# Gay, mostly gay, or bisexual leaning gay?

## An exploratory study distinguishing gay sexual orientations among young men.

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This exploratory study assessed physiological, behavioral, and self-report measures of sexual and romantic indicators of sexual orientation identities among young men (mean age = 21.9 years) with predominant same-sex sexual and romantic interests: Those who described themselves as bisexual leaning gay (n = 11), mostly gay (n = 17), and gay (n = 47). Although they were not significantly distinguishable based on physiological (pupil dilation) responses to nude stimuli, on behavioral and self-report measures a descending linear trend toward the less preferred sex (female) was significant regarding sexual attraction, fantasy, genital contact, infatuation, romantic relationship, sex appeal, and gazing time to the porn stimuli. Results supported a continuum of sexuality with distinct subgroups only for the self-report measure of sexual attraction. The other behavioral and self-report measures followed the same trend but did not significantly differ between the bisexual leaning gay and mostly gay groups, likely the result of small sample size. Results suggest that romantic indicators are as good as sexual measures in assessing sexual orientation and that a succession of logically following groups from bisexual leaning gay, mostly gay, to gay. Whether these three groups are discrete or overlapping needs further research.

**KEY WORDS**: sexual orientation; romantic indicators; bisexual leaning gay; mostly gay; pupil dilation

## INTRODUCTION

Sexual orientation is traditionally defined as sexual attraction to members of the opposite sex, same sex, or both sexes (Bailey, Vasey, Diamond, Breedlove, Vilain, & Epprecht, 2016; LeVay, 2016). In this formulation, two critical assumptions are made. First, sexual orientation is a tripartite composition of categories (heterosexual, bisexual, homosexual) and, second, sexual indicators (usually attraction, behavior, or identity) assess sexual orientation. In addition, despite contrary perspectives, sexual orientation is usually assessed with a single method and a single indicator (Korchmaros, Powell, & Stevens, 2013; Savin-Williams, 2005; Sell, 1996).

The research reported here explores an alternative perspective, namely that sexual orientation is a continuum best interpreted through multiple overlapping categories and assessed by multiple methods, including romantic indicators. Specifically, given previous research demonstrating predominantly heterosexual men fall along a sexual/romantic continuum (Savin-Williams, 2014, online), we investigated whether predominantly same-sex attracted men (bisexual leaning gay, mostly gay, exclusively gay) fall along the same continuum using multiple sexual *and* romantic indicators.

Whether sexual orientation should be conceptualized as a continuum with degrees of attractions to men and/or women, or as three discrete categories with little overlap, remains an unresolved controversy (Gangestad, Bailey, & Martin, 2000; Haslam, 1997; McConaghy, 1987, 1999; Norris, Marcus, & Green, online; Pega, Gray, Veale, Binson, & Sell, 2013; Petterson, Dixson, Little, & Vasey, 2015; Savin-Williams, 2014). Weinrich et al. (1993) referred to these two types as the "lumpers" and the "splitters," and he found support for both perspectives. For their part, investigators usually assess sexuality as a continuous construct with some version of a Kinsey scale (Kinsey, Pomeroy, & Martin, 1948; Klein, Sepekoff, & Wolf, 1985), and then

dissolve this continuum into relatively few categories (Haslam, 1997). Kinsey 0s and 1s are combined and defined as heterosexual, Kinsey 5s and 6s become gay, and all extraneous (nonexclusive) orientations (Kinsey 2s, 3s, 4s) are labeled bisexual. This reduction is usually undertaken for practical considerations, for example, if few nonheterosexual participants are recruited. Because more men than women congregate at the extreme ends of a Kinsey scale, the categorical approach is more frequently applied to samples of men than women (Bailey, 2009).

The second issue, the exclusive use of a single sexual indicator, is counter to a more expansive approach that includes romantic indicators. Though rarely implemented in recent studies of sexual orientation, not only did Kinsey defy a dichotomous, either-or perspective of sexual orientation with a heterosexual-homosexual continuum, he also added a psychological component to the behavioral component of sexual orientation (Gonsiorek, Sell, & Weinrich, 1995). Although several early scholars included an *affectional disposition* or preference to their sexual orientation measure (Klein et al., 1985; Sell, 1997; Shively & DeCecco, 1977), succeeding investigators defined "psychological" exclusively in sexual terms (e.g., attractions, fantasies, urges, desires, arousal). Weinrich et al. (1993), however, identified two factors in the Klein Grid instrument: the first loaded across all sexual *and* affectional indicators ("general sexual orientation") accounting for the majority of the variance, and a second loaded on social/emotional preferences ("emotional preference").

