, 1984). This is known as *global risk perception*, because it assesses overall perceived level of threat without distinguishing the source of the risk (Reisen & Poppen, 1999). Asking participants to estimate the likelihood of becoming infected with HIV over the course of their lifetimes assesses global risk perception and summarizes perceived risk over all partners and all behaviors for the given or implied time period. Reisen and Poppen (1999) suggest, however, that global risk perception may not be appropriate for assessing personal vulnerability to HIV and other STIs, because the perceived risk of becoming infected from a sexual partner can vary depending on characteristics of that partner. Thus, they suggested a conceptualization of risk known as *partner-specific risk perception* (PSRP).

Partner-specific risk perception and sexual risk-taking. The perception of risk of becoming infected with HIV/STIs from a sexual partner can vary depending on a number of factors, including characteristics of the partner, which in turn can influence decisions about whether or not a condom is used with that partner. Thus, Reisen and Poppen (1999) proposed PSRP, a conceptualization of risk perception based on the likelihood of contracting HIV/STIs from a given partner at a given time, rather than on global risk perception, in order to better assess the impact of risk perception of subsequent behavior. The following sections will review research on the association between PSRP and sexual risk-taking, as well as variables that influence partner-specific risk perception.

PSRP and sexual risk-taking. Reisen and Poppen (1999) conducted two

studies to examine the association between PSRP and condom use. In Study 1, the authors gave a questionnaire to 399 college students to gather information on PSRP and sexual behaviors, including condom use. Two questions were designed to assess PSRP for both HIV and STIs. The question for HIV was “How great a risk for transmission of HIV did you think that your partner posed for you?” Participants answered based on a 6-point scale ranging from 1 (*no risk whatsoever*) and 6 (*almost certainty of transmission*). Outcome measures included whether or not condoms were used at the most recent occasion of intercourse, and relationship safety. Relationship safety was operationalized as a dichotomous variable in which a relationship was safer if condoms were used for every incident of intercourse during the previous four weeks or had been in a mutually exclusive relationship in which partners had tested negative for HIV or were first partners. Participants in relationships not meeting these criteria were characterized as less safe.

Results indicated that, contrary to hypotheses, no relationship was found between PSRP and condom use at last intercourse. In addition, PSRP had the opposite relationship than predicted with relationship safety; participants who perceived greater risk had less safe relationships. This result is consistent with similar unexpected findings from other researchers (i.e., Brunswick & Banaszak-Holl, 1996; Kalichman et al., 2008; Van der Velde & Van der Pligt, 1991), and these authors similarly concluded that PSRP in this case was acting as a consequent, rather than an antecedent, of engaging in safe practices. Thus, people who engaged in relationship safety tended to perceive that the risk of HIV transmission from their partners was lower than those who did not engage in such practices.

Reisen and Poppen (1999) had concerns that these findings may have been attributed to inconsistency in the time periods for which behaviors and risk perception were reported. Although behavioral information can be recalled for the entire four-week period, reports of risk perception likely represented risk perception at the end of the time specified rather than throughout the period. An additional limitation of Study 1 was the specific risk-perception questions, for which the authors believed that the wording emphasized risk posed by the partner, not the probability that the partner had HIV or an STI. However, a partner could be seen as posing limited risk not only if they are perceived as disease free, but also if other conditions were met, specifically if condoms were used during all instances of sexual contact, or if both partners had tested seronegative for HIV and their relationship was exclusive (i.e., relationship safety).

To address these limitations, Reisen and Poppen (1999) conducted a second longitudinal study to test the hypothesis that PSRP influences subsequent self-protective behavior. The same questionnaire as Study 1 was used, except that PRSP was measured in two items based on the perception of the likelihood that the partner currently had HIV or an STI. The response scale was also modified to be on an 11-point scale ranging from 0 (*impossible*) to 10 (*certain*). Questionnaires were given at Time 1, and then again at Time 2 four weeks later.

Results indicated that PSRP at Time 1 predicted condom use with that partner at Time 2, even after controlling for condom use reported at Time 1. Additional studies conducted since have provided further evidence of a positive relationship between PSRP and future condom use (Ellen, Adler, Gurvey, Millstein, & Tschann,

2002; Thorburn, Harvey, & Ryan, 2005). Thus, risk perception can motivate self-protection in regards to safer sex practices when risk perception is measured in a way that captures source of the risk: in this case, from a specific partner.

Predictors of PSRP. Reisen and Poppen (1999) also hypothesized that PSRP would be predicted by partner's sexual history (e.g., partner's current STI status, whether the partner had received a negative result on an HIV test or ever had an STI), relationships factors (e.g., length of relationship, level of commitment), and global risk perception. Specifically, they predicted that PSRP would have a positive association with partner's number of previous partners or the partner previously having had an STI. In addition, PSRP was hypothesized to be negatively associated with length of relationship and level of commitment, based on previous research indicating that there is a lesser likelihood of condom use in committed relationships, or with primary (as opposed to casual) partners, but that there is a greater perception of safety in these types of relationships. Thus, the authors conclude that perception of safety may mediate the effect of relationship characteristics on behavior.

Study 1 results indicated that global HIV risk perception and partner's total number of partners were positively related to PSRP, and level of commitment to the relationship was negatively related to PSRP. Results of Study 2 replicated these findings, and also showed that length of relationship and whether the partner had ever had an STI predicted PSRP in the manner expected. It is important to note, however, that these predictors explained only 33% of the variance in PSRP, which would indicate that there are other factors that could influence PSRP that were not examined in their study.

Other researchers have considered predictors of PSRP that are considerably more subjective than a partner's sexual history, which led to the creation of the Partner Safety Beliefs Scale (PSBS; Masaro et al., 2008). Items of PSBS were developed based on scales used in previous STI/HIV research (Clark, Miller, Harrison, & Kay, 1996; Misovich, Fisher, & Fisher, 1996) as well as qualitative studies (Hammer, Fisher, Fitzgerald, & Fisher, 1996; Offir et al., 1993; Skidmore & Hayter, 2000; Swann, Silvera, & Proske, 1995). Participants were asked how strongly they agreed with items in several categories using the statement "In general, I would be pretty sure that a person I was considering as a sex partner was safe (did not have an STI) if..." The categories of the PSBS include familiarity (e.g., "I felt I knew this person"), trust (e.g., "I felt I could trust this person"), similarity (e.g., "This person came from a background similar to mine"), likeability (e.g., "I liked or loved this person very much"), superficial traits (e.g., "This person was physically attractive"), sexual history (e.g., "I felt I knew this person's sexual history"), and relationship type (e.g., "This person was someone I considered myself serious about"). The mean score on the PSBS was 50.80 out of a possible score of 80 (a score of 48 would have been considered "neutral"), which Masaro et al. (2008) believed indicated that, on average, participants were relying on partner safety beliefs when they evaluated the sexual safety of their partners.

It seems clear that people use information regarding partner safety that is not an accurate predictor of whether or not the partner is infected with HIV/STIs. Much qualitative research has shown that people feel they "just know" whether or not someone is HIV-positive, often based on perceptible characteristics, despite

consciously acknowledging that HIV cannot be detected simply by looking at a person (Hughes, 1999; Kitzinger, 1991; Offir et al., 1993; Williams et al., 1992). An excerpt from a qualitative study conducted with gay men regarding reasons for inconsistent use of AIDS-protective behaviors indicates how prevalent the use of superficial characteristics to judge the risk posed by a potential partner may be:

Eleven men reported using “non-verbal methods” to ascertain a partner's risk (e.g., looking for signs of illness); one reported that unprotected oral sex was safe if “you don't see any bleeding [in the receptive partner's mouth],” but others were not sure exactly how they determined a partner's degree of riskiness, only that it was done “nonverbally.” For instance, one man reported engaging in unprotected anal sex after determining non-verbally that his partner was not infected with the virus, but could not remember how he had made this determination (Offir et al., 1993, p. 68).

The use of “non-verbal” methods to deduce the HIV status of a potential sexual partner is a potentially deadly heuristic, as HIV-status cannot be accurately judged based on appearance, because a person who is infected can be asymptomatic for 10 years or more. Simply put, the only way to tell if a partner is HIV-positive is if they have been tested; reliance on other cues provides a dangerous, false sense of security (CDC, 2015; Thompson, Kent, Thomas, & Vrungos, 1999; Williams et al., 1992). The inaccuracy of these types of cues has been empirically shown as well: a study that presented participants with photos of both HIV-positive and HIV-negative individuals and asked participants to identify the HIV-status of the individuals found that, on average, people were able to guess correctly 5.5 out of 12 images, which is no better than chance (Thompson, Kyle, Swan, Thomas, & Vrungos, 2002).

Physical attractiveness as a predictor of PSRP. Physical attractiveness has been investigated as a potential cue used to determine the STI risk associated with a

potential sexual partner, for heterosexual men and women, as well as MSM.

However, results of these studies have not been consistent: Some studies have found that physical attractiveness is associated with less likelihood of STI risk (Agocha & Cooper, 1999; Blanton & Gerrard, 1997; Gold & Skinner, 1992; Offir et al., 1993; Schmalzle et al., 2012); others have shown that physical attractiveness is associated with estimates of a greater likelihood of STI risk (Dijkstra et al., 2000; Gold & Skinner, 1996); another found no association between physical attractiveness and STI risk associated with a partner (Epstein et al., 2007; Renner et al., 2012).

Agocha and Cooper (1999) conducted a study in which 300 heterosexual male and female undergraduates were shown photos in which physical attractiveness was manipulated. The aim of the study was to examine if physical attractiveness would predict perceived desirability, intention to have intercourse, perceived risk, and likelihood of condom use. A pilot study was used to select physically attractive and unattractive photos of men and women that were used as stimulus materials. Along with the photos, participants were also given a brief sexual history of the target person, including that he or she had dated and had sex with a certain number of people in his or her lifetime. All previous relationships were described as “pretty serious,” and exclusive. Level of risk based on sexual history was manipulated by the number of previous sexual partners the target person had had. Specifically, low, moderate, and high risk conditions were 1, 6, or 18 people for the female target, and 2, 8, or 20 people for the male target. These values were based on low (corresponding to the 10th percentile), moderate (corresponding to the 50th percentile), and high (corresponding to the 90th percentile) values observed for the number of lifetime

partners in a random sample of sexually active 18- to 21-year-old men and women (Cooper et al., 1994).

