## PERSONALITY AND BISEXUALITY

# A Thesis

Presented to the Faculty of the Graduate School of Cornell University

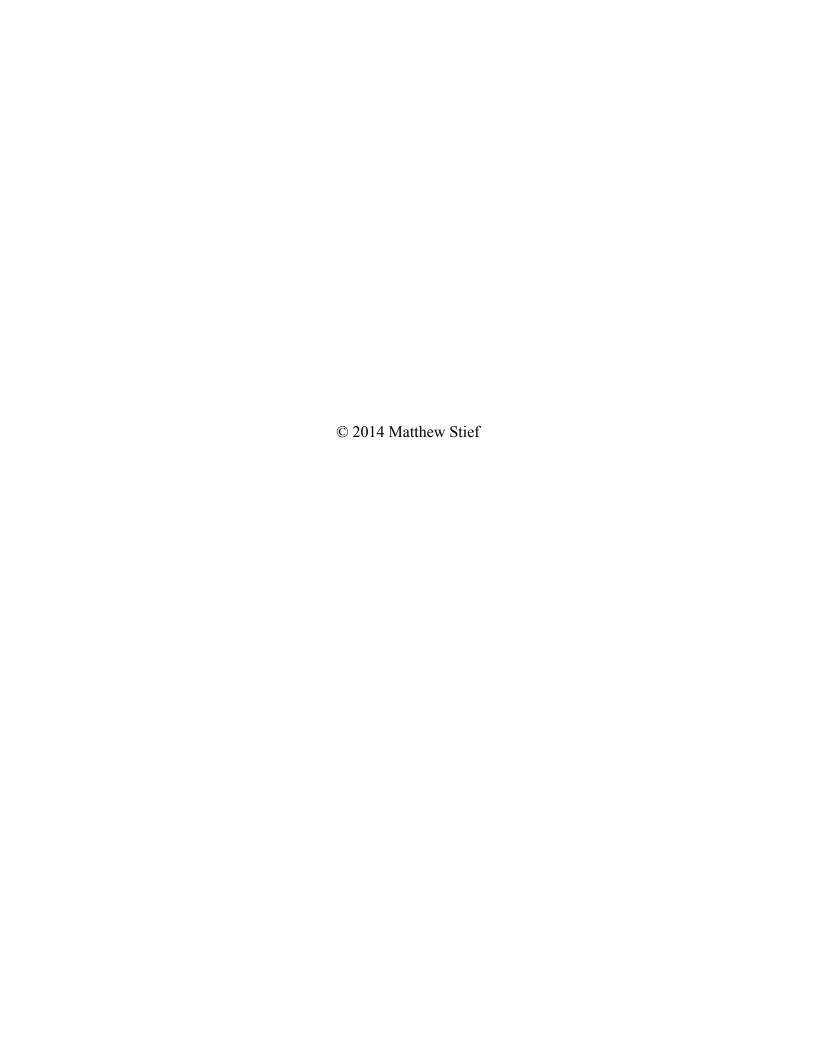
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Master of Arts

by

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#### **ABSTRACT**

Sexual orientation is typically assumed to be independent of factors like personality. Although this is probably accurate for heterosexual and homosexual orientations, personality may play a role in bisexuality. I hypothesized that bisexuality may be potentiated by personality traits that allow sexual behavior to occur independently of an oriented predisposition to males or females. If so, such traits should be elevated in bisexual women and men. Female sexual response is relatively independent of the sex of the partner, so I also hypothesized that such relationships would be stronger for bisexual women than bisexual men. This was tested in two online studies. Study 1 (N = 828) tested for elevated levels of two relevant personality traits, sexual sensation seeking and sexual excitability. Study 2 (N = 616) did the same with sexual curiosity, and tested whether the relationship between sexual curiosity and bisexuality was independent of the Big Five. Elevated levels of sexual sensation seeking and sexual curiosity were found for bisexual women and men. Elevated levels of sexual excitability were found only for bisexual women. The predicted sex difference was found for each trait, and sexual curiosity was elevated independently of the Big Five.

#### **BIOGRAPHICAL SKETCH**

Matthew Christian Stief was born in Martinez, California on February 13, 1983. He dropped out of high school during his sophomore year at Stonewall Jackson Senior High School in Manassas, Virginia. After becoming an emancipated minor at the age of 16 and living and working as an adult for two years in San Francisco, California, at the age of 18 he took the California High School Proficiency Exam, allowing him to take the Scholastic Assessment Test, on which he did very well. Based on this, he was able to attend the University of California at Santa Cruz from 2001 to 2005, in the same cohort that he would have had he not dropped out of high school, where he earned a Bachelor of Arts in Anthropology. From 2007 to 2009 he attended San Francisco State University where he earned a Master of Arts in Human Sexuality Studies, working with the anthropologist Dr. Gilbert Herdt. He entered the Department of Human Development at Cornell University in the Fall of 2009 where he worked with Dr. Ritch Savin-Williams.