Another strain of research, "relationship science," has focused on passionate (involving infatuation and lust) and companionate love (involving intimacy, commitment, and attachment). These types of love are considered to be universal, biological phenomenon rooted in neuropsychological correlates, documented across a considerable number of cultural groups, and entrenched with evolutionary significance (e.g., bonding, mating) (Feybesse & Hatfield, in

preparation; Hatfield & Rapson, 1987, 2009; Karandashev & Clapp, in preparation; Sternberg, 1988). The congruence between romantic domains ("the desire for union with another") and sexual arousal/desire ("the desire for sexual union with another") has been characterized as *strongly associated*, tightly linked constructs that overlap but are not identical (Hatfield & Rapson, 1987, p. 259; Hatfield & Rapson, 2009). The research of Weinrich et al. (1993) and Savin-Williams (2014) support this perspective. Savin-Williams (2014) reported five sexual and romantic indicators were significantly inter-correlated for both sexes (*rs* = .81 to .98) and the romantic indicators (infatuation, romantic relationship) were significantly related to sexual orientation with effect sizes near 1.0.

These findings are consistent with research on the heterosexual end of the sexual continuum (Savin-Williams & Vrangalova, 2013). Based on sexual and romantic indicators, a *mostly straight* sexual orientation was found to be unique from exclusive heterosexuality. Mostly straights (Kinsey 1s) exhibited physiological, behavioral, and self-report sexual and romantic profiles that distinguish them as a separate group in between heterosexuals (Kinsey 0s) and bisexual leaning straights (Kinsey 2s). Indeed, there are more mostly straights than bisexual, mostly gay, and gay individuals combined (Copen, Chandra, & Febo-Vazquez, 2016; Savin-Williams, Joyner, & Rieger, 2012).

By contrast, research has seldom examined these issues regarding the gay end of the sexual orientation continuum. Our question, are *mostly gay* individuals distinct from *bisexual leaning gay* and *exclusively gay* young men? In a US nationally representative study, one third of those who were equally, mostly, or only attracted to men identified as mostly gay men (Chandra, Mosher, & Copen, 2011). Another study found mostly gay men were more similar to self-identified bisexual than gay men in their reports of sexual attraction to and sex partners with both

sexes (Vrangalova & Savin-Williams, 2012). Other than these findings, little is known about men with a predominant but not exclusive sexual orientation towards men.

To minimize the variance attributable to the measurement or method rather than to the construct itself (Campbell & Friske, 1959), the present multimethod study explored the gay end of sexuality by determining whether Kinsey 4s, 5s, and 6s vary from each other using physiological, behavioral, and self-report measures in assessing sexual/romantic indicators of sexual orientation (Rieger & Savin-Williams, 2012; Rieger, Rosenthal, Cash, Linsenmeier, Bailey, & Savin-Williams, 2013; Rieger, Cash, Merrill, Jones-Rounds, Dharmavaram, & Savin-Williams, 2015).

Given cohort differences in attitudes toward sex (e.g., acceptability of various forms of sexual behavior), expressions of sexuality (e.g., the interplay between sex and romance), and sexual and romantic milestones (e.g., age of first sex, dating) (Calzo, Antonucci, Mays, & Cochran, 2011; Jones & Cox, 2010; Savin-Williams, 2005; Twenge, Sherman, & Wells, 2015), the investigation was limited to the *millennial*, cohort—those 18 to 32 years (Horovitz, 2012).

## METHOD

### Participants

From October 2010 to June 2011, participants were recruited for a study investigating "sexuality, gender, and personality." These data, across men with different sexual orientations and their link to pupil dilation, have been previously published (Rieger & Savin-Williams, 2012). The present research focuses on the distinction between gay groups, and this aspect of the data has not been previously published. Of the 165 men who responded, 47 identified their sexual orientation as gay, 17 as mostly gay, and 11 as bisexual leaning gay. Ages ranged between 17 and 32 (mean = 21.9). The majority of men had some college education (64%); the remainder

had graduated from college (12%), enrolled in graduate school (9%), had a postgraduate degree (8%), or graduated from high school (8%). The most common ethnicity was Caucasian (64%), followed by mixed ethnicities (12%), African American (12%), Latino (7%), Asian American (5%), and Native American (1%).

**Measures**

**Sexual Orientation**. A Kinsey-type 7-point scale requested participants to choose the one description that most accurately reflected their current understanding of their sexuality, ranging from exclusively straight ("only sexually attracted to the opposite sex") to exclusively gay ("only sexually attracted to the same sex"). Included in the present research were men who indicated they are bisexual leaning gay ("primarily sexually attracted to the same sex and definitely attracted to the opposite sex"), mostly gay ("mostly sexually attracted to the same sex and occasionally attracted to the opposite sex"), and gay.

**Sexual and Romantic Indicators**. The men were requested, "Please indicate your current sexual status regarding the percent directed toward males and females." Five domains were presented: sexual attraction, sexual fantasy, genital contact ("genital contact on the part of one or both of you"), infatuation ("crushes"), and romantic relationship ("dating, serious and not so serious"). The total equaled 100% for sexual attraction, fantasy, and infatuation, and in most cases for genital contact and romantic relationship (except for those who reported no sexual contact or romantic relationship, in which case they did not answer these two questions).