Participants were told that they would view a photograph and dating agency profile of a member of the opposite sex and that they would be given an opportunity, after the study, to exchange photographs, phone numbers, and possibly go on an introductory date with this person if they so chose. They were then shown the photographs and descriptions of the sexual history of the targets and completed questionnaires of the dependent measures. These included perceived desirability, or how interested the participant was in dating or having intercourse with the target; intention to have intercourse with the target; perceived risk, or the likelihood of getting an STI or HIV from the target; and condom use intentions, or the likelihood of using a condom if intercourse were to occur.

Main effects of physical attractiveness were found for perceived desirability, intention to have sex, and perceived risk, but not for condom use intentions. Physically attractive targets were associated with greater perceived desirability, greater intention to have sex, and less perceived risk. These main effects were qualified by interaction effects with gender, however, such that the association between physical attractiveness and perceived risk were significant only among men.

The authors also conducted a path analysis to test a model containing relations among all variables, and found that physical attractiveness predicted condom use intentions by increasing the desire for intercourse which, both directly and indirectly, via lowered risk perceptions, decreased condom use intentions. Although greater risk associated with the partner's sexual history (i.e., greater number of previous sexual

partners) also indirectly influenced condom use via increased perceived risk, the magnitude of the indirect effect of physical attractiveness on condom use was almost six times larger than that of sexual history. The authors conclude that although a more accurate method to judge the risk associated with the targets (sexual history) was used by participants in making risk judgments and in planning their behavior, less useful types of information (physical attractiveness) influenced behavioral intentions more strongly. Interestingly, the path analysis also revealed that the direct relation between physical attractiveness and intentions to use condoms was a positive one, although the indirect relation, via intentions to have sex, was negative.

Blanton and Gerrard (1997) conducted an experimental study to investigate the effect of sexual motivation on risk perceptions for STIs in a sample of 40 male undergraduates using two trials. In the first trial, participants were given the sexual history of nine different women and then estimated the STI/HIV risk of having sex with each one. The sexual histories contained the woman's number of past sexual partners and her frequency of condom use. In the second trial, motivation was induced by having participants make a second set of estimates about the same women under high and low sexual motivation. Half of the participants made this second set of estimates with non-diagnostic information about the women (i.e., personality and interests), and half did not have any additional information. All participants were given the same sexual histories of the women that they were presented with in the initial trial. The high and low sexual motivation was manipulated by the sex appeal of photographs of the women, which was determined via pilot testing in which men rated their desire to have sex with the women in the photographs.

During this second trial, participants were shown a photograph of a woman for 10 seconds while they engaged in an imagery task. Participants were instructed to imagine that they met this woman at a bar and then returned with her to her apartment, where it becomes apparent that she is interested in having sexual intercourse. Participants were told to reflect on this situation and how they would respond. Participants also rated how interesting, similar, likable, attractive, and sexy the target was, in addition to their personal sexual interest in her. Results indicated that during the second trial, participants who viewed photographs that were high in sex appeal and who also had non-diagnostic information about the women made lower risk estimates regarding those women. This effect failed to occur among participants who received no non-diagnostic information.

Schmalzle, Renner, and Schupp (2012) conducted an experimental study in which male and female college students (91% of whom were heterosexual) viewed 120 photographs meeting the following criteria: (a) frontal head portrait; (b) neutral emotional expression; (c) gaze directed toward the observer; (d) Caucasian face; (e) young adult. Participants were shown each photo for a period of two seconds, followed by a one-second delay, and then asked about their risk perceptions using the question, “How likely do you think it is that this person is HIV-positive?” Participants responded on a scale from 1 (“very unlikely”) to 7 (“very likely”). After a 10-minute break, participants were also asked to rate the following characteristics about the photos: attractiveness, healthiness, responsibility, trustworthiness, valence, arousal, and willingness to interact. These items were also rated on a 7-point scale, with higher scores indicating that the characteristic was more pronounced. Perceived risk

was negatively correlated with physical attractiveness, but was more highly negatively correlated with trustworthiness and responsibility.

Gold and Skinner (1992) examined justifications for having condomless intercourse in their study with 219 young (aged 15-21 years) gay men. Structured interviews were conducted with gay men regarding sexual encounters they engaged in without using condoms in the previous six months. They presented participants with a list of 81 possible justifications for having sex without a condom (created from a discussion with AIDS counselors and pilot testing). For each one, participants indicated how strongly it had been in their mind at the time they decided to have sex.

The authors conducted a factor analysis on the 81 items and found two distinct factors. One appeared to be related more to feeling states or thoughts that the participant had that indicated an acceptance of the risk being taken (e.g., “We take chances every day – after all, it’s even taking a chance to cross a road. Taking a risk is just part of life”; “Most of the time I’m careful, but I can’t be perfect – it’s only human to break out occasionally”). The other appeared to be related to an assessment of the risk based on perceptible characteristics of the partner. One of these justifications was specifically related to physical attractiveness of the partner: “This guy is so beautiful, he can’t possibly be infected.” This justification was endorsed by 23.7% of participants, and had a loading of 0.61 on the second factor. Other justifications that loaded onto this factor involved other characteristics of the partner, such as, “This guy looks so healthy, he can’t possibly be infected,” “This guy seems so intelligent/well-educated, so I’m sure he’s been careful. So he can’t possibly be infected,” and “This guy seems such a nice person – he’s got a lovely personality – so

he can't possibly be infected" (Gold & Skinner, 1992, p. 1026).

Finally, Offir, Fisher, Williams, and Fisher (1993) conducted a qualitative study using a focus group with 41 gay men to discuss AIDS-preventative behavior. Perceptible characteristics as a method of evaluating the risk posed by a partner was expressed by these participants; eleven men reported using "non-verbal methods" to ascertain a partner's risk. Many of these men were unsure of how they had nonverbally determined a partner's degree of riskiness; however, at least seven men seemed to evaluate all physically attractive partners as low in HIV risk, even in the absence of objective risk information. Taken together, the results of this group of studies appear to support the hypothesis that physical attractiveness influences decreased perceptions of risk posed by a potential sexual partner, among both heterosexual men and MSM. However, other studies have supported the opposite conclusion: physical attractiveness influences increased perceptions of risk. This group of studies will be reviewed in the following section.

Dijkstra, Buunk, and Blanton (2000) conducted a study with 72 Dutch heterosexual male undergraduates to determine the effect of physical attractiveness of a female target on motivation to have sex, perceived promiscuity, perceived past condom use, and perceived risk for STI infection. Photographs of women were obtained from a modeling agency and a photographer and were pilot tested to gauge the attractiveness of the photos. Based on these ratings, two photos were selected for the experimental conditions, one attractive and one unattractive. Participants were given either an attractive or unattractive photo and asked to imagine the following:

You don't have a girlfriend. A few weeks ago you met Marjan. You hit it off immediately and, ever since, you have spent a great deal of

time together: You have had dinner, and you have gone out several times. You feel comfortable with Marjan, and you can relate to each other very well. This evening the two of you have gone out with a couple of friends. After a while, everybody goes home and only the two of you are left. Your conversations are getting more intimate. Time flies and before you know it, it is closing time. The lights go out, the music stops. What a shame, the two of you have not finished talking yet. You leave the cafe and you walk home part of the way together. On the way home, you decide to get a drink at Marjan's place. When you are in her room, Marjan pours you a drink and sits next to you on the couch (Dijkstra et al., 2000, p. 1743-4).

Participants were then given a manipulation check asking them to rate the attractiveness of the target profile, along with measures of motivation to have sex with the target, perceived promiscuity of the target (assessing how often they believe the target had sex with people she did not know very well), perceived past condom use of the target (and past partners of the target), and how likely it was that they would be infected with an STI if they were to have sex with the target one time without using a condom, and how likely it was that the target was infected with an STI. Results indicated that the target's physical attractiveness was positively related to perceptions of STI risk; this effect was mediated by perception of promiscuity.

The authors noted that the fact that their participants were motivated to have sex with physically attractive targets, but nonetheless perceived a greater risk associated with acting on this impulse, was in contrast to Blanton and Gerrard's (1997) findings. To explain this discrepancy, they highlight that their study was conducted in the Netherlands, and that their contrasting results may be a product of cultural differences between the Netherlands and the United States:

Compared with most other cultures, people in The Netherlands appear to emphasize sexual equality more and to have more liberal attitudes about sexuality (Hofstede, 1984). As a consequence, people in The Netherlands may be more used to anticipating and consciously

deliberating on what to do if a sexual opportunity would arise. If this is the case, people in The Netherlands may rely more on cold calculations with regard to STI risks instead of being overwhelmed by motivational factors that may be biased by a potential sex partner's sexual desirability or physical attractiveness (Dijkstra et al., 2000, p. 1751-2).

Thus, it appears unclear how generalizable these results are to an American sample. It could be that, had this study been replicated in the United States, results would have been more similar to those found by Blanton and Gerrard (1997).

Gold and Skinner (1996) conducted a study with 66 MSM, most of whom (94%) identified as gay/homosexual, to determine relationships between several characteristics and likelihood of being HIV infected. Six characteristics were investigated: physical attractiveness, intelligence/education level, healthy appearance and lifestyle, personality, a combination of the 4 preceding characteristics, and wealth; wealth, however, was included as a control because it was hypothesized not to affect judgments of antibody status. Participants were given descriptions of men that highlighted one of the six characteristics; three versions of each description were used that depicted the men in either positive, negative, or neutral terms. For example, these were the three versions of the description that highlighted the man's physical attractiveness:

Positive version

Grant often goes to the local gay beach in summer. He really loves it. Actually, he is one of the beach's main attractions. He has classic masculine features, blue eyes, and long blond hair. His body is muscular and lean. When he emerges from the water, all the sunbakers on the sand-dunes turn to watch him admiringly.