# ACKNOWLEDGEMENTS

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### **Personality and Bisexuality**

#### 1. Introduction

Sexual orientation is typically assumed to be uninfluenced by traits like personality. While some correlations between sexual orientation and personality have been found, researchers have typically assumed that such correlations are caused by a third variable, such as prenatal hormones (Lippa, 2005). This is probably accurate for heterosexuality and homosexuality, which a large body of evidence suggests is determined prenatally (Hines, 2011). Bisexuality, however, introduces a continuous dimension of variability that may be susceptible to influences like personality. The ratio of relative responsivity to male or female stimuli varies enormously between individuals (Laumann, Gagnon, Michael, & Michael, 1994), across time (Savin-Williams & Ream, 2007), and in different contexts (Diamond, 2008). Very little is known about what determines this variation. One possibility is that personality traits that influence the relative dominance of "oriented" and "unoriented" sexual response systems (Diamond, 2006; Diamond & Wallen, 2011) may move people toward or away from exclusive sexual orientations. In particular, personality traits associated with sexual novelty seeking may motivate bisexual behavior independently of an oriented erotic response. If so, elevated levels of such traits would push people toward the non-exclusive center of the sexual orientation continuum.

#### 1.1. Personality and Sexual Orientation

Oriented systems are those that are sensitive to information about the sex of potential mates in sexual stimuli, and generate an excitatory response only to males or females. Such systems are particularly involved in approach motivation and behavior, and are called *proceptive* (Beach, 1976; Diamond, 2006; Wallen, 1990). Unoriented systems are those that generate an excitatory response to sexual stimuli regardless of the sex of the potential mate. Such systems

are primarily involved in preparing the body for sexual intercourse, and are called *arousability* (Beach, 1976; Diamond, 2006; Wallen, 1990). The two systems are neurologically and physiologically distinct (Agmo, 1999). Sexual orientation is most relevant to approach motivation in that initial approach is the first point at which the sex of potential mates is determined (Diamond, 2006; Diamond & Wallen, 2011). The arousability system primarily operates after sexual contact has been initiated, and therefore need not strongly distinguish between sexes (Diamond, 2006; Diamond & Wallen, 2011). Anything that allows sexual contact to occur independently of the proceptive system, therefore, should make bisexual behavior more likely.

Personality traits related to sexual novelty seeking may provide proceptivity-independent motivation. For people whose proceptive systems are primarily oriented toward one sex, sexual contact with the non-preferred sex will be novel. Supporting this possibility, heterosexual men with the long form of the dopamine D4 receptor gene, associated with novelty seeking, were five times more likely to have had sex with both men and women than those with the short form, and homosexual men with the long form had six times as many female sex partners (Hamer, 2002). A substantial body of research exists on sexual novelty-seeking (for a review see, Hoyle, Fejfar, & Miller, 2000). Most of this research has centered on a measure of sensation seeking adapted for research on sexuality termed sexual sensation seeking (Kalichman & Rompa, 1995). General sensation seeking is theorized to predict novel sexual behavior and sexually permissive attitudes (Zuckerman, 1994), and is correlated with number of unfamiliar sexual partners (Fisher & Misovich, 1990; Zuckerman & Kuhlman, 2000).

Based on these relationships, the Sexual Sensation Seeking Scale (Kalichman & Rompa, 1995) was developed to optimize the construct for the sexual domain. It successfully predicts

behaviors related to sexual novelty-seeking such as extra-dyadic sexual behavior (Wiederman & Hurd, 1999), number of 1-night stands (Gaither & Sellbom, 2003), the diversity of sexual images a person is willing to view (Gaither, Sellbom, & Meier, 2003), and anal sex in women (Gaither & Sellbom, 2003). Another approach to sexual novelty seeking is derived from Eysenck's system of attitudinal predispositions to sexuality, two factors of which (sexual curiosity and promiscuity) are relevant (Eysenck, 1970). Rieger et al. (2013) recently developed a "sexual curiosity" scale based on items from these factors that is conceptually similar to sexual sensation seeking. The two scales primarily differ in that they focus on behavioral and attitudinal tendencies, respectively. Despite this difference, Rieger et al. (2013) found that they were highly correlated (.72), and concluded that they likely tap the same underlying trait from complementary behavioral and attitudinal perspectives. Critically, both scales contain no items referring to the sex of potential mates, ensuring the non-triviality of any potential relationship with bisexuality.

It is also possible that the absolute sensitivity of the arousability system may make it more likely to operate independently of proceptivity. If such an effect exists, however, it is likely to be weaker than that of sexual novelty-seeking because it would not provide motivation for bisexual contact to occur. Self-report scales for the sensitivity of the arousability system have been developed to assess the sources of sexual dysfunction (Janssen, Vorst, Finn, & Bancroft, 2002). The most influential model in this area posits a dual-control model of sexual response consisting of interacting excitatory and inhibitory systems (Bancroft, 1999). The excitatory component of this model is conceptually identical to arousability, which was primarily developed in the context of animal sexual behavior (Beach, 1976). Bisexual women have been

found to score higher on sexual excitability than heterosexual or homosexual women (Sanders, Graham, & Millhausen, 2008).

Each of these traits, sexual sensation seeking/sexual curiosity and sexual excitability, are therefore hypothesized to push people toward the bisexual center of the sexual orientation continuum. To test this, I predicted that bisexual men and women would show elevated levels of each these traits relative to people with heterosexual or homosexual orientations.