**Pupil Dilation.** Each stimulus was a 30-second video showing either a nude male or female model masturbating. In a pilot study, the most attractive models were selected from a pool of 200 videos drawn from the Internet, showing either a man or woman masturbating. Six male and 7 female research assistants independently evaluated which 10 male and 10 female stimuli they

found the most sexually appealing. Next, the assistants independently re-rated all stimuli compiled from these initial evaluations. Using a 7-point Likert scale, they agreed on whom they found the most sexually appealing (*Cronbach's* $\alpha$ = .96). The 20 male and 20 female stimuli that were rated as most appealing, on average, were further evaluated by a group of participants not involved in the main study. These raters were 15 heterosexual men, 17 nonheterosexual men, 19 heterosexual women, and 14 nonheterosexual women. Within each group ratings of the model's attractiveness were reliable (*Cronbach's* $\alpha$'s $\geq$ .92) and the average ratings of these four groups were strongly correlated ($p$'s < .0001, all $r$'s $\geq$ .87). These evaluations were averaged across all raters and the 12 male and 12 female models rated most sexually appealing were used for the study.

Two 1-minute videos, showing landscapes, were taken from a nature documentary to create neutral stimuli. Stimuli luminance was set to equal thresholds using FinalCut Pro.

An SR Research Remote infrared gaze tracker recorded participants' eyes. The gaze tracker collected data every two milliseconds with a 16 mm lens focused on participants' preferred eye (99% chose their right eye). Participants' heads rested on a mount 500 mm from the lens, and the head's exact position was automatically recorded by measuring the distance from the lens to the forehead. The program EyeLink computed pupil area as the number of the tracker's camera pixels occluded by the infrared light reflected by the pupil. If pupils dilated while viewing stimuli, more pixels were occluded (for more detail see Rieger & Savin-Williams, 2012).

**Viewing Time.** Viewing time was assessed with the SR Research gaze tracker as the percentage of time each man looked at the male versus the female nude stimuli. Viewing time was computed such that higher numbers indicated higher percentage of time viewing the same

sex. These percentages were highly reliable across paired stimuli (*Cronbach's* $\alpha$ = .96) and averaged within participants.

**Sex Appeal.** After each stimulus was presented in the pupil dilation task, a participant answered in random order three questions regarding how sexually attractive he found the person, how sexually appealing he found the person, and how much he would like to date the person. We expected responses to these three would be highly intercorrelated and would serve as a measurement check for an assessment of "sex appeal." Participants answered each question with a 7-point scale ranging from "not at all" to "average" to "very much." Answers were indeed highly reliable within stimuli for each stimulus sex (*Cronbach's* $\alpha$'s $\geq$ .92). Thus, for each participant an average was computed across ratings. Averages represented participants' self-reported sexual attraction to stimuli of the same sex. The inclusion of sex appeal measure was intended to assess subjective attraction to stimuli in a different context (pupil dilation as opposed to the survey response) and to broaden the definition of sex attraction to include a romantic ("dating") component.

**Procedure**

Participant recruitment was broadly advertised with adverts placed on a US Northeast university websites, residence halls, a Facebook page, and a Craigslist web forum oriented toward sexual minorities. Young men contacted the lab by email and an appointment was arranged. Written informed consent was obtained once the men arrived at the university lab. The survey portion of the study was administered online using a Web surveyor tool (Qualtrics) in a confidential setting on a lab computer following the pupil physiological assessment tasks.

Because at that time courses were not offered or research conducted at the University on the relationship between eye-tracking and viewing time and sexual orientation, these procedures

and measures were likely to be novel to participants. Thus, following IRB protocol, the lab procedures were described in detail and the young men were given the option to decline participating in the research without penalty in terms of payment. None took this option.

For the physiological portion of the study, the men sat in a dimly lit room facing the gaze tracker underneath a monitor with a screen resolution of 1024 by 768 pixels. Stimuli were presented in two modules. In the first module, for pupil dilation data, all participants first watched a 1-minute neutral stimulus, then, in random order, all 12 female and 12 male stimuli, interspersed with questions about stimuli.

For each presented stimulus, number of occluded pixels was assessed each 2 milliseconds, and these numbers were averaged for each male, female, and neutral stimulus. With these we then computed, within each participant, z-scores of pupillary response because pupils vary in size and in degree of dilation. With the obtained z-scores we further computed for each participant three mean values reflecting overall pupil dilation to male, female, and neutral stimuli. Whenever pupillary response to sexual stimuli was used in analyses, we first subtracted response to neutral stimuli.