Neutral version

Grant often goes to the local gay beach in summer. He really loves it. But he rarely turns heads there. His face is pleasant enough, but nothing out of the ordinary. Though his body is not unattractive, it is a

bit on the weedy side. The sunbakers on the sand-dunes, looking for spunks [attractive young men], scarcely notice him at all.

Negative version

Grant often goes to the local gay beach in summer. He really loves it. But his presence doesn't add to the beach's attractions. His face is long and pointy, and covered in pimples. His body is pear-shaped, and his hair is thinning badly. When he emerges from the water, the sunbakers on the sand-dunes think how ugly he is (Gold & Skinner, 1996, p. 43).

Participants were then asked to rate, on a scale of 0 to 100, the likelihood that the men in the descriptions were HIV-infected.

To analyze the results, two sets of planned comparisons were conducted for each of the six characteristics, one for the positive and neutral descriptions versus the negative description, and one for the positive versus the neutral descriptions. Results showed that for the descriptions that highlighted the man's physical attractiveness, the positive and neutral versus negative comparison was not significant; however, the positive versus neutral comparison was significant such that the man in the positive description of physical attractiveness was rated as more likely to be HIV-infected than the man in the neutral description. In addition, the men in the negative descriptions of intelligence/education level, healthy appearance and lifestyle, personality, and the combination of the 4 characteristics were all rated as more likely to be HIV-infected than the men in the positive and neutral descriptions. As expected, wealth was not a significant predictor of HIV status. Gold and Skinner (1996) suggest that gay men may believe that a good-looking man is likely to be able to attract more sexual partners, and is thus more likely to be exposed to HIV/STIs. The authors also assert

The inferences cannot even be reduced to the assumption that men with features desirable from a sexual or romantic perspective are less

likely to be infected; the results for physical attractiveness indicated that attractive men were regarded as *more* likely to be infected. It remains unclear which of the inferences can be viewed as manifestations of a single underlying assumption. At least in principle, a different line of reasoning could underlie each inference (Gold & Skinner, 1996, p. 41).

Renner, Schmalzle, and Schupp (2012) investigated associations between perceived HIV risk and other trait characteristics in a sample of 82 male and female undergraduate students. Participants viewed 120 photos of opposite sex persons in two sessions. In the first session, participants viewed the photos and, after a one second delay period, were asked to evaluate how likely it is that the presented person is infected with HIV. In the second session, which took place one week after the first, participants viewed the same 120 photos and were asked to evaluate them according to the following characteristics: attractiveness, healthiness, responsibility, trustworthiness, valence (i.e., feelings), arousal, and HIV risk. In addition, participants rated their willingness to interact with the person.

The stimulus photos were taken from a popular online photo-sharing community and were selected on the basis of several criteria, including being a color photo of a single person in the foreground whose face was clearly visible. All photographs were of young (aged 18-35), White people in order to resemble the study's target population in terms of age and race. In order to resemble naturalistic viewing conditions and to facilitate impression formation, only photos exhibiting attire, socioeconomic status cues, or situational context features were included.

Factor analysis was conducted on the trait characteristics measured for each photo to examine personal impressions relating to perceived HIV risk. Average responses for each stimulus person were used for ratings of attractiveness,

healthiness, responsibility, trustworthiness, valence, arousal, HIV risk, and willingness to interact with the person. The first factor, which accounted for 55% of the variance, had high positive loadings for attractiveness, valence, healthiness, and willingness to interact; therefore, the authors labeled this the “valence-approach” factor. The second factor, which accounted for 32% of the variance, had high negative loadings for arousal and HIV risk, and high positive loadings for responsibility and trustworthiness; the authors labeled this the “perceived safeness” factor. Based on these results, the authors concluded that risk perceptions were not related to perceptions of attractiveness or valence (i.e., feelings), although these did influence participants’ willingness to interact with the person. Rather, risk perceptions were influenced by perceptions of responsibility or trustworthiness of the person.

Epstein and colleagues (2007) conducted a study to replicate Agocha and Cooper’s (1999) study in an online format with a sample of both heterosexual and LGB men and women. The authors selected 20 photos (10 men, 10 women) and used pilot data from 213 heterosexual and 68 LGB men and women to select the three most attractive and two least attractive photos. Participants included 357 heterosexual men ($n = 238$) and women ($n = 119$) and 911 LGB men ($n = 732$) and women ($n = 179$). Each participant was randomly assigned an attractive or unattractive photo and given the sexual history of a target individual in the form of number of previous sexual partners (low, medium, or high, described as “only one sexual partner,” “a few partners,” or “several partners,” respectively). All heterosexual participants received a different-gender target photo, and all LGB participants received a same-gender target photo. An important distinction between this study and Agocha and Cooper’s (1999)

study is that participants in Epstein et al.'s (2007) study were not led in any way to believe that they might have the opportunity to meet, exchange phone numbers, or go on a date with the targets in the photos. Participants then responded to questions regarding the target on perceived desirability, intentions to have sex, perceived risk, and intention to have protected sex (i.e., use a condom).

Results indicated that, although physical attractiveness was positively associated with intentions to have sex, contrary to the findings of Agocha and Cooper (1999), no association was found between physical attractiveness and perceived risk or intention to have protected sex. In addition, no significant interaction effects were found for gender or sexual orientation, indicating that these results were found for heterosexual and LGB participants. The authors attribute these differing results to their older, more educated, and more sexually experienced sample. They also suggest that the lack of association between attractiveness and risk may be due to the presence of sexual history of the targets, which they found was positively associated with perceived risk. Although they suggest, "knowledge of the sexual history of a high PA [physical attractiveness] individual may, therefore, alter the relationship between PA and intentions to have protected sex," (Epstein et al., 2007, p. 29). However, it is unclear why knowledge of the targets' sexual histories would have affected these results, and not Agocha and Cooper's (1999) results.

Taken together, previous studies do not provide a consistent picture of the relation of physical attractiveness to perceptions of risk. There may be several possibilities as to why this is the case. The first could be related to differences in populations being sampled. Dijkstra et al. (2000) suggested that their results could

have been attributed to differences in cultural norms around sex in The Netherlands, meaning that their sample would have been more likely to use “cold calculations” (p. 1751) and rely less on biased reasoning. This raises questions regarding generalizability to MSM in the US. In addition, there are a number of methodological differences among studies that could have contributed to their varying results: correlational (e.g., Schmalzle et al., 2012) versus experimental (e.g., Epstein et al., 2007) studies; whether participants were given photos (e.g., Agocha & Cooper, 1999) or written descriptions (e.g., Gold & Skinner, 1996) as stimuli; whether information about sexual history of targets was provided (e.g., Blanton & Gerrard, 1997); and whether other information about the targets (such as personality characteristics) was provided (e.g., Blanton & Gerrard, 1997).

Differences among studies that may be particularly useful in interpreting discrepancies in their findings are those that relate to ecological validity to MSM who use GSN apps. For example, viewing photos more closely approximates the experience of app users than reading written descriptions of attractiveness. Additionally, studies have differed in the extent to which they encouraged participants to focus on the possibility of having sex with the target. Agocha and Cooper (1999) led participants to believe that they might have the opportunity to meet the target after the completion of the study; Blanton and Gerrard (1997) instructed participants to imagine having an encounter with the target in which it becomes apparent that she is interested in having sex. Epstein et al. (2007), however, did not influence participants in any way to imagine having sex with the targets. It appears, then, that the studies with greater ecological validity to MSM using GSN apps (i.e.,

those that use photos as stimuli and in which there is an emphasis on meeting or having sex with the target) are those that have found a negative association between attractiveness and perceived risk.

Differing results could be also attributed to the presence or absence of certain mechanisms linking physical attractiveness to decreased perception of risk, which are discussed in the following section.

Mechanisms Explaining Links between Attractiveness and PSRP

Although some research has suggested that physical attractiveness is associated with perceptions that a potential partner is safe (i.e., does not have HIV or another STI), what is less clear are the mechanisms whereby these assumptions occur. Many studies have pointed to an unconscious process, based on evidence that assumptions about the risk associated with potential partners are made without an awareness of how or why they were made (Hughes, 1999; Kitzinger, 1991; Offir et al., 1993). For example, Gold and Skinner (1996) noted that the gay men in their study were “generally unaware (or only dimly aware) that they were inferring antibody status from perceptible characteristics” (p. 42). In addition, some of the gay men interviewed by Offir et al. (1993) were not sure how they determined a partner’s degree of riskiness, only that it was done “nonverbally.” In addition, research on brain responses to high and low risk stimuli related to HIV has found that distinguishing between these stimuli occurs at a speed that “supports the notion of processing efficiency (~220ms) and is too short for deliberate reasoning to play a role” (Renner et al., 2012, p. 6). Finally, it appears that this unconscious process occurs independently of a conscious acknowledgement that perceptible characteristics are

not accurate predictors of HIV-status; for example, participants in one study often stated, “You can’t tell who’s infected by looking,” (Offir et al., 1993). Thus, it behooved researchers to attempt to answer the question of what unconscious processes occur that allow individuals to feel assured that they have a sense of the risk posed by a potential partner based on perceptible characteristics, such as physical attractiveness.

Implicit personality theory. Two mechanisms have been proposed to explain how decisions about partner risk, and subsequent behaviors related to condom use, occur. One of these is known as implicit personality theories, which can be defined as “cognitive structures whose primary components are personal attributes (e.g., personality traits) and inferential relations that specify the degree to which these attributes covary” (Eagly et al., 1991, p. 110). This conceptualization treats stereotypes as a part of ordinary social cognition, and places them within a larger set of knowledge structures that individuals use to make sense of other people’s behavior (Ashmore, 1981; Ashmore & Del Boca, 1979).

The antecedent of the scholarly literature on implicit personality theories is writing on a phenomenon known as the “halo effect,” a term coined by Edward Thorndike, who described it as

...a marked tendency to think of the person in general as rather good or rather inferior and to color the judgments of the qualities by this general feeling. This same constant error toward suffusing ratings of special features with a halo belonging to the individual as a whole appeared in the ratings of officers made by their superiors in the army (Thorndike, 1920, p. 25).