#### 1.2. Sex Differences

Female sexual response has been shown to be consistently less dependent on the sex of the partner compared to men (Chivers, Rieger, Latty, & Bailey, 2004). Consistent with this, men experience consistently high proceptivity levels mediated by consistently high testosterone levels (Udry, 1988), while women experience cyclical proceptivity governed by hormones released during ovulation and possess a correspondingly independent arousability system (Diamond & Wallen, 2011; Penton-Voak & Perrett, 2000). Additionally, women report higher rates of bisexual behaviors and sexual attractions, and self-identify as bisexual at a greater rate than men (Laumann et al., 1994; Savin-Williams & Ream, 2007). Women's sexuality is also more likely to change over time (Diamond, 2008; Dickson, Paul, & Herbison, 2003). Taken together, these data suggest that female sexual orientation is less determined by prenatal factors, and more open to the potential influence of personality. Therefore, sexual sensation seeking, sexual excitability, and sexual curiosity were hypothesized to be more elevated in women than in men.

#### 1.3. Role of the Big Five

Few studies relating the Big Five to sexual orientation have included bisexual samples. In one study, of the five major personality dimensions, extraversion had the largest and most consistent effect on sexuality, correlating with more sexual partners, more frequent sex, more

diverse sexual behaviors, and higher sexual satisfaction (Barnes, Malamuth, & Check, 1984). It might, therefore, be expected to facilitate arousability. However, a different study using the five major personality dimensions (Lippa, 2008) has found that bisexual women and homosexual men had elevated levels of neuroticism compared to heterosexual and homosexual women, and bisexual and heterosexual men, respectively. No other significant effects were found for the other five major dimensions, including extraversion. This is not surprising, because, although the major personality dimensions have a consistent effect on sexual attitudes (Eysenck, 1970), their effect on sexual behavior is weak (Heaven, Fitzpatrick, Craig, Kelly, & Sebar, 2000). Sexual sensation seeking has also been shown to have good discriminant validity relative to the Big Five, with a predictable pattern of weak or nonsignificant correlations (Gaither & Sellbom, 2003). Based on this reasoning, bisexuality's relationship with sexual sensation seeking/sexual curiosity and sexual excitability is predicted to be independent of the Big Five.

### 1.4. The Present Research

The present research consists of two studies using two independently gathered convenience samples recruited through online sources. Study 1 tested for elevated levels of sexual sensation seeking (Gaither & Sellbom, 2003) and sexual excitability (Janssen et al., 2002), and the predicted larger effect in bisexual women. Study 2 tested for elevated levels of sexual curiosity (Eysenck, 1970; Rieger et al., 2013), the independence of this effect from the Big Five, and the predicted sex difference.

## 2. Study 1

#### 2.1. Method

#### 2.1.1. Participants and procedure.

A total of 934 participants completed an online questionnaire. Eleven were removed for inconsistent answers and 95 did not complete items used in the analyses, resulting in a sample of 828. Participants were recruited through the websites Facebook and Craigslist in Fall 2011. Sexual minority participants were also recruited through mailing lists for lesbian, gay, and bisexual students. Recruitment targeted sexual minorities in order to obtain an adequate sample size across the sexual orientation continuum. Participants had a chance to win one \$100 and ten \$10 prizes.

Half (48%) of participants were women. Ages ranged from 18 to 39. The mean age (with SD) was 23.47 (5.06). The most common ethnicities were Caucasian (65%), Asian/Pacific Islander (9%), Hispanic (9%), Mixed/Multi-racial (9%), and African American/Black (6%). Regarding sexual orientation identity, participants were asked "Which of the following best describes you?" The possible responses were "exclusively straight," "mostly straight," "bisexual," "mostly gay/lesbian," and "exclusively gay/lesbian." Percentages for each response were, respectively, 48%, 17%, 19%, 8%, 8% for women and 41%, 11%, 11%, 9%, 28% for men.

#### 2.1.2. Measures.

Sexual orientation. Sexual orientation was measured using degrees of other-sex versus same-sex sexual attractions and fantasies. Participants indicated what percentage of their current sexual attractions was directed at males or females. The same question was asked for current sexual fantasies. Female and male percentages were forced to sum to 100. Same-sex attraction and fantasy were highly correlated for both men, r(430) = .97, p < .001, and women, r(386) = .89, p < .001. Sexual orientation was computed as the mean of same-sex attraction and fantasy percentages, resulting in a sexual orientation score ranging from zero (*exclusively heterosexual*)

to 100 (*exclusively homosexual*). The continuous measure correlated strongly with sexual orientation identity for both men (See Table 1).

Sexual sensation seeking. Sexual sensation seeking was measured using a 10-item scale (Kalichman & Rompa, 1995). The scale (Kalichman & Rompa, 1995) demonstrated good test-retest reliability (.78) and internal consistency (.75). It also correlated strongly (.53) with a simultaneously developed sensation seeking scale stripped of sex-specific items (Kalichman & Rompa, 1995). Items are answered in a 4-point Likert scale from 1 (*not at all like me*) to 4 (*very much like me*). An example item is, "I like to have new and exciting sexual experiences and sensations." Scores were computed as the mean response. Cronbach's α for the current sample was .81 for men and .84 for women.