After each stimulus, participants answered the three sex appeal questions. These questions were written on the screen and participants used a mouse to answer by clicking at the number of their choice. The vast majority of participants answered these questions within 3 seconds. After completion, the next stimulus was presented.

Immediately following the first module, the second module began with a neutral stimulus. Then, two stimuli were presented simultaneously with half showing the male to the right of the female and the other half had the opposite presentation. These paired stimuli were the same as

used in the first module and were shown in random order. This module was chosen for the collection of data regarding time spent viewing men and women.

The equipment was capable of collecting whether participants fixated on the right or left side of the screen, as measured from the screen's center. Paired stimuli were displayed full-screen in a manner that they abutted each other exactly in the center. Hence, if a participant looked at the right or left side, the recorded coordinates of they eye would allow computing whether they were fixated on the side with the male or the female. For each paired stimulus, a percentage of viewing time was then calculated (percentage of viewing male or female side – the total was always 100%). Viewing time for each pair stimulus was then computed such that higher numbers indicated higher percentage of time viewing the same sex. These percentages were highly reliable across paired stimuli (*Cronbach's* $\alpha$ = .98 for all men) and averaged within participants.

In the rare cases that participants looked away from the screen, we immediately detected this from the control room (we were able to track in real time what they were viewing) and instructed them through the intercom that they needed to pay attention to the screen, regardless of whether they liked the content. Otherwise, they were free to watch whatever section of the screen they preferred to watch.

When we designed the experiment we did not expect carry-over effects from one stimulus to another because pupils dilate and constrict within milliseconds (unlike genital arousal measures). However, because each stimulus was presented immediately after the questions for the previous stimulus (without a neutral stimulus), there was a chance that undesired factors influenced pupillary response to stimuli. Specifically, degree of attention to the previous stimulus and its questions could result in cognitive load and, thus, affect pupillary response to the

subsequent stimulus (Goldinger & Papesh, 2012). To avoid such influences, data analyses were restricted to the last 10 seconds of each stimulus. The subsequent results were virtually identical, regardless of whether the full stimuli length or the last 10 seconds were used for analyses. Restricting analyses to the last 10 seconds yielded, in general, marginally stronger effect sizes. To better control for this possibility, in subsequent research (Rieger et al., 2013) we included neutral stimuli of several seconds just before each sexual stimulus. The correlations of pupil dilation to same-sex or other-sex stimuli with sexual orientation were not affected by the change in methodology.

The presentation of the modules was not randomly presented because pupil dilation (first module) was the focus measure at the time this experiment was conducted. Viewing time (second module) was included to validate pupil dilation. In addition, the benefit of this set-up was that for the assessment of pupil dilation, stimuli were always novel. The limitation of this procedure was that for the assessment of viewing time, stimuli were always shown for the second time. However, it is unlikely that this affected results in any substantial way because viewing time corresponded strongly with sexual orientation in the expected directions. Thus, we do not believe that this measure was seriously confounded by being assessed in the second module.

Finally participants completed a questionnaire after they exited the eye-tracing booth with the aforementioned indicators of their sexual and romantic attractions. Self-reported sexual orientation identity (Kinsey Scale) was assessed twice, before and after the experiment. Across males, these two measures were strongly correlated, $r = .98$, $p < .000$, and did not significantly differ on average, $t(164) = 1.09$, $p = .27$. Hence, it is unlikely that the experiment affected this variable. The procedure took approximately 45 minutes. No participant was deleted from the

study because of poor pupil dilation quality or missing data from questionnaires. Participants were compensated for their time and debriefed.

## RESULTS

Nine one-way ANOVA's were conducted with post-hoc Bonferroni adjustments and for each, the independent variable was sexual orientation group with three levels (gay, mostly gay, bisexual leaning gay). In each ANOVA, one of the nine variables (attraction, genital contact, infatuation, fantasy and romantic relationship with females; gaze at females; pupil dilation to males and to females; sex appeal of females) was the dependent variable, all of which were measured on continuous scales.

Seven of the nine sexual and romantic indicators (female-oriented sexual attraction, sexual fantasy, genital contact, infatuation, romantic relationship, viewing time, sex appeal) significantly differentiated Kinsey 4s, 5s, and 6s (Table 1). The exceptions were pupil dilation to males and to females. The only indicator in which all three Kinsey groups were significantly distinct from each other was their self-reported sexual attraction toward women.

Table 1

### Bisexual Leaning Gay vs. Mostly Gay

On all indicators, except pupil dilation to males, bisexual leaning gays were on average more female focused than mostly gays. These mean differences, however, only reached significance for sexual attraction but approached significance on sexual fantasies to women, viewing time directed to females, and sex appeal of females.

### Bisexual Leaning Gay vs. Gay

On all indicators bisexual leaning gays were on average more female focused than gays. These mean group differences reached significance on all indicators except pupil dilation to

males and females. These latter two were, however, in the expected direction with bisexual leaning gays more dilated toward females and less dilated toward males than gays were.