One of the characteristics that Thorndike found was associated with other positive qualities among the army officers was “physique,” which was correlated with

intelligence, leadership, and character. Thorndike noted that these results were consistent with another researcher's study of characteristics associated with the general merit of teachers, one of which was "general appearance."

Following the initial theory of the halo effect came additional hypotheses regarding stereotypes associated with physical attractiveness, namely that "what is beautiful is good," which was explored in a landmark study conducted by Dion, Berschied, and Walster (1972). The authors conducted an experiment with 60 undergraduate students, 30 male and 30 female, to answer the following research questions: (a) Do individuals have stereotyped notions of the personality traits possessed by individuals of varying attractiveness? (b) To what extent are these stereotypes accurate? (c) What is the cause of the correlation between beauty and personality if such a correlation exists?

The authors propose several possibilities to explain the correlation between personality characteristics and appearance. They first suggest that certain personality traits may influence appearance (e.g., being a calm person may mean developing fewer wrinkles on one's face than perhaps a tense, irritable person may develop). Second, they proposed that cultural stereotypes about the kinds of personalities appropriate for beautiful or ugly people may mold the personalities of these individuals. For example, if casual acquaintances assume that attractive individuals are more sincere, noble, and honest, these individuals are more likely to be afforded a certain level of respect. Based on the notion that self-concept develops from observing what others think about oneself, the authors suggest that if a physically attractive person is consistently treated as a virtuous person, he or she may become

one.

Participants in Dion et al.'s (1972) study each examined three photos: one of a physically attractive person, a person of average attractiveness, and a relatively unattractive person. They were then asked to rate the individuals in the photos on 27 different personality traits, including altruistic, conventional, self-assertive, exciting, stable, emotional, dependent, interesting, genuine, sensitive, outgoing, sincere, warm, sociable, competitive, obvious, kind, modest, strong, serious, simple, poised, hold, sophisticated, safe, sexually permissive, and sexually warm. Results confirmed the hypothesis that attractive individuals are assumed to possess more socially desirable personality traits than physically unattractive stimulus persons. The “what is beautiful is good” hypothesis has been extensively explored in social psychology literature since the publication of these results, including connecting its theoretical implications to those of implicit personality theories.

Eagly and colleagues (1991), in their meta-analysis of research on stereotypes associated with physical attractiveness, use implicit personality theories to conceptualize the “what is beautiful is good” hypothesis. The authors argue that research on the beauty-is-good stereotype can be viewed as examining the inferential relations between physical attractiveness and personal attributes. The social categories of attractive and unattractive people should thus be associated in individuals' cognitions with various dimensions of personality. This approach differs, however, from previous research on the physical attractiveness stereotype that takes into account only inferences from attractiveness to general social desirability, exactly the sentiment described in the phrase “what is beautiful is good,” popularized by the

pioneering study conducted by Dion et al. (1972).

Although the authors acknowledge that there is some value in treating dependent variables used in attractiveness research as a single, good-bad continuum, they point to research on implicit personality theory that has demonstrated that the evaluative dimension can be operationalized into content-specific types of evaluative meaning. Support for this distinction is based on Rosenberg's research using multidimensional scaling, which has identified several important content-specific evaluative categories, including social competence, intellectual competence, maturity, concern for others, integrity, psychological stability, and, finally, physical attractiveness (Kim & Rosenberg, 1980; Rosenberg, Nelson, & Vivekananthan, 1968). The inclusion of physical attractiveness among the content-specific evaluative categories leads the authors to deem implicit personality theories as appropriate for analyzing the beauty-is-good stereotype.

Indeed, the results of Eagly and colleagues' (1991) meta-analysis confirmed the existence of the "what is beautiful is good" stereotype, but found that the effect was only moderate in size, and the strength of the effect varied significantly from study to study. However, consistent with the implicit personality theory framework, a substantial portion of the variation was explained by the specific content of the inferences that participants were making; thus, it appears that what is beautiful is good, but that "good" must be more narrowly defined in order to accurately conceptualize the scope of this stereotype. Although HIV/STI status was not examined as one of the inferences in this meta-analysis, other research has shown that it may be a component in implicit personality theories regarding physically attractive

individuals.

Implicit personality theory and the link between attractiveness and PSRP.

Implicit personality theory was initially proposed to be related to perceptions of risk by Williams et al. (1992). In their qualitative study of 306 college students consisting of focus groups on safe and unsafe sexual behavior, data indicated that participants had well-developed and generally accepted ideas regarding which potential sexual partners are risky and which are not (Williams et al., 1992). These authors concluded that it is clear that the students in their study judged riskiness based on characteristics that are not objectively related to HIV status – specifically, whether they know and like the partner and whether a previously unknown partner has certain traits. They go on to explain how this is an example of an implicit personality theory and the danger it presents:

Perceived relationships among characteristics, such as the perception that a partner whom one knows or who is from a small town is not risky, are called implicit personality theories (e.g., Schneider, Hastorf, & Ellsworth, 1979). Clearly, college students are using an implicit personality theory to determine the riskiness of sexual partners, rather than consistently practicing safer sex.

Implicit personality theories are often adaptive, even if they are not entirely accurate, because they allow people to interpret their social world. However, the use of an implicit personality theory for ascertaining a partner's AIDS risk is extremely unreliable and potentially fatal. Because the only way to accurately determine someone's AIDS risk is through knowledge of that person's HIV status, the use of any other cues to assess risk will often provide a dangerous, false sense of security (Williams et al., 1992, p. 927).

In a review of research on AIDS preventative behavior, Misovich, Fisher, and Fisher (1997) discuss person perception biases involving the use of implicit personality theories. The authors note that evidence of the use of implicit personality theories to determine a partner's HIV risk have been documented in a wide variety of

populations, including gay men (e.g., Offir et al., 1993), injection drug users (Kline, Kline, & Oken, 1992), and college students (e.g., Williams et al., 1992).

These implicit personality theories revolve around the belief that partners who have desirable traits are unlikely to have HIV or other STIs and do not require safer sexual precautions. In contrast, potential partners who have undesirable or unappealing characteristics are viewed as more likely to have HIV or other STIs and to necessitate the practice of safer sex. There are several cognitive processes that may occur in the process of forming implicit personality theories (Misovich et al., 1997). One might be individuals' belief in a just world in which "good things happen to good people, and bad things happen to bad people," which may equate to a belief that a partner with good characteristics is unlikely to have HIV or other STIs. It is also possible that individuals possess a cognitive prototype of the characteristics of an individual who has HIV/STIs (e.g., Perloff, 1987; Van der Pligt, Otten, Richard, & Van der Velde, 1993), and, to the extent that a potential partner does not possess those characteristics, that partner will be judged as safe.

Misovich et al. (1997) also suggest that upon initial acquaintance with a potential sexual partner, it is possible that a two-stage decision process of characterization and correction (e.g., Gilbert, 1989) occurs. In such a process, a perceiver makes a relatively automatic, "snap judgment" about another person (e.g., that the person is attractive, has desirable traits, and therefore is not HIV positive) and then, under some circumstances, undertakes a comparatively cognitive effortful process of situation correction (i.e., recalling the fact that appearance is not generally diagnostic of HIV status). However, it has also been shown that perceivers who are

cognitively busy (e.g., because of interaction demands) frequently do not correct their initial inferences about a person (Gilbert, 1989). This could mean that an individual who meets an attractive potential partner may quickly decide, based on implicit personality theories, that he or she is unlikely to pose any risk, and may not stop to consider that this decision was based on information that is not actually diagnostic of the partner's HIV risk.

In support of the implicit personality theory, research has shown that those who are perceived as having certain positive traits are also believed to pose less risk for HIV/STIs. For example, Renner et al. (2012) found that responsibility and trustworthiness were negatively associated with perceptions of risk. Although Renner et al. (2012) did not find that the factor containing attractiveness was correlated with that containing HIV risk, it is important to note that their use of orthogonal rotation in their factor analysis forced these factors to be uncorrelated, precluding the examination of the potential association of attractiveness with both responsibility and trustworthiness. Furthermore, it is possible Renner et al. (2012) could have found that trustworthiness and responsibility mediated the relation between physical attractiveness and HIV risk had they investigated these relations in their study, which would have provided clear support for the role of implicit personality theory. Schmalzle et al.'s (2012) similar finding of high negative associations of trustworthiness and responsibility with HIV risk, and a lower negative association between attractiveness and HIV risk, could be explained by the same mediating process.

In addition, Blanton and Gerrard's (1997) participants rated the more

physically attractive targets as also being more likeable, interesting, and similar to themselves, in addition to being less likely to pose risk for STIs. Furthermore, in addition to justifying previous instances of condomless sex with explanations related to the attractiveness of the partner, men in Gold and Skinner's (1992) study also reported justifications related to the partner being healthy, clean, trustworthy, intelligent, and nice. It seems possible that for the men in this study, the partner's attractiveness may have been related to their perceptions of these other traits, although there was no way for this to be tested, given the retrospective methodology. Finally, Gold and Skinner (1996) found significant differences in perception of HIV infection between the combined positive and neutral versus negative conditions for intelligence, healthy appearance, and personality, as well as a combination of these three traits with physical attractiveness. These results introduce the possibility that physical attractiveness is positively related to positive personality traits (e.g., Dion et al., 1972; Eagly et al., 1991), which are in turn negatively related to perceived HIV risk, however, this mediation has not been empirically studied.

Motivated reasoning. Another possible mechanism underlying the association between physical attractiveness and partner safety is motivated reasoning, which is based on the notion that goals affect reasoning. The body of research on motivated reasoning has argued that motivation causes people to make self-serving attributions and permit them to believe what they want to believe because they want to believe it (Kunda, 1990). Motivated reasoning phenomena can be viewed as falling into two major categories: those in which the motive is to arrive at an accurate conclusion, whatever it may be, and those in which the motive is to arrive at a

particular, direction conclusion. Kunda (1990) argues that both types of goals (accuracy goals and directional goals) affect reasoning by influencing the choice of beliefs and strategies applied to a given problem. Accuracy goals lead to the use of beliefs and strategies that are considered most appropriate for yielding the accurate conclusion, whereas directional goals lead to the use of those that are considered most likely to yield the desired conclusion.