Sexual excitability. Sexual excitability was measured using the propensity for sexual excitation sub-scale of the Sexual Inhibition and Excitation Scale (Janssen et al., 2002). The sub-scale consists of 6 items answered in a 4-point Likert scale from 1 (*strongly agree*) to 4 (*strongly disagree*). It differs from conceptually similar scales such as erotophobia-erotophilia (Fisher, Byrne, White, & Kelley, 1988) in that it focuses on self-reported physiological response rather than behavioral or attitudinal tendencies. An example item is, "When a sexually attractive stranger accidentally touches me, I easily become aroused." The sub-scale (Janssen et al., 2002) demonstrated good test-retest reliability (.76) and internal consistency (.89). Scores were computed as the mean response. Cronbach's  $\alpha$  in the present sample was .76 for men and .71 for women.

#### 2.2. Results

The hypothesis that bisexuality would be associated with elevated levels of sexual sensation seeking and sexual excitability was tested with hierarchical quadratic regression. An

elevated level of a trait in bisexual participants is indicated by an inverted-U shape quadratic curve. If such an effect is present the quadratic coefficient should be significant and negative.

2.36 (.64) M(SD)[.45, .60][-.01, .19][-.01, .19][.05, .25].53\*\*\* (.52)5 [-.01, .19][.28, .45] [.03, .23]2.63 (59)4 24.43 (5.53)[-.02, .17](43.62)44.88 2 [.00, .19][.05, .24].96,.97(49) ual Orientation Identity<sup>a</sup> ual Sensation Seeking<sup>c</sup> ual Excitability<sup>c</sup> ual Orientation<sup>b</sup> l Excitability

Female data are shown above the diagonal; male data are shown below the diagonal

tions for Sexual Orientation Identity, Sexual Orientation, Age, Sexual Sensation Seeking, and

1 Summary of Intercorrelations [with 95% Confidence Intervals], Means, and Standard

es from 1 (exclusively straight) to 5 (exclusively gay/lesbian)

ses from 0 (exclusively heterosexual) to 100 (exclusively homosexual)

es from 1 (low) to 4 (high).

p < .05. \*\* p < .01. \*\*\* p < .00

Table 2 presents the results of these models for both sexual sensation seeking and sexuality excitability. The predicted inverted-U shaped effect was found and was highly significant for both traits. Step 1 demonstrates the predicted quadratic relationships in the simplest models. Step 2 further tested the predicted relationship by adding sex and age as control variables. Controlling for sex and age strengthened the predicted quadratic effects of sexual orientation with sexual sensation seeking and sexual excitability.

Table 2 Hierarchical Quadratic Regression Analyses Predicting Sexual Sensation Seeking and Sexual Excitability With Sexual Orientation and Controls

	Sexual Sensation Seeking		Sex Excita	tual ability
	β	$\Delta R^2$	β	$\Delta R^2$
Step 1 – Basic Model Sexual Orientation Sexual Orientation <sup>2</sup>	.27*** 29***	.05***	.19*** 13**	.02***
Step 2 - Controls Sexual Orientation <sup>2</sup> Sex <sup>a</sup> Age	34*** .24*** .24***	.13***	17*** .17*** .10**	.04***
Step 3 – Interactions with Sex Sexual Orientation <sup>2</sup> Sex*Sexual Orientation Sex*Sexual Orientation <sup>2</sup>	32*** 10* .23**	.01*	17*** 06 .22**	.01*
Total $R^2$		.19***		.07***

*Note.* For brevity only the quadratic sexual orientation term is displayed in subsequent steps.

 $<sup>^{</sup>a}$ Female = 0; Male = 1.

p < .05. p < .01. p < .001.

The hypothesis that the inverted-U shaped relationships would be stronger in women, was tested in Step 3 by interacting sex and the quadratic effects. The hypothesis was confirmed for both traits. Sex differences were further investigated in separate analyses for women and men. For sexual sensation seeking, the quadratic term was significant for both women,  $\beta = -.50$ , p < .001,  $\Delta R^2 = .12$ , and men,  $\beta = -.25$ , p < .001,  $\Delta R^2 = .05$ , suggesting that the negative quadratic effect is present in both women and men, but larger in women. Figure 1 illustrates the quadratic relationships with sexual sensation seeking in women and men.

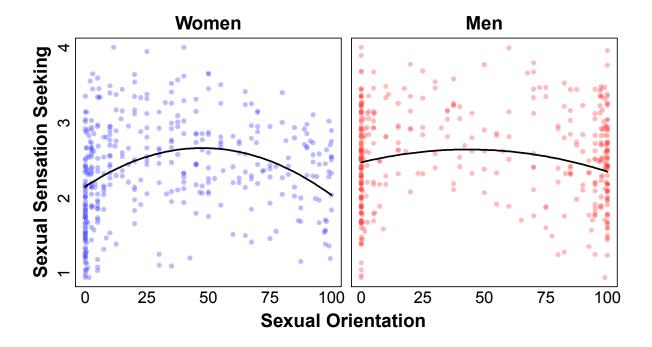


Figure 1. Inverted-U shape quadratic relationships between sexual orientation and sexual sensation seeking

For sexual excitability, only the female model was significant, p < .001,  $\beta = -.33$ ,  $\Delta R^2 = .06$ ; the male model was in the predicted direction but did not reach significance, p = .13,  $\beta = -$ 

.08,  $\Delta R^2$  = .01. Figure 2 illustrates the resulting significant quadratic relationship for women and the corresponding non-significant curve for men.