**Mostly Gay vs. Gay**

Similar to bisexual leaning gays, on all indicators mostly gays were on average more female focused than gays. On six of the nine indicators this difference reached significance. The three exceptions, though not significant, were in the expected direction: more sex with females, more dilation to females, and less dilation to males.

## DISCUSSION

Group differences existed in seven of the nine sexual/romantic indicators. The exceptions were physiological: pupil dilation to male and female images. Although differences among Kinsey 4s, 5s, and 6s did not always reach significance between adjacent groups (especially between Kinsey 4s and 5s), they were, excluding dilation to their preferred sex (males), in the expected direction: from bisexual leaning gay to mostly gay to exclusive gay there was decreasing sexual and romantic focus on the less preferred sex (females). On eight indicators mean group differences were stronger in the bisexual leaning gay versus gay comparisons. Exclusively gay men across all sexual and romantic indicators were strongly directed toward males.

The meaning of these results for the conceptualization of sexual orientation as categorical or a continuum remains open to debate, in large part dependent on one's understanding of what constitutes a continuum and which sexual/romantic indicator is privileged. Based on the overall and within group comparisons regarding sexual attraction, a common measure of sexual orientation (Pega, Gray, Veale, Binson, & Sell, 2013), to females a gay-related sexuality exists along a continuum with three discrete but overlapping categories. This finding parallels data

previously reported at the heterosexual end of the continuum (Savin-Williams, 2014, online).

This same conclusion is not statistically supported, but is strongly suggested, for three other sexual/romantic indicators, largely because differences between Kinsey 4s and 5s on self-reported sexual fantasies of females, the sex appeal of the female nude stimuli, and the percent of time gazing at the female rather than the male porn stimuli did not reach acceptable levels of significance. Whether these three, plus genital contact and the two romantic indicators (infatuation, romantic relationship), would have separated bisexual leaning gays from mostly gays with a larger sample size are unknown but worthy of future research.

The failure of pupil dilation to distinguish the three gay-related sexual orientation groups is puzzling given previous dilation and genital arousal research that established the linear nature of the entire male continuum from heterosexual to homosexual (Rieger et al., 2015) and that indicated the uniqueness of mostly straight men (Kinsey 1s) in their physiological responsiveness to their less preferred sex (males) (Savin-Williams, Rieger, & Rosenthal, 2013). These latter findings were somewhat, though not significantly, mirrored in the current data. That is, greater physiological arousal to the less preferred sex (females) and not lower arousal to the more preferred sex more distinguished bisexual leaning gay and mostly gay from exclusively gay men. Thus, what most clearly defines, in a physiological sense, not being exclusively straight or gay is not arousal to one's preferred sex but slight arousal to one's nonpreferred sex.

Perhaps the failure of the pupil dilation measure lies in the measure itself. The measure is not perfect because it is sensitive to other factors, such as cognitive load, that can interfere and potentially confound results. Even if we assume such confounds diminished true effects, there remain strong and significant correlates between male sexual orientation, pupil dilation to sexual stimuli, and reported attraction to these stimuli – which suggests that it is a measure of sexual

response (Rieger & Savin-Williams, 2012). Although Aboyoun and Dabbs (1998) failed to find a correlation between male sexual orientation and pupil dilation using heterosexual male participants, the combined work from our group (Rieger & Savin-Williams, 2012; Rieger et al., 2013, 2015), the early work by Hess (Hess & Polt, 1960; Hess, Seltzer, & Shlien, 1965), and a recent paper by another group (Attard-Johnson, Bindemann, & Ó Ciardha, online) suggests that, in general, pupil dilation is an indicator of sexual interest and sexual arousal, even if an imperfect measure.

Alternatively, we consider it possible that present null-findings are due to small sample sizes. Another option is that in their physiological sexual responses, bisexual leaning gay, mostly gay, and exclusively gay men do not differ.

In future research it would be informative to use other physiological measures (genital arousal, brain imaging) to compare these groups. It would also be instructive to vary sexual and romantic stimuli (e.g., depictions of explicit sexual acts, romantic scenes, use of individualistic preferences such as body type or particular sex or romantic acts) in order to better discern differences among continuum groups.

The self-report and behavioral data provided limited information as to the relative strength of sexual versus romantic indicators in distinguishing the three groups along the gay end of the continuum. With respect to magnitude of effect ($\eta^2$), it is noteworthy that the second strongest effect after sexual attraction, the sexual appeal of nude female stimuli, combines sexual and romantic elements (i.e., a composite of sexual attractiveness, sexual appeal, and desire to date). In addition, although the other two romantic indicators, infatuation and romantic relationship, did not significantly separate Kinsey 4s from 5s, overall they significantly distinguished the three sexual orientation identities. These findings support Hatfield's claim

(Hatfield & Rapson, 1987, 2009) that romantic orientation (our term) overlaps but is not identical to sexual orientation.