Theory on accuracy-driven reasoning suggests that when people are motivated to be accurate, they expend more cognitive effort on reasoning, attend to relevant information more carefully, and process it more deeply (Kunda, 1990). Experimental research in the area of accuracy goals has motivated participants to be more accurate by increasing the stakes involved in drawing the wrong conclusion, without increasing the attractiveness of any particular conclusion. The strategy used to demonstrate that accuracy motives lead to more deep and careful cognitive processes has involved showing that when these motivations are present, cognitive biases are reduced. Indeed, studies have shown that when participants have been motivated to be accurate (because they expected to be evaluated, to justify their judgments, that their judgments would be made public, or that their evaluations of another person would affect that person's life), they showed less tendency to rely on stereotypes (Freund, Kruglanski, & Shpitzajzen, 1985; Kruglanski & Freund, 1983; Tetlock, 1983). The underlying assumption in these studies is that cognitive biases result from hasty reasoning, and eliminating these biases is a result of more careful thinking (Kunda, 1990). This interpretation has been supported by the finding that these biases are exaggerated when participants are forced to make judgments quickly (Freund et al.,

1985; Kruglanski & Freund, 1983).

More direct evidence that accuracy goals lead to more complex reasoning comes from studies in which researchers attempted to examine the thought processes that lead to judgments, rather than only the judgments themselves. For example, Tetlock and Kim (1987) showed that participants who were motivated to be accurate wrote more cognitively complex descriptions of persons whose response to a personality test they had seen. This included considering more alternatives and evaluating the persons from more perspectives. In fact, as a result of this increased complexity, these participants were more accurate than others in predicting the person's responses on additional personality measures and were less overconfident about the correctness of those predictions. It appears, then, that when individuals have the sole goal of being accurate, rather than of choosing one conclusion over another, they process information more carefully, and cognitive biases are weakened (Kunda, 1990).

In contrast, Kunda (1990) proposes that people motivated to arrive at a particular conclusion attempt to be rational and to construct a justification of their desired conclusion that would persuade a dispassionate observer. Individuals draw the desired conclusion only if they are able to muster up the necessary evidence to support it; in other words, they strive to maintain an "illusion of objectivity." To achieve this, they search their memory for beliefs that may support their desired conclusion. This may take the form of creatively combining accessed knowledge to construct new beliefs that could logically support the desired conclusion. The process of memory search and belief construction is biased by directional goals. However,

people do not realize that the process is biased, making the objectivity of the justification illusory. Only a subset of relevant knowledge is accessed, and it is likely that different beliefs would be accessed in the presence of different directional goals; in fact, people might even be capable of justifying opposite conclusions on different occasions.

A body of research suggests that directional goals are associated with biased beliefs about others. These studies have used a manipulation termed *outcome dependency*, in which participants are led to believe that their own outcomes depend in some way on a target person. For example, in a study by Darley and Berscheid (1967), participants who expected that they would have intimate sexual discussion with one target person, but not with another, read personality descriptions of both. Participants generally reported liking their expected partner more than the other person, presumably with the directional goal of having a likable partner. Berscheid, Graziano, Monson, and Dermer (1976) used a similar manipulation in which participants expected to date one of three target persons and observed a taped discussion among the three. Similarly, participants reported more liking for the person they expected to date than for the others. In addition, participants rated the personalities of the person they expected to date more extremely and positively, and were more confident in their ratings. One can assume that the directional goal of wanting their date to be nice so that their interactions would be pleasant created bias in their judgments.

Although the mechanisms underlying motivated reasoning are not yet fully understood, it is clear that directional goals affect reasoning, and that people are more

likely to arrive at the conclusions that they want to arrive at (Kunda, 1990). When applying this theory to physical attractiveness and perceptions of risk, it could be that interacting with an attractive person induces a motivation to have sex with that person; thus, a directional goal is developed with a desired conclusion that the person is safe, which could lead to condomless sex.

Motivated reasoning and the link between attractiveness and PSRP. In their study of the relation between attractiveness and perceived risk, Blanton and Gerrard (1997) tested the influence of motivated reasoning on the relation between physical attractiveness and perceived risk. They hypothesized that behavioral motivation, in the form of motivation to have sex, would undermine rational risk perception through the use of personality information that could be used to justify beliefs regarding the safety of a partner. For example, a man trying to calculate the risk of having condomless sex with a sexually attractive woman cannot conclude that the woman possesses low probability of having an STI if the man knows that the woman has had many high-risk partners in the past. Thus, the man must incorporate other information into his impression of the woman that will help lead him to the desired conclusion (e.g., that she is well-educated, which does not seem typical for high-risk individuals). Using this information, the man can conclude that having condomless sex with the woman poses little risk. On the other hand, if this man were not motivated to have sex with the woman, he would not consider this information relevant to judgment of STI risk. The authors predicted that the motivation to have sex would bias risk calculations only if the participants were supplied with additional non-diagnostic information from which they could justify their new risk estimates.

Indeed, their results supported this hypothesis, because the physically attractive targets were only rated as having lower perceived risk when the participants were provided with additional personality information (irrelevant to STI risk) upon which they could justify this perception; when participants were not given this additional information, they did not decrease their risk perceptions for attractive targets. The authors note, however, that it is not possible to determine conclusively whether it was sexual motivation that caused decreased estimates of risk. An alternative explanation could be more similar to implicit personality theory, such that the photographs evoked a stereotype that attractive women possess desirable personality attributes, which was overgeneralized to conclude that they also possess lower STI risk. Indeed, the participants may have used the nondiagnostic information as evidence that the target had other desirable characteristics, rather than using it to justify lowered risk estimates based on biased beliefs. In support of this, the women in the high sex appeal photos were not only seen as more sexually appealing and attractive, but also as more likable, interesting, and similar to the participant, as one might expect had the participants been utilizing implicit personality theory.

Thus, it is unclear which mechanism could explain Blanton and Gerrard's (1997) results. It seems possible that the two mechanisms could be occurring simultaneously, and perhaps influencing one another, supporting a more integrated model of risk perception. Perceptions of a partner are likely to be influenced not only by cognitive processes (e.g., a halo effect), but also by motivational processes (e.g., sexual motivation to have sex leads to beliefs that they are likeable, interesting, and similar to oneself). Similarly, sexual motivation is likely to be influenced not only by

the attractiveness of a partner, but also by other positive characteristics of the partner, including personality (e.g., beliefs that they are likeable, interesting, and similar to oneself). For example, previous literature has shown that participants who were motivated to see a member of a stigmatized group (someone with schizophrenia) positively, because they expected to interact with him, reported more positive perceptions of the group (Klein & Kunda, 1992). This phenomenon has also been shown to exist for potential romantic partners, wherein participants showed a positivity bias, evaluating targets as more personable and appealing, when they expected that they would date the target (Goodwin, Fiske, Rosen, & Rosenthal, 2002). Thus, perceptions of partner personality could be used, when preceded by sexual motivation, to justify lower perceptions of risk, as Blanton and Gerrard (1997) suggest; however, sexual motivation could also directly influence perceptions of partner personality, and vice versa.

The role of motivated reasoning may be supported by Gold and Skinner's (1992, 1996) contradictory results regarding the relationship between physical attractiveness and perception of HIV status. In their experimental study, physically attractive men described in written vignettes were deemed more likely to be HIV-infected than men described as neutral in attractiveness (Gold & Skinner, 1996). In their retrospective, self-report study, participants justified previous instances of condomless anal sex with the belief that physically attractive men are less likely to be HIV-infected (Gold & Skinner, 1992). The authors explain these results by pointing out that a difference in study methodology is whether or not participants were sexually motivated when they made their judgments. Gold and Skinner (1992)

suggested that the inferences made by the participants during previous instances of UAI could only have occurred during actual sexual encounters, because “they are used merely to enable a desire for unprotected intercourse to be fulfilled” (p. 1029). The men in the experimental study, however, were not motivated to reach one conclusion over another, and although they were not given an explicit motivation to be accurate, their responses seem to indicate less biased reasoning.

Agocha and Cooper’s (1999) results provide support for the role of motivated reasoning in the association between attractiveness and lowered risk perceptions, based on the mediating role of desire for intercourse (i.e., motivation to have sex) in the association between attractiveness, perceived risk, and intentions to use condoms. It is important to note that participants in Agocha and Cooper’s (1999) study also received the sexual histories (i.e., previous number of partners) of the individuals in the photos, and yet their perceived risk and condom use intentions were still decreased with physically attractive targets. In Blanton and Gerrard’s (1997) study, however, this effect of physical attractiveness occurred only among participants who were also given nondiagnostic (i.e., personality) information about the target.

This may be explained by a theory that sexual arousal not only biases reasoning through the use of irrelevant information to justify beliefs, but it may also prevent individuals from engaging in complex cognitive processing because they are forced to make a judgment hastily. Kunda (1990) described the lack of complex processing as another consequence of the presence of a directional goal that has been supported by previous research (Freund et al., 1985; Kruglanski & Freund, 1983). Gold and Skinner (1992) suggested that their results could have occurred because of a

limited capacity for rational information processing during a sexual encounter. This explanation appears consistent with findings from Offir et al. (1993):

Some participants suggested that it is sometimes too difficult to think rationally enough in sexual situations to avoid risk behavior...For instance, being “swept away by passion” was often stated as a cause of “accidental” ARB [AIDS risk behavior], as by the individual who stated that “If I get horny enough, it doesn't make a whole lot of difference [if sex is safe].” Another individual recounted a situation in which he diverged from his normally safer behavior because “I was just very hot and very horny and I wanted it” (p. 65-66).

Williams et al. (1992) found similar results in their focus group interviews.

One participant admitted, “There’s been a couple of times...that you do give in because it’s like *the moment*.” Another explained, “In the heat of the moment you don’t think about it [AIDS]” (Williams et al., 1992, p. 930). This draws into question whether or not having information (e.g., personality information; Blanton & Gerard, 1997) to justify beliefs about partner safety is necessary in order for motivation to have sex to affect risk perception.