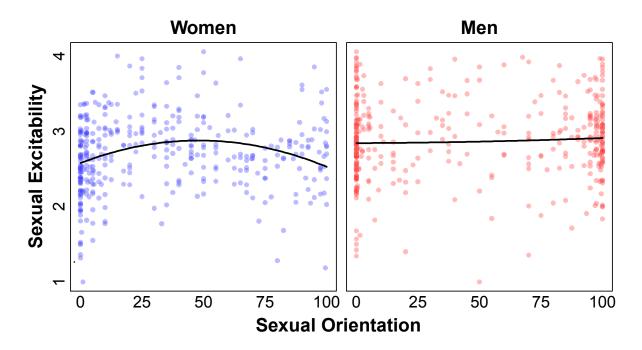


Figure 2. *Inverted-U shape quadratic relationship between sexual orientation and sexual excitability for women and the corresponding non-significant curve for men.* 

Study 2 extends these results to sexual curiosity, a measure similar to sexual sensation seeking, but differing from it in focusing on attitudinal rather than behavioral tendencies. Study 2 also includes data on the Big Five, clarifying the relationship between the sexual curiosity, a trait specific to the domain of sexuality, and the five major personality dimensions.

## **3. Study 2**

#### 3.1. Method

## 3.1.1. Participants and procedure.

A total of 667 participants completed an online questionnaire. Eleven were removed for inconsistent answers, and 40 did not complete items used in the analyses, resulting in a final sample of 616. Participants were recruited through the websites Facebook and Craigslist in the Fall of 2010. Sexual-minority participants were also recruited through mailing lists for lesbian, gay, and bisexual students. Recruitment targeted sexual minorities in order to obtain an adequate sample size across the sexual orientation continuum.

Half (53%) of participants were women. Mean ages (with *SD*) were 24.6 (7.46) for men and 23.25 (6.00) for women. The most common ethnicities were Caucasian (58%), Asian/Pacific Islander (21%), Mixed/Multi-racial (11%), Hispanic (5%), and African American/Black (5%). Participants self-reported sexual orientation identity in a 7-point Kinsey scale from 0 (*exclusively straight*) to 6 (*exclusively gay*). Percentages for each response were, respectively, 38%, 12%, 6%, 7%, 6%, 11%, 19% for women, and 37%, 11%, 5%, 5%, 6%, 9%, 27% for men.

#### 3.1.2. Measures.

Sexual orientation. Sexual orientation was measured as in Study 1. Same-sex attractions and fantasies were highly correlated for both men, r(289) = .98, p < .001, and women, r(327) = .001

.93, p <.001. The resulting continuous sexual orientation measure also correlated strongly with self-reported sexual orientation for men (See Table 3).

Sexual curiosity. Sexual curiosity was measured with a 10-item scale, using items adapted from the sexual curiosity and sexual promiscuity factors of the Inventory of Attitudes to Sex (Evsenck, 1970; Rieger, Rosenthal, Cash, Linsenmeier, Bailey, & Savin-Williams, 2013). Sexual curiosity is defined as an attitudinal tendency organized around a predisposition to seek out and respond favorably to sexual novelty (Rieger et al., 2013). Items are answered in a 7point Likert scale from 1 (strongly agree) to 7 (strongly disagree). An example item is "If I were invited to an orgy, I would accept." Eysenck's treatment of sexual curiosity as an attitudinal tendency predated more recent work on the general curiosity trait construct, so external correlations to conceptually related measures have not been performed (Kashdan et al., 2009). Addressing this lack, Rieger et al. (2013) found that sexual curiosity correlated most strongly with sexual sensation seeking (.73), and only moderately with non-sexual or general sensation seeking (.24) (Hoyle et al., 2002; Kalichman & Rompa, 1995). Correlations with two measures of general curiosity were also only moderate at .32 for the Curiosity and Exploration Inventory-II (Kashdan et al., 2009), and .33 for 10-item Curiosity/Interest in the World Scale (Peterson & Park, 2009). These data suggest that, despite its name, the sexual curiosity scale is probably broadly identical to sexual sensation seeking in tapping an underlying trait organized around responses to sexual novelty. Scores were computed as the mean response. Cronbach's α was .88 for men and .91 for women.