Although these results do not resolve the continuum versus categorical approach to sexuality, they strongly suggest that sexual orientation can be conceptualized as a continuum with multiple overlapping, discrete categories. Though still in use, the categorical approach was challenged some 40 years ago by Hart et al. (1978, p. 607) in their review of mental health issues. They warned *against* subsuming all "homosexuals…under the same label" simply because they engage in similar behavior. To do so is to overlook their complexities, including the extent to which similar behavior arises from discrepant "underlying biological, psychological, or socio-cultural mechanisms." In further support of a continuum approach, a recent review of sexual orientation measures concluded that assessing sexual attractions along a continuum acknowledges that such data are "likely [to] be more accurate than data from questions using distinct categories [identity, sexual behavior] (Pega et al., 2013, p. 3). The tripartite model erases our knowledge regarding possible diversity within bisexual sexual and romantic desires.

Future research investigating a sexual/romantic continuum would benefit in terms of generalizability from having a diverse and representative sample of young men, rather than those specifically recruited to participate in research on sexuality. Also needed are larger samples and more fine-tuned measures of sexual and romantic orientation that might better distinguish adjoining points along the continuum. Sell (1996) advocated including information regarding the degree of intensity and the frequency of each indicator. For example, perhaps exclusively gay men become more intensively aroused and more frequently aroused than either bisexual leaning gay or mostly gay men to erotic male images.

In addition, qualitative studies are needed to help us better understand what young men

mean when they classify themselves as bisexual leaning gay, mostly gay, and exclusively gay. We have conducted interviews with mostly gay young men and they appear to be quite diverse in their sexual and romantic profiles in ways that might affect quantitative results on group differences.

The data lend support to the hypothesis that the classic differentiation of gay as distinct from bisexuality misses the gradations between these two. We suggest that a tripartite (straight, bisexual, gay) portrayal should be revised to capture varying degrees of same-sex sexuality. In this, the conceptualization of sexual orientation as a complex human characteristic expressed through multiple cognitive, emotional, and behavioral domains, similar to other individual differences, can be advanced.

## COMPLIANCE WITH ETHICAL STANDARDS

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Conflict of Interest: All authors declare that they have no conflict of interest.

Ethical Approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent: Informed consent was obtained from all individual participants included in the study.

**REFERENCES**

Aboyoun, D. C., & Dabbs, J. M. (1998). The Hess pupil dilation findings: Sex or novelty? *Social Behavior and Personality, 26*, 415-420.

Attard-Johnson, J., Bindemann, M., & Ó Ciardha, C. (online). Pupillary response as an age-specific measure of sexual interest: An exploratory study. *Archives of Sexual Behavior*.

Bailey, J. M. (2009). What is sexual orientation and do women have one? In D. A. Hope (Ed.), *Nebraska Symposium on Motivation: Vol. 54: Contemporary perspectives on lesbian, gay, and bisexual identities* (pp. 43-63). New York: Springer. doi: 10.1007/978-0-387-09556-1_3

Calzo, J. P., Antonucci, T. C., Mays, V. M., & Cochran, S. D. (2011). Retrospective recall of sexual orientation identity development among gay, lesbian, and bisexual adults. *Developmental Psychology, 47*, 1658–1673. doi: 10.1037/a0025508

Campbell, D. T., & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin, 56*, 81-105.

Chandra, A., Mosher, W. D., & Copen, C. (2011, March). Sexual behavior, sexual attraction, and sexual identity in the United States: Data from the 2006-2008 National Survey of Family Growth. *National Health Statistics Reports,* Number 36. U.S. Department of Health and Human Services. doi: 10.1007/978-94-007-5512-3_4

Copen, C. E., Chandra, A., & Febo-Vazquez, I. (2016, January). Sexual behavior, sexual attraction, and sexual orientation among adults aged 18-44 in the United States: Data from the 2011-2013 National Survey of Family Growth. *National Health Statistics Reports,* Number 88. U.S. Department of Health and Human Services.

Costa, M., Braun, C., & Birbaumer, N. (2003). Gender differences in response to pictures of nudes: a magnetoencephalographic study. *Biological Psychology, 63,* 129-147. doi: 10.1016/S0301-0511(03)00054-1

Ebsworth, M., & Lalumière, M. L. (2012). Viewing time as a measure of bisexual sexual interest. *Archives of Sexual Behavior, 41,* 161-172. doi: 10.1007/s10508-012-9923-9

Feybesse, C., & Hatfield, E. (in preparation). The dark side of love: Brazil. In *Interpersonal relationships: Conceptions and context of intervention and evaluation*.

Gangestad, S. W., Bailey, J. M., & Martin, N. G. (2000). Taxometric analyses of sexual orientation and gender identity. *Journal of Personality and Social Psychology, 78,* 1109-1121.