Finally, researchers have studied the relation between sexual arousal and intention to engage in risky sex and have found that those who use condoms inconsistently often report strong feelings of passion and desire as a reason for their inconsistent condom use (Patel, Gutnik, Yoskowitz, O’Sullivan, & Kaufman, 2006; Strong, Bancroft, Carnes, Davis, & Kennedy, 2005). It has also been found that for men and women who reported experiences of high sexual arousal during a sexual encounter were least likely to use condoms (Boldero, Moore, & Rosenthal, 1992). In addition, experimental studies have shown that inducing sexual arousal can result in decreased intentions to use condoms (Abbey, Saenz, & Buck, 2005; Ariely & Loewenstein, 2006; Skakoon-Sparling, Cramer, & Shuper, 2015), that that this effect

is stronger with more attractive partners (Shuper & Fisher, 2008).

Appendix B: Advertisements for Participant Recruitment

Text in ads featured on GSN apps Grindr and Scruff.

Earn \$10 for Completing an Online Survey

We are researchers at the University of Maryland studying first impressions of dating or sexual partners met through phone apps, like Grindr. You can earn \$10 for completing the online survey. Tap here to see if you are eligible!

Text sent to organizers of community organization listservs.

SUBJECT: Hi <insert name> - Please send to <insert group>

Hi <insert name>,

My name is Elissa and I am a doctoral student in the Department of Psychology at University of Maryland, College Park. I am writing to inquire about the possibility of distributing an announcement to the members of <insert group> about a paid research study that I am conducting. This research has been reviewed by the University of Maryland College Park Institutional Review Board.

The purpose of the project is to contribute much needed information on how first impressions are formed of dating or sexual partners met through phone apps such as Grindr. Our goal is to learn whether these impressions may be contributing to sexual risk taking, and **the results of the study may be used to help improve the sexual health of men who have sex with men.** We hope to recruit a diverse sample of respondents to our survey and **the members of your organization represent a key demographic we hope to reach.**

Our online survey is confidential and takes most respondents between 30 and 40 minutes to complete. **Participants will earn \$10 for completing the full survey.** I'd be grateful if you could help out our effort by sending the announcement below to members of your email list. **I'd appreciate it if you would reply to this email to confirm that you sent it out (or simply copy FirstImpressionsStudy2017@gmail.com on the distribution).**

If I need to speak with someone else in your organization about the possibility of distributing the announcement, then it would be great if you could give me the name and contact information for the person. Please let me know if you have any questions or concerns about this research.

Thanks in advance for your help.

Sincerely,

Elissa Sarno, M.S.
The Social Identity Research Team
Department of Psychology
University of Maryland, College Park

Dear <insert group> listserv members,

We are researchers at the University of Maryland who are interested in how first impressions are formed of dating or sexual partners met through phone apps such as Grindr.

You can help our effort by taking our online survey. **Those who complete the full survey will earn \$10 for their participation.** To participate in this study, you must (a) be living in the US, (b) be a cisgender man, (c) identify as gay, bisexual, or queer, (d) use or have used phone apps to find dating or sexual partners, (e) not currently be in a monogamous relationship, and (f) be 21 years of age or older. The survey takes most people between 30 and 40 minutes to complete.

To take the survey, click the following link (or cut and paste the link into your preferred Internet browser):

ter.ps/appstudy

Thank you for your interest in our study, which has been reviewed by the University of Maryland College Park Institutional Review Board. If you have questions or concerns about participating, feel free to email FirstImpressionsStudy2017@gmail.com.

We appreciate you considering participating in this study!

Elissa Sarno, M.S.
The Social Identity Research Team
Department of Psychology
University of Maryland, College Park

Text sent to moderators of online message boards.

Hi [subreddit] moderators,

My name is Elissa and I am a doctoral student in the Department of Psychology at University of Maryland, College Park. I am writing to inquire about the possibility of posting an announcement on [subreddit] about a paid research study that I am conducting. This research has been reviewed by the University of Maryland College Park Institutional Review Board.

The purpose of the project is to contribute much needed information on how first impressions are formed of dating or sexual partners met through phone apps such as Grindr. Our goal is to learn whether these impressions may be contributing to sexual risk taking, and the results of the study may be used to help improve the sexual health of men who have sex with men.

Our online survey is confidential and takes most respondents between 30 and 40 minutes to complete. Participants will earn \$10 for completing the full survey. I'd be grateful if you could help out our effort by allowing me to post an announcement about the study on [subreddit]. Please let me know if you have any questions or concerns about this research.

Thanks in advance for your help.

Sincerely,

Elissa Sarno, M.S.
The Social Identity Research Team
Department of Psychology
University of Maryland, College Park

Text posted to online message boards.

Subject: Earn \$10 by participating in an online survey on experiences using dating apps like Grindr

We are researchers at the University of Maryland who are interested in how first impressions are formed of dating or sexual partners met through phone apps such as Grindr. This study has been approved by the University of Maryland College Park Institutional Review Board

You can help our effort by taking our online survey. **Those who complete the full survey will earn \$10 for their participation.** To participate in this study, you must (a) be living in the US, (b) be a cisgender man, (c) identify as gay, bisexual, or queer, (d) use or have used phone apps to find dating or sexual partners, (e) not currently be in a monogamous relationship, and (f) be 21 years of age or older. The survey takes most people between 30 and 40 minutes to complete.

To take the survey, click the following link (or cut and paste the link into your preferred Internet browser):

ter.ps/appstudy

Thank you for your interest in our study. If you have questions or concerns about participating, feel free to email FirstImpressionsStudy2017@gmail.com.

We appreciate you considering participating in this study!

Elissa Sarno, M.S.
The Social Identity Research Team
Department of Psychology
University of Maryland, College Park

Appendix C: Introduction and Eligibility Form

First Impressions Survey 2017

Thank you for your interest in our study.

We are researchers at the University of Maryland who are interested in first impressions formed of individuals on online dating applications (like Grindr or Scruff). This study involves viewing photographs of men found on dating applications and answering questions regarding your impressions of them. This study also involves watching video clips with sound, so you may need to use headphones or turn up the volume on your computer. Completing the survey will take most people anywhere from 30 to 40 minutes. Information collected from individuals who are deemed ineligible for the study will be immediately erased.

We appreciate your considering serving as a participant in this study!

The Social Identity Research Team
Department of Psychology
University of Maryland, College Park

Eligibility

Before you complete the survey, it is important to ensure that you are eligible for participation. This page includes question(s) that will help determine whether you meet the criteria required to participate.

Do you currently reside in the United States?

- Yes
- No

Are you 21 years of age or older?

- Yes
- No

What is your current gender identity?

- Cisgender woman
- Cisgender man
- Transgender woman
- Transgender man
- Genderqueer
- Different identity (please state):

What was your sex assigned at birth?

- Male
- Female

What is your current HIV status?

- HIV-positive
- HIV-negative
- I don't know/I'm not sure
- Prefer not to say

Do you currently use smartphone or tablet-based computer applications (e.g., Grindr, Scruff) to find sexual partners in your area?

- Yes
- Not currently, but I have in the past
- No

Have you had any sexual activity in the past year?

- Yes
- No

Please check all of the genders below that describe people with who you have had sexual activity within the past year:

“Cisgender” people have a gender identity that is aligned to what they were designated at birth, whereas “transgender” people have a gender identity that is different from what they were assigned at birth. “Genderqueer” people have a gender identity that is outside of, not included within, or beyond the binary of female and male.

- Cisgender woman
- Cisgender man
- Transgender woman
- Transgender man
- Genderqueer
- Different identity (please state):

Are you currently in a sexually exclusive (i.e., monogamous) relationship?

- Yes
- No

Appendix D: Informed Consent

GOOD NEWS! Based on your responses, you are eligible to participate in this study!

The following two pages will provide you with information about the study to help you understand what participation involves and make an educated decision about whether you would like to complete the survey.

The details included in this portion of the survey may seem a bit dry, but these pages are critical to your understanding of what it means to be a participant in this study. Thank you for taking the time to read this important information.

Consent Form

PURPOSE: The purpose of this research project is investigate first impressions formed when using phone apps (like Grindr or Scruff) to find dating or sexual partners under different conditions, such as when one is sexually aroused. This research is being conducted by Elissa L. Sarno, M.A., M.S., and Jonathan J. Mohr, Ph.D. at the University of Maryland, College Park. To participate in this study, you must (a) be a cisgender man (i.e., non-transgender man), (b) have engaged in sexual behavior with a man in the past year (c) use or have used phone apps to find dating or sexual partners, (d) are not currently in a monogamous relationship, and (e) be 21 years of age or older. We are inviting you to participate in this research project because you indicated that you fit these eligibility criteria.

PROCEDURES: This survey will take most people 30-40 minutes. It involves viewing photographs of men and answering questions about their physical attractiveness, personality, and your interest in having a sexual relationship with them. Before viewing these photographs, participants will view one of several six-minute video clips. Some of these video clips include sexual behavior between two men. None of the video clips depict violence. These video clips include sound, so please use headphones or choose a location where you can turn up the volume on your computer. Please choose a location where you can enter your responses privately and confidentially, and complete the survey in one sitting. Those who attentively complete the full survey will be eligible to earn \$10 for their participation. Participants who do not respond correctly to the validity questions (i.e., who do not take the survey in an attentive manner) may not be compensated for completion of the survey. You may choose to receive your \$10 in one of two ways: cash or a \$10 Amazon e-gift card. You may stop taking the survey at any time; however, only those who complete the survey in its entirety and in an attentive manner will be eligible to receive the \$10 compensation.