*Big Five.* The Big Five were measured using the Ten Item Personality Measure, developed to be brief yet maintain construct validity (Gosling, Rentfrow, & Swann, 2003). Items were answered in a 7-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*). Each

trait was measured using two items. Scores were computed as the mean response. Cronbach's as were extraversion, .82, agreeableness, .37, conscientiousness, .62, neuroticism, .69, and openness to experience, .56. The low inter-item reliability for some traits is due to the use of minimally overlapping items in a short measure, which is necessary to capture the sub-factors of

5.43) 1.38) 1.62) 5.11 (1.10) 5.38 ry of Intercorrelations [with 95% Confidence Intervals], Means, and Standard Deviations for Sexual Orientation .18,.43] .00,27 .14\* 6 -.47,-.23] -.32,-.05] -.19  $\infty$ [-.17,.1]-.11 -.46,-.21] 9 -.15,.15 [-.1,.19]Orientation, Age, Sexual Curiosity, and the Big Five [-.25,.03]-.15,.15(1.27)-.11 [-.13,.16]-.31, -.0324.20 .04 [.09,.31]-.08,.21 -.05,.23 -.08,.20] .08,.36] -.08,.21] .06,.23] [-.10,.19] -.07,.15] .09,.31-.06,.23] .20\*\*\* .06,.34] .20\*\* .07  $\mathsf{ness}^{\mathfrak{c}}$ ation

a are shown above the diagonal; male data are shown below the diagonal exclusively straight) to 9 (exclusively gay/lesbian)

exclusively heterosexual) to 100 (exclusively homosexual) low) to 7 (high,

each trait as fully as possible (Gosling et al., 2003). Despite this, because agreeableness had such low internal consistency and is not theoretically relevant, it was not included in analyses.

Table 4 Hierarchical Quadratic Regression Analyses Predicting Sexual Curiosity With Sexual Orientation and Controls

Orientation and Controls		
	β	$\Delta R^2$
Step 1 – Basic Model		.14***
Sexual Orientation	.34***	
Sexual Orientation <sup>2</sup>	29***	
Step 2 – Controls		.11***
Sexual Orientation <sup>2</sup>	35***	
Sex <sup>a</sup>	31***	
Age	.09**	
Step 3 – Big Five		.03*
Sexual Orientation <sup>2</sup>	36***	
Extraversion	.13**	
Conscientiousness	$09^{\dagger}$	
Neuroticism	00	
Openness to Experience	.01	
Step 4 – Interactions with Sex		.00
Sexual Orientation <sup>2</sup>	30***	
Sex*Sexual Orientation	.14	
Sex*Sexual Orientation <sup>2</sup>	08	
Total $R^2$		.27***

Note. For brevity only the quadratic sexual orientation term is displayed in subsequent steps.

<sup>&</sup>lt;sup>a</sup>Male = 0; Female = 1. †p = .054. \*p < .05. \*\*p < .01. \*\*\*p < .001.

#### 3.2. Results

As in Study 1, hypotheses were tested using hierarchical quadratic regression analyses. Table 4 presents the results of these analyses. Step 1 confirms the quadratic relationship between sexual orientation and sexual curiosity. Step 2 further tests this effect by controlling for sex and age. The quadratic effect remained significant, and was strengthened, after the addition of the controls. Step 3 extended Study 1 by testing whether the relationship with sexual curiosity is independent of the five major personality dimensions. The quadratic effect was slightly weakened but remained highly significant.

Step 4 tested the predicted sex difference by interacting sex and the quadratic sexual orientation effect. Unlike in Study 1, the interaction was not significant. Sex differences were further investigated in separate analyses for women,  $\beta$  = -.44, p < .001,  $\Delta R^2$  = .15, and men,  $\beta$  = -.35, p < .001,  $\Delta R^2$  = .11. Figure 3 illustrates the resulting quadratic relationships. Note that despite the nonsignificant interaction with sex, the female model has a larger standardized coefficient and variance explained, consistent with the predicted sex difference.

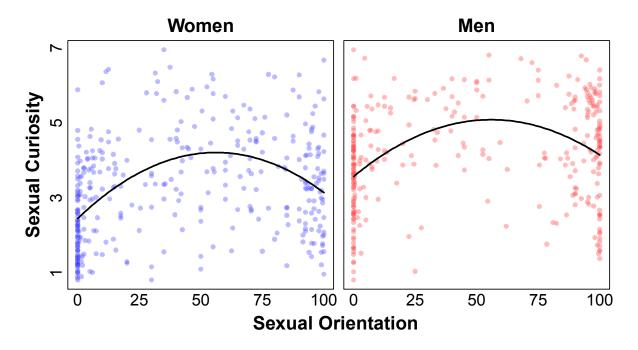


Figure 3. *Inverted-U shape quadratic relationships between sexual curiosity and sexual orientation.* 

## 4. Discussion

The present research indicates that bisexuality is associated with elevated levels of three personality traits: sexual sensation seeking, sexual curiosity, and sexual excitability. Findings were strongest for traits that motivate novel sexual behavior—sexual sensation seeking and sexual curiosity. Bisexual participants had higher levels of both sexual sensation seeking and sexual curiosity than heterosexual and homosexual participants. In contrast, only bisexual women had elevated levels of sexual excitability. A consistent pattern of evidence was found

that these effects were larger in women. Although sex differences were not significant for sexual curiosity, separate male and female analyses showed that in the female model standardized regression coefficients were larger for the female sample, consistent with the proposed sex difference. Finally, the relationship between bisexuality and sexual curiosity, a trait specific to the sexuality domain, was independent of the Big Five.

