



## The impact of cues of stigma and support on self-perceived sexual orientation among heterosexually identified men and women

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### HIGHLIGHTS

- ▶ We manipulate perceived stigma against and support for same-sex sexuality.
- ▶ We examine effects on self-perceived sexual orientation among heterosexuals.
- ▶ Cues of support lead to less reported same-sex sexuality than do cues of stigma.
- ▶ We conclude that social context affects beliefs about sexual orientation.

### GRAPHICAL ABSTRACT



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### ABSTRACT

Sexual orientation can be thought of as encompassing both actual sexual experience (e.g., behavior, attraction, fantasy) and beliefs about those experiences. We refer to those beliefs as self-perceived sexual orientation. We report the first experimental evidence that manipulating situational cues directly impacts self-perceived sexual orientation among heterosexually identified men and women. Across three studies that used distinct manipulations (both explicit and implicit), measured different outcomes, and sampled different ages, we found that cues of support for same-sex sexuality lead to self-perceived sexual orientation containing more same-sex sexuality than did cues of stigma against same-sex sexuality. We discuss the implications for understanding the role of factors outside of actual sexual experience in the development and maintenance of sexual orientation.

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### Introduction

Though scientists and non-scientists often discuss sexual orientation as a unitary construct, sexual orientation is composed of multiple components (e.g., identity, attraction, behavior, fantasy; Savin-Williams & Ream, 2007), each of which may fluctuate across time and context (e.g., Diamond, 2008). However, sexual orientation is also composed of two basic elements: actual sexual experiences of attraction, behavior, and fantasy, and personal *beliefs* about those sexual experiences. We refer to these beliefs as self-perceived sexual orientation. A woman

might indicate on a survey that she identifies as heterosexual, is attracted to men, and yet is also somewhat attracted to women. This woman is reporting her self-perceived sexual orientation, that is, her beliefs about two aspects of her sexual orientation — her identity and attractions.

Self-perceived sexual orientation is partially tethered to actual sexual experiences — a woman may believe she is somewhat attracted to women because she experiences physiological arousal when around certain other women and has fantasies about sex with a female partner. We propose that self-perceived sexual orientation can also be influenced by factors outside of actual sexual experience. We argue that situational factors motivate people to hold self-serving perceptions of their own sexual orientation. There is correlational evidence for this hypothesis (e.g., Preciado & Peplau, 2011) and others have theorized about the

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influence of contextual factors on sexual orientation (e.g., Hammack, 2005), yet prior work has not demonstrated a causal link. Moreover, research has primarily focused on change in the self-perceived sexual orientation among individuals who identify as lesbian, gay and bisexual (e.g., Diamond, 2008). We provide the first experimental evidence supporting a causal account of the influence of motivational factors on self-perceived sexual orientation among heterosexually identified women and men.

### The influence of motivational factors on self-perceived sexual orientation

People often believe what they want to believe about themselves (e.g., Gilovich, 1991; Kunda, 1990). Generally, people wish to believe that they are attractive, intelligent, and skilled (e.g., Critcher & Dunning, 2009; Taylor & Brown, 1988). Such motivated beliefs are maintained in part because of an ability to selectively focus on evidence that supports preferred beliefs (Critcher & Dunning, 2009; Kunda, 1990).

We propose that similar motivational processes shape self-perceived sexual orientation. A desire to avoid social stigma and to embrace social support, for example, may motivate people to think about their sexual orientation in a particular way. When the negative consequences that stem from stigma against same-sex sexuality (e.g., Herek, Cogan, & Gillis, 2002; Meyer, 2003) are salient, people may eschew perceptions of their sexual orientation that indicate same-sex attraction or experiences. Conversely, perceived social support for same-sex sexuality may embolden a person to interpret ambiguous same-sex experiences in a more open manner, indicating that they do experience same-sex sexuality.

Ambiguity in the relevance of sexual experiences to one's sexual orientation can facilitate motivated cognition. When deciding whether one experiences same-sex attraction