Goldinger, S. D., & Papesh, M. H. (2012). Pupil dilation reflects the creation and retrieval of memories. *Current Directions in Psychological Science, 21,* 90-95.

Haslam, N. (1997). Evidence that male sexual orientation is a matter of degree. *Journal of Personality and Social Psychology, 73,* 862-870.

Hatfield, E., & Rapson, R. L. (1987). Passionate love/sexual desire: Can the same paradigm explain both? *Archives of Sexual Behavior, 16,* 259-278.

Hatfield, E., & Rapson, R. L. (2009). The neuropsychology of passionate love. In E. Cuyler & M. Ackhart (Eds.), *Psychology of social relationships*. Hauppauge, NY: Nova Science.

Hess, E. H., & Polt, J. M. (1960). Pupil size as related to interest value of visual stimuli. *Science, 132,* 349-350. doi: 10.2307/1706082

Hess, E. H., Seltzer, A. L., & Shlien, J. M. (1965). Pupil response of hetero- and homosexual males to pictures of men and women: A pilot study. *Journal of Abnormal Psychology, 70,* 165-168. doi: 10.1037/h0021978

Horovitz, B. (2012). After Gen X, Millennials, what should next generation be? *USA Today*. Retrieved May 3, 2013.

Huberman, J. S., & Chivers, M. L. (2015). Examining gender-specificity of sexual response with concurrent thermography and plethysmography. *Psychophysiology*.

Jones, R. P., & Cox, D. (2010). *Two decades of polling on gay and lesbian issues at Pew: An overview and assessment analysis*. Washington, DC: Public Religion Research Institute.

Karandashev, V., & Clapp, S. (in preparation). Dimensional and typological approaches to love. Submitted for publication.

Kinsey, A. C., Pomeroy, W. B., & Martin, C. E. (1948). *Sexual behavior in the human male*. Philadelphia: W. B. Saunders.

Klein, F., Sepekoff, B., & Wolf, T. J. (1985). Sexual orientation: A multi-variable dynamic process. *Journal of Homosexuality, 11*, 35-49.

Korchmaros, J. D., Powell, C., & Stevens, S. (2013). Chasing sexual orientation: A comparison of commonly used single-indicator measures of sexual orientation. *Journal of Homosexuality, 60*, 596-614. doi: 10.1080/00918369.2013.760324

LeVay, S. (2016). *Gay, straight, and the reason why: The science of sexual orientation, 2nd ed.* New York: Oxford University Press.

Lippa, R. A. (2012). Effects of sex and sexual orientation on self-reported attraction and viewing times to images of men and women: Testing for category specificity. *Archives of Sexual Behavior, 41*, 149-160. doi: 10.1007/s10508-011-9898-y

McConaghy, N. (1987). Heterosexuality/homosexuality: Dichotomy or continuum. *Archives of Sexual Behavior, 16*, 411–424.

McConaghy, N. (1999). Unresolved issues in scientific sexology. *Archives of Sexual Behavior, 28,* 285-318.

Norris, A. L., Marcus, D. K., & Green, B. A. (online). Homosexuality as a discrete class. *Psychological Science*. doi: 10.1177/0956797615598617

Pega, F., Gray, A., Veale, J. F., Binson, D., & Sell, R. L. (2013). Toward global comparability of sexual orientation data in official statistics: A conceptual framework of sexual orientation for health data collection in New Zealand's Official Statistics System. *Journal of Environmental and Public Health, 8,* 1-8. http://dx.doi.org/10.1155/2013/473451

Petterson, L.J, Dixson, B.J., Little, A.C. & Vasey, P.L. (2015). Viewing time measures of sexual orientation in Samoan cisgender men who engage in sexual interactions with fa'fafine. PLoS ONE, 10(2): e0116529.

Rieger, G., Cash, B. M., Merrill, S. M., Jones-Rounds, J., Dharmavaram, S., & Savin-Williams, R. C. (2015). Sexual arousal: The correspondence of eyes and genitals. *Biological Psychology, 104,* 56-64. doi: 10.1016/j.biopsycho.2014.11.009

Rieger, G., Chivers, M. L., & Bailey, J. M. (2005). Sexual arousal patterns of bisexual men. *Psychological Science, 16,* 579-584. doi: 10.1111/ j. 1467-9280.2005.01578.x

Rieger, G., Rosenthal, A. M., Cash, B., Linsenmeier, J. A. W., Bailey, J. M., & Savin-Williams, R. C. (2013). Male bisexual arousal: A matter of curiosity? *Biological Psychology, 94,* 479– 489. doi: 10.1016/j.biopsycho.2013.09.007

Rieger, G., & Savin-Williams, R. C. (2012). The eyes have it: Sex and sexual orientation differences in pupil dilation patterns. *PLoS ONE, 7,* e40256. doi: 10.1371/journal.pone.0040256

Savin-Williams, R. C. (2005). *The new gay teenager.* Cambridge, MA: Harvard University Press.