These data support a view of sexual orientation emphasizing the interaction of multiple factors. Although this is typically assumed for any psychological process, in the case of sexual orientation factors other than prenatal androgens have largely been ignored in modern research. Although it is clear that prenatal organizational effects are important determinants of sexual orientation, the impracticality of research on human perinatal neural development makes postnatal development an important area of inquiry. The present findings suggest that personality may be a source of such post-natal factors.

While the present research suggests the existence of arousability-driven bisexuality, there is also evidence that proceptivity-driven bisexuality exists. Recent research has documented for the first time a sample of men who self-identify as bisexual and exhibit genital arousal to both males and females elevated beyond that of self-identified heterosexual and homosexual men (Rosenthal, Sylva, Safron, & Bailey, 2011). However, previous genital arousal studies are more consistent with arousability-driven bisexuality. Rieger et al. (2005) found that bisexual men showed genital response patterns that were, as a whole, indistinguishable from those of heterosexual and homosexual men (Rieger, Bailey, & Chivers, 2005; Tollison, Adams, & Tollison, 1979). The more recent study differed from previous studies in using more stringent inclusion criteria, including extended sexual relationships with both males and females (Rosenthal et al., 2011). The failure to detect strong bisexual arousal to erotic video stimuli in a

laboratory setting may have resulted from a sampling strategy that drew from a broad population of self-identified bisexual men consisting of different types. Laboratory studies using video stimuli are particularly well suited to elicit a response in the proceptive system because proceptivity needs to be sensitive to such stimuli in order to reliably generate approach motivation toward the reproductively appropriate target. Studies using video stimuli are unlikely to detect those whose capacity for bisexual response depends on tactile stimuli.

#### **Limitations and Future Research**

However, this is not the only possible interpretation of the present results. An additional possibility is that the association between bisexuality and elevated levels of sexual sensation seeking, sexual curiosity, and sexual excitability is driven by a failure to accurately measure bisexuality through self-report. This point relies on the distinction between sexual orientation, defined as a pattern of psychophysiological response to sexual stimuli (Bailey, 2009), and the self-perception or self-report of sexual orientation (Cass, 1996). Rather than influence bisexual responsivity, and thus sexual orientation, personality may make people more likely to inaccurately report bisexual attractions and fantasies. Recent work by Preciado and Peplau (2011) has found that heterosexual women with lower need for structure were more likely to report a capacity for bisexual behavior and desire. They suggest that need for structure influences the way that people interpret ambiguous arousal states, with people low in need for structure being more likely to attribute arousal in a way discordant with their heterosexual selfconcept. People may also be more likely to report non-exclusive sexual attractions and fantasies because they view them as being consistent with self-concepts of sexual sensation seeking, sexual curiosity, or sexual excitability. A converse scenario is also possible. People whose bisexuality is driven by proceptivity may develop sexual self-schema based on their bisexual

experience (Anderson & Cyranowski, 1994) that is consistent with elevated scores on sexual sensation seeking, sexual curiosity, and sexual excitability.

The evidence currently available is unable to distinguish between these possibilities. The issue is further complicated by the possibility that self-perception and past experience may itself influence sexual response. For example, a low need for structure may potentiate independently functioning arousability by decreasing motivation to reconcile arousability-derived sexual arousal with a self-concept based on the orientation of the proceptive system. Additionally, arousability-driven bisexual experience may spark a feedback loop of positive conditioning, leading to a distinct pattern of sexual responsivity in adulthood (Hoffman, 2012). Such a scenario is suggested by a recent finding that bisexual men had uniquely elevated genital arousal to video pornography of a bisexual "three-way," something that should be unique to their sexual history (Cerny & Janssen, 2011). It is also possible that a common etiological factor underlies both bisexuality and personality. Recalling this possibility, recent work suggests that a common genetic factor underlies both nonheterosexuality and personality traits associated with psychiatric vulnerability (Zietsch, Verweij, Bailey, Wright, & Martin, 2011; Zietsch et al., 2012). Although this work has focused on psychopathology, it is possible that nonclinical traits associated with sexual nonexclusivity show a similar pattern.

The present research is obviously unable to address this complicated set of possiblities. Future research will have to distinguish between self-report and non-self-report measures of sexual orientation, using measures such as genital arousal (Rieger et al., 2005), pupil dilation (Rieger & Savin-Williams, 2012), and viewing time (Lippa, 2013). The relevance of arousability and proceptivity would be more firmly supported by assessing traits such as sexual excitability directly using similar psychophysiological measures, and by relating personality to

the context-dependent variability typical of sexual fluidity in women (Diamond, 2006). A more systematic investigation of an array of related personality traits may also reveal fruitful relationships. Research associating genetics and heritability with both sexual orientation and personality traits is also indicated. Although much work remains to be done, the present research suggests that such a research program is likely to yield important results, particularly in terms of how individual differences in personality relate to how people experience and describe their sexual orientation.