POTENTIAL RISKS AND DISCOMFORTS: A foreseeable risk of participating in this study includes feelings of discomfort associated with revealing private and potentially sensitive information about oneself. You do not have to answer any

question that makes you uncomfortable, and can stop taking the survey at any time by closing your Internet browser. An additional risk is discomfort with viewing pornographic videos and potentially becoming sexually aroused while taking the survey, which some participants may experience if they choose to participate in this study. To minimize potential discomfort if this occurs, please be sure to take the study in a private place where you would be comfortable becoming sexually aroused. If you experience feelings of discomfort and wish to discuss them or seek help, then we encourage you to seek local support (e.g., counseling center, mental health professional). You are welcome to contact us if you would like assistance in identifying potential sources of local support for concerns raised through participation in this study. An additional risk of participating in this study is a breach of confidentiality. Information on methods to maintain confidentiality is included in the “Confidentiality” section below. You may contact Elissa Sarno, the principal investigator for this study, at elsarno@umd.edu or Dr. Jonathan Mohr, the faculty advisor overseeing this project, at jmohr@umd.edu.

BENEFITS: This research is not designed to help you personally and thus, there are no direct benefits to participants. However, the results may contribute to knowledge about first impressions of dating or sexual partners found through phone apps.

CONFIDENTIALITY: The information you provide will be kept confidential to the furthest extent possible. You will not be required to provide your name or other personal information that identifies you. The only exception to this is if you wish to receive your \$10 compensation in the form of cash. In this case, we will give you a link to a separate survey designed to gather your name, email address, and mailing address. Your responses to that survey will be completely separate from your responses to the main survey. Also, we will delete all files containing your name, email, and mailing addresses 3 months after the study is complete. If you choose to receive your compensation in the form of a \$10 Amazon e-gift card, you will only have to provide your email address.

Your responses will be transmitted over the Internet in an encrypted form that would be difficult to interpret. All survey responses will be kept in a secure computer environment. Data downloaded will be stored in a secure format on a password-protected computer. Any personal information for contact purposes will not be included in or merged with data that we collect for publication. Only members of the research team will have access to the data. If we write a report or article about this research project, your identity will be protected to the maximum extent possible.

PARTICIPANT RIGHTS AND QUESTIONS: Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If there is a need to quit the survey in the middle of taking it, then you can simply close your Internet browser.

If you have questions, concerns, or complaints, please contact Elissa Sarno (elsarno@umd.edu) or Dr. Jonathan Mohr (jmohr@umd.edu). Additionally, if you would like to discuss any of the topics discussed in this study, you can call the GLBT National Help Center Hotline at 1-888-THE-GLNH (888-843-4564). If you have more questions about your rights as a research participant or wish to report a research-related injury, please contact:

University of Maryland, College Park
Institutional Review Board Office
1204 Marie Mount Hall
College Park, MD, 20742
301-405-0678; irb@umd.edu

This research has been reviewed according to the University of Maryland, College Park IRB procedures for research involving human subjects.

Your consent indicates that you are at least 21 years of age; you have read the above consent page or have had it read to you; your questions have been answered to your satisfaction; and you voluntarily agree to participate in this research study. You may click here to download an electronic copy of this consent form.

If you agree and intend to participate, please click "I consent and wish to participate" below. If you do not agree or do not intend to participate, please click "I do not wish to participate."

- I consent and wish to participate
- I do not wish to participate

Appendix E: Demographic Form

What is your age? (text box)

What state do you currently live in? (text box)

How would you describe the area you live in?

- Rural
- Urban
- Suburban

What is the highest level of education you have completed?

- Less than High School
- High School or GED
- Some College or Associate's Degree (Two-Year Degree)
- Bachelors Degree
- Masters Degree
- Professional (M.D., J.D., Ph.D.)

Are you currently a college student?

- Yes
- No

What is your current dating or relationship status?

- Single
- In a relationship
- Multiple committed relationships
- One primary partner and at least one casual relationship
- Other (please specify): (text box)

Please check all of the following that describe your race/ethnicity.

- European American/Caucasian/White
- African American/Black/Caribbean American
- Asian/Asian American/Pacific Islander
- Latino/Hispanic, Middle Eastern
- Native American/American Indian
- Other (please specify): (text box)

Which of the following best describes you?

- Heterosexual
- Gay
- Bisexual
- Other (please specify): (text box)

What is your current HIV status?

- HIV-positive

- HIV-negative
- I don't know/I'm not sure

When was the last time you were tested for HIV?

- Within the last 30 days
- Within the past 3 months
- Between 3-6 months ago
- Between 6 months-1 year ago
- Between 1-2 years ago
- Over 2 years ago
- Never

Are you currently taking pre-exposure prophylaxis (PrEP), also known as Truvada®?

- Yes
- No

How often do you take PrEP (Truvada®)?

- Every day
- Most days
- Some days
- Occasionally
- Rarely

Of the last ten (10) times you had anal sex, how many times did you use a condom?

- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10

Please check off all of the following that best describe partners with whom condoms were not used (you may select more than one answer).

- Boyfriend or significant other
- Someone I was casually dating/hanging out with
- A friend
- Someone I just met
- My spouse or domestic partner
- Someone who paid me for gave me something for sex
- Someone I paid or gave something to for sex
- Other (please specify): (text box)

Please check off all of the smartphone or tablet-based computer applications listed below that you have used to find dating or sex partners at any point in time (you may select more than one answer).

- Grindr
- Scruff
- Manhunt
- Adam4Adam
- Jack'd
- Hornet
- Growlr
- Tinder
- Mr X
- Gay.com
- Daddyhunt
- Surge
- Recon
- Other (please specify): (text box)

Appendix F: Video Clips and Sexual Arousal Manipulation Checks

Sexual Arousal Clip 1

Please watch the following six-minute video clip.

This video clip is sexually explicit, so please be sure that you are in a private place where you would feel comfortable watching the clip.

Please make sure that you are able to hear the sound by using headphones or turning up the volume on your computer.

<https://ucsf.box.com/s/i0m0xnodf97beg3ju86gg6i7ao1xoq06>

Video was embedded in survey for participants; please click the link above to watch clip

How sexually aroused do you feel right now?

Not at all sexually aroused									Extremely sexually aroused
1	2	3	4	5	6	7	8	9	

Sexual Arousal Clip 2

Please watch the following six-minute video clip.

This video clip is sexually explicit, so please be sure that you are in a private place where you would feel comfortable watching the clip.

Please make sure that you are able to hear the sound by using headphones or turning up the volume on your computer.

<https://ucsf.box.com/s/c3f0iux111q6v3zrwyw1dte591133ch1>

Video was embedded in survey for participants; please click the link above to watch clip

How sexually aroused do you feel right now?

Not at all sexually aroused									Extremely sexually aroused
1	2	3	4	5	6	7	8	9	

Control Clip 1

Please watch the following six-minute video clip.

Please make sure that you are able to hear the sound by using headphones or turning up the volume on your computer.

<https://youtu.be/uuK2BnzKGNU>

Video was embedded in survey for participants; please click the link above to watch clip

How sexually aroused do you feel right now?

Not at all sexually aroused									Extremely sexually aroused
1	2	3	4	5	6	7	8	9	

Control Clip 2

Please watch the following six-minute video clip.

Please make sure that you are able to hear the sound by using headphones or turning up the volume on your computer.

<https://youtu.be/bHTbnDnIzPM>

Video was embedded in survey for participants; please click the link above to watch clip

How sexually aroused do you feel right now?

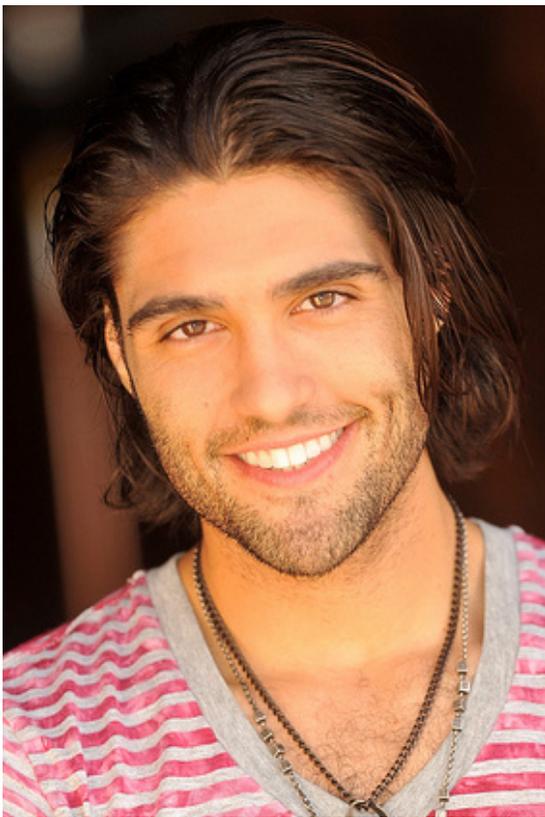
Not at all sexually aroused									Extremely sexually aroused
1	2	3	4	5	6	7	8	9	

Appendix G: Photos and Physical Attractiveness Manipulation Checks

Photo instructions

In the next section, you will be presented with a series of photos of men in your area taken from a phone app used to locate dating or sexual partners. You will be asked to answer several questions about the man in each photo.

There is no need to spend a lot of time on each question, please just give your first impression of the man in the photo. We are interested in what you personally think of the person, not what you think others might think of the person.



Overall, how would you rate the person in the photo on physical attractiveness?

Extremely unattractive	Very unattractive	Somewhat unattractive	Neither attractive nor unattractive	Somewhat attractive	Very attractive	Extremely attractive
1	2	3	4	5	6	7



Overall, how would you rate the person in the photo on physical attractiveness?

Extremely unattractive	Very unattractive	Somewhat unattractive	Neither attractive nor unattractive	Somewhat attractive	Very attractive	Extremely attractive
1	2	3	4	5	6	7



Overall, how would you rate the person in the photo on physical attractiveness?

Extremely unattractive	Very unattractive	Somewhat unattractive	Neither attractive nor unattractive	Somewhat attractive	Very attractive	Extremely attractive
1	2	3	4	5	6	7



Overall, how would you rate the person in the photo on physical attractiveness?

Extremely unattractive	Very unattractive	Somewhat unattractive	Neither attractive nor unattractive	Somewhat attractive	Very attractive	Extremely attractive
1	2	3	4	5	6	7



Overall, how would you rate the person in the photo on physical attractiveness?