Savin-Williams, R. C. (2014). An exploratory study of the categorical versus spectrum nature of sexual orientation. *Journal of Sex Research, 51*, 446–453. doi: 10.1007/s10508-013-0219-5

Savin-Williams, R. C. (online). An exploratory study of exclusively heterosexual, primarily heterosexual, and mostly heterosexual young men. *Sexualities*.

Savin-Williams, R. C., Joyner, K., & Rieger, G. (2012). Prevalence and stability of self-reported sexual orientation identity during young adulthood. *Archives of Sexual Behavior, 41*, 103-110. doi: 10.1007/s10508-012-9913-y

Savin-Williams, R. C., Rieger, G., & Rosenthal, A. M. (2013). Physiological evidence for a mostly heterosexual orientation among men. *Archives of Sexual Behavior, 42*, 697-699. doi: 10.1007/s10508-013-0093-1

Savin-Williams, R. C., & Vrangalova, Z. (2013). Mostly heterosexual as a distinct sexual orientation group: A systematic review of the empirical evidence. *Developmental Review, 33*, 58-88. doi: 10.1016/j.dr.2013.01.001

Sell, R. L. (1996). The Sell Assessment of Sexual Orientation: Background and scoring. *Journal of Gay, Lesbian, and Bisexual Identity, 1*, 295-310.

Sternberg, R.J. (1988). Triangulating love. In R. J. Sternberg & M. L. Barnes (Eds.), *The psychology of love* (pp. 119-138). New Haven, CT: Yale University Press.

Twenge, J. M., Sherman, R. A., & Wells, B. E. (2015). Changes in American adults' sexual behavior and attitudes. *Archives of Sexual Behavior, 44*, 2273-2285. doi: 10.1007/s10508-015-0540-2

Vrangalova, Z., & Savin-Williams, R. C (2012). Mostly heterosexual and mostly gay/lesbian: Evidence for new sexual orientation identities. *Archives of Sexual Behavior, 41,* 85-101. doi: 10.1007/s10508-012-9921-y

Wright, L., Jr., & Adams, H. (1994). Assessment of sexual preference using a choice reaction time task. *Journal of Psychopathology and Behavioral Assessment, 16,* 221-231. doi: 10.1007/BF02229209

Table 1. Mean scores, upper and lower 95% confidence levels, and ANOVA with post-hoc Bonferroni adjustments for three sexual orientation groups for nine indicators.

| | **Bi Leaning Gay [n = 11]** | **Mostly Gay [n = 17]** | **Gay [n = 47]** | **ANOVA** |
|---|---|---|---|---|
| **Sexual Attraction to Females** | 27.82 [21.03, 34.60][a] | 11.82 [7.36, 16.29][b] | 2.38 [1.19, 3.58][c] | $F$ = 72.83* $\eta^2$ = 0.67 |
| **Genital Contact with Females** | 22.00 [9.98, 34.02][a] | 10.53 [-1.75, 22.81][a, b] | 1.00 [.01, 1.99][b] | $F$ = 12.15* η2 = 0.25 |
| **Infatuation with Females** | 18.73 [10.87, 26.59][a] | 14.00 [7.98, 20.02][a] | 2.87 [1.13, 4.61][b] | *F = 21.88** *η2* = 0.38 |
| **Sexual Fantasy to Females** | 20.00 [10.52, 29.48][a] | 9.53 [5.13, 13.93][a] | 2.11 [.81, 3.40][b] | $F$ = 27.22* η2 = 0.43 |
| **Romance with Females** | 29.36 [18.30, 40.43][a] | 17.35 [5.32, 29.38][a] | 2.51 [.27, 4.75][b] | $F$ = 19.54* η2 = 0.35 |
| **Percent Gaze to Females** | .45 [.42, .49][a] | .38 [.33, .42][a] | .23 [.20, .26][b] | $F$ = 31.33* η2 = 0.47 |
| **Pupil Dilation to Males** | .305 [.212, .398][a] | .298 [.22, .374][a] | .352 [.301, .403][a] | $F$ = 00.88 η2 = 0.02 |
| **Pupil Dilation to Females** | .317 [.218, .416][a] | .302 [.216, .388][a] | .241 [.189, .292][a] | $F$ = 01.39 η2 = 0.04 |
| **Female Stimuli Appealing** | 3.83 [3.22, 4.44][a] | 2.97 [2.43, 3.52][a] | 1.60 [1.41, 1.79][b] | $F$ = 44.91* η2 = 0.56 |

[a, b, c] Sexual orientation groups sharing same letter do not significantly ($p < .05$) differ on indicator. The effect size, $\eta^2$, indicates the amount of explained variance.
*Significant at the $p < .0001$ level.