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## Appendix A

# Sexual Sensation Seeking Scale (Kalichman & Rompa, 1995)

**Instructions**: A number of statements that some people have used to describe themselves are given below. Read each statement and then circle the number to show how well you believe the statement describes you.

Please read the following sentences and respond with one the following options:

[1]	[2]	[3]	[4]
Not at all	Slightly	Mainly	Very much
like me	like me	like me	like me

- 1) I like wild "uninhibited" sexual encounters.
- 2) The physical sensations are the most important thing about having sex.
- 3) I enjoy the sensation of intercourse without a condom.
- 4) My sexual partners probably think I am a "risk taker."
- 5) When it comes to sex, physical attraction is more important to me than how well I know the person.
- 6) I enjoy the company of "sensual" people.
- 7) I enjoy watching X-rated movies.
- 8) I am interested in trying out new sexual experiences.
- 9) I feel like exploring my sexuality.
- 10) I like to have new and exciting sexual experiences and sensations.

#### Appendix B

## Sexual Excitation and Sensation Seeking Scale (Janssen, Vorst, Finn, & Bancroft, 2002)

Instructions: In this section you will find statements about how you might react to various sexual situations, activities, or behaviors. Please read each statement carefully and decide how you would be most likely to react. In many statements you will find words describing reactions such as "sexually aroused," or sometimes just "aroused." By "aroused" we mean feelings of sexual excitement, being turned on, horny, hot, etc. If you read a statement that you feel is not applicable, please just pick the response you would choose if it were applicable to you. Please try not to skip any questions.

*Please read the following sentences and respond with one the following options:* 

[1]	[2]	[3]	[4]
Not at all	Slightly	Mainly	Very much
like me	like me	like me	like me

- 1) When I think of a very attractive person, I easily become sexually aroused.
- 2) When a sexually attractive stranger looks me straight in the eye, I become aroused.
- 3) When I see an attractive person, I start fantasizing about having sex with him/her.
- 4) When I talk to someone on the telephone who has a sexy voice, I become sexually aroused.
- 5) When I have a quiet candlelight dinner with someone I find sexually attractive, I get aroused.
- 6) When an attractive person flirts with me, I easily become sexually aroused.
- 7) When I see someone I find attractive dressed in a sexy way, I easily become sexually aroused.
- 8) When I think someone sexually attractive wants to have sex with me, I quickly become sexually aroused.
- 9) When a sexually attractive stranger accidentally touches me, I easily become aroused.

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- 10) When I see others engaged in sexual activities, I feel like having sex myself.
- 11) If I am with a group of people watching an X-rated film, I quickly become sexually aroused.
- 12) If I am on my own watching a sexual scene in a film, I quickly become sexually aroused.
- 13) When I look at erotic pictures, I easily become sexually aroused.
- 14) When I feel sexually aroused, I usually have an erection.
- 15) When I start fantasizing about sex, I quickly become sexually aroused.
- 16) Just thinking about a sexual encounter I have had is enough to turn me on sexually.
- 17) When I feel interested in sex, I usually get an erection.
- 18) When I am taking a shower or a bath, I easily become sexually aroused.
- 19) When I wear something I feel attractive in, I am likely to become sexually aroused.
- 20) Sometime I become sexually aroused just by lying in the sun.

# **Appendix C**

## Sexual Curiosity (Eysenck, 1970)

The next set of questions is about some of your sexual preferences. Please indicate how much you agree or disagree with each of the following statements.

[1]	[2]	[3]	[4]	[5]	[6]	[7]
Strongly	Disagree	Somewhat	Neutral	Somewhat	Agree	Strong.
Disagree		Disagree		Disagree		Agree

- 1) The thought of having a threesome is appealing to me.
- 2) If I were invited to be in an orgy, I would accept.
- 3) I believe in taking my pleasures where I find them.
- 4) The idea of partner-swapping is exciting to me.
- 5) I would do almost anything for a dare.
- 6) If I were invited to see a porn movie, I would accept.
- 7) Casual sex is appealing to me.
- 8) I would enjoy watching my usual partner having sex with someone else.
- 9) Sex without love is appealing to me.
- 10) If I were offered a highly pornographic magazine, I would accept it.

### Appendix D

# The Ten Item Personality Measure (Gosling, Rentfrow, & Swann, 2003)

Here are a number of personality traits that may or may not apply to you. Please indicate the extent to which you agree or disagree with that statement. You should rate the extent to which the pair of traits applies to you, even if one characteristic applies more strongly than the other.

[1]	[2]	[3]	[4]	[5]	[6]	[7]
Strongly	Disagree	Somewhat	Neutral	Somewhat	Agree	Strong.
Disagree		Disagree		Disagree		Agree

- 1) I see myself as extraverted, enthusiastic
- 2) I see myself as critical, quarrelsome
- 3) I see myself as dependable, self-disciplined
- 4) I see myself as anxious, easily upset
- 5) I see myself as open to new experiences, complex
- 6) I see myself as reserved, quiet
- 7) I see myself as sympathetic, warm
- 8) I see myself as disorganized, careless
- 9) I see myself as calm, emotionally stable
- 10) I see myself as conventional, uncreative