Extremely unattractive	Very unattractive	Somewhat unattractive	Neither attractive nor unattractive	Somewhat attractive	Very attractive	Extremely attractive
1	2	3	4	5	6	7



Overall, how would you rate the person in the photo on physical attractiveness?

Extremely unattractive	Very unattractive	Somewhat unattractive	Neither attractive nor unattractive	Somewhat attractive	Very attractive	Extremely attractive
1	2	3	4	5	6	7



Overall, how would you rate the person in the photo on physical attractiveness?

Extremely unattractive	Very unattractive	Somewhat unattractive	Neither attractive nor unattractive	Somewhat attractive	Very attractive	Extremely attractive
1	2	3	4	5	6	7



Overall, how would you rate the person in the photo on physical attractiveness?

Extremely unattractive	Very unattractive	Somewhat unattractive	Neither attractive nor unattractive	Somewhat attractive	Very attractive	Extremely attractive
1	2	3	4	5	6	7



Overall, how would you rate the person in the photo on physical attractiveness?

Extremely unattractive	Very unattractive	Somewhat unattractive	Neither attractive nor unattractive	Somewhat attractive	Very attractive	Extremely attractive
1	2	3	4	5	6	7



Overall, how would you rate the person in the photo on physical attractiveness?

Extremely unattractive	Very unattractive	Somewhat unattractive	Neither attractive nor unattractive	Somewhat attractive	Very attractive	Extremely attractive
1	2	3	4	5	6	7

Appendix H: Intentions to Have Sex Measure

How interested would you be in meeting this person?

Not at all interested						Extremely interested
1	2	3	4	5	6	7

How interested would you be in having a “get-to-know” date with this person?

Not at all interested						Extremely interested
1	2	3	4	5	6	7

How interested would you be in having a casual dating relationship that involves sex with this person?

Not at all interested						Extremely interested
1	2	3	4	5	6	7

How interested would you be in having a steady or exclusive dating relationship that involves sex with this person?

Not at all interested						Extremely interested
1	2	3	4	5	6	7

Overall, how desirable would this person be to start a dating relationship with?

Not at all desirable						Extremely desirable
1	2	3	4	5	6	7

Overall, how sexually desirable is the person in the photo?

Not at all desirable						Extremely desirable
1	2	3	4	5	6	7

How interested would you be in having sex with this person?

Not at all interested						Extremely interested
1	2	3	4	5	6	7

How likely is it that you would ever have sex with this person?

Not at all likely					50/50 chance						Absolutely likely
0	10	20	30	40	50	60	70	80	90	100	

Appendix I: Positive Partner Personality Measure

Please rate your impression of the man in the photo on the following attributes.

There is no need to spend a lot of time on each question, please just give your first impression of the man in the photo.

Very unlikeable 1	2	3	4	5	6	Very likeable 7
Very unfriendly 1	2	3	4	5	6	Very friendly 7
Very uninteresting 1	2	3	4	5	6	Very interesting 7
Very unintelligent 1	2	3	4	5	6	Very intelligent 7
Very untrustworthy 1	2	3	4	5	6	Very trustworthy 7
Very irresponsible 1	2	3	4	5	6	Very responsible 7
Very unhealthy 1	2	3	4	5	6	Very healthy 7
Very dissimilar to me 1	2	3	4	5	6	Very similar to me 7

Appendix J: Perceived Risk Measure

Suppose you decide to have sex with the person in the photo. Please answer the following questions using a percentage from 0% (not at all likely) to 100% (absolutely likely).

There is no need to spend a lot of time on each question, please just give your first impression of the man in the photo.

How likely do you think it is that you would get HIV - the virus that causes AIDS - from this person?

Not at all likely						50/50 chance					Absolutely likely
0	10	20	30	40	50	60	70	80	90	100	

How likely do you think it is that you would get a sexually transmitted infection other than HIV (e.g., herpes or gonorrhea) from this person?

Not at all likely						50/50 chance					Absolutely likely
0	10	20	30	40	50	60	70	80	90	100	

Please imagine that you and the person in the photo had sex and took no precautions whatsoever and answer the following questions.

How likely do you think it is that this person would infect you with HIV (the virus that causes AIDS)?

Not at all likely						50/50 chance					Absolutely likely
0	10	20	30	40	50	60	70	80	90	100	

How likely do you think it is that this person would infect you with a sexually transmitted infection besides HIV?

Not at all likely						50/50 chance					Absolutely likely
0	10	20	30	40	50	60	70	80	90	100	

In terms of overall risk for HIV, how risky do you think the person in the photo is?

Not at all risky											Extremely risky
1	2	3	4	5	6	7					

In terms of overall risk for other sexually transmitted infections besides HIV, how risky do you think the person in the photo is?

Not at all
risky

1

2

3

4

5

6

Extremely
risky

7

Appendix K: Condom Use Intentions Measure

Please imagine that you decided to have sex with the person in the photo and answer the following questions using a percentage from 0% (not at all likely) to 100% (absolutely likely).

There is no need to spend a lot of time on each question, please just give your first impression of the man in the photo.

How likely is it that you would bring up the issue of using condoms before you had sex?

Not at all likely						50/50 chance						Absolutely likely
0	10	20	30	40	50	60	70	80	90	100		

How likely is it that you would ask him to use a condom during sex?

Not at all likely						50/50 chance						Absolutely likely
0	10	20	30	40	50	60	70	80	90	100		

How likely is it that you would insist on condom use during sex with this person?

Not at all likely						50/50 chance						Absolutely likely
0	10	20	30	40	50	60	70	80	90	100		

How likely is it that you would refuse to have sex with this person if a condom was not used?

Not at all likely						50/50 chance						Absolutely likely
0	10	20	30	40	50	60	70	80	90	100		

Suppose that you did decide to have sex with the person in the photo, and he insisted that condoms be used, how likely would you be to agree?

Not at all likely						50/50 chance						Absolutely likely
0	10	20	30	40	50	60	70	80	90	100		

Suppose that you did decide to have sex with the person in the photo, and he refused that condoms be used, how likely would you be to go ahead and have sex anyway?

Not at all likely						50/50 chance						Absolutely likely
0	10	20	30	40	50	60	70	80	90	100		

Appendix L: Data Check Items

The following items were presented at three evenly dispersed intervals throughout the survey.

Please choose the option “Rose” below. This item is here to make sure you are completing the survey in an attentive manner.

- Tulip
- Daisy
- Poppy
- Lily
- Rose

Please choose the option “Yellow” below. This item is here to make sure you are completing the survey in an attentive manner.

- Red
- Blue
- Yellow
- Purple
- Orange

Please choose the option “Copper” below. This item is here to make sure you are completing the survey in an attentive manner.

- Iron
- Copper
- Steel
- Aluminum
- Tin

The following items were presented after all measures of mediator and outcome variables were completed.

We would like to end by asking you a few questions about your process of completing this survey. Your honest responses will help to improve the quality of this research; there are no right or wrong answers.

I was somewhere that was quiet enough for me to focus on the survey.

- Agree
- Disagree

I was distracted by worries that other people might be able to see the survey and my responses.

- Agree
- Disagree

My survey responses reflect my true opinions and reactions.

- Agree
- Disagree

In our opinion, should we use your data?

- Yes
- No

What is your best guess about the purpose of this study? If you think there was more to this study that you might have thought initially, please share your thoughts with us. (text box)

Appendix M: Debriefing Statement

Thank you for your participation in this study! We wanted to give you a little more information about what we were trying to learn by conducting this study. We were interested in looking at how physical attractiveness of a person can influence someone's impression of the risk for sexually transmitted infections (STIs) that they might have if they were to have sex with that person.

In this study, photographs of various men shown in the study are not actually of men in your area taken from dating apps. We apologize for not being completely forthright about the nature of the photos used for this study. We told you that the photos were taken from a dating app in order to help you be in the mindset of someone who was looking at photos of men on a phone app. Previous research that has also used this strategy has found that doing so helps the study to more closely approximate the experience someone would have in real life. This helps to ensure that the results of the study reflect what happens in the real world as closely as possible.

Your participation is a huge help to us in order to answer our questions regarding the relation between physical attractiveness and impressions of STI risk. We hope to contribute to scholarly knowledge about why people engage in sex without condoms that could potentially put them in danger in order to learn more about how to best help people not to engage in this behavior in the future. We hope that our efforts will contribute to a decrease in rates of HIV and other STIs, especially among gay and bisexual men.

If you would like any additional information about this study, or would like to be sent a report of the results, please contact the principal investigator Elissa Sarno at elsarno@umd.edu.

Appendix N: Compensation Form

Thank you for taking the time to complete this questionnaire. Please click NEXT to submit your responses. The final page will contain information about ways to process your \$10 cash prize.

Note that responses from this point onwards will be separate from those in the previous pages and your information are strictly protected. The information you provide on the next page will not be linked in any way to your responses on the previous pages.

When participants clicked “NEXT,” they were re-directed to a separate survey (below).

Thank you for participating in this study. You are eligible to receive a payment of \$10 cash or a \$10 Amazon e-gift card for your participation. In order to process your payment, please complete the form below. Please note that if you do not complete the form, you will not receive payment.

How would you like to receive your \$10 payment?

- I would like to receive \$10 cash
- I would like to receive a \$10 Amazon e-gift card

If “I would like to receive \$10 cash” was selected:

In order to process your cash payment, please complete the form below. Please note that your responses on the form will not be linked in any way to your survey data, and will be destroyed 3 months after the completion of this study.

Name (text box)

Address (text box)

Address 2 (text box)

City (text box)

State (text box)

Postal code (text box)

Thank you for completing the payment form. Your payment will be processed within 1 week, and you will receive your payment in the mail within 2 weeks. If you have any questions, please contact Elissa L. Sarno at elsarno@umd.edu.

If “I would like to receive a \$10 Amazon e-gift card” was selected:

Please enter the email address where you would like to receive your \$10 Amazon e-gift card below. Please note that your email address will not be linked in any way to

your survey data, and will be destroyed 3 months after the completion of this study.
(text box)

Thank you. Your payment will be processed within 1 week. If you have any questions, please contact Elissa L. Sarno at elsarno@umd.edu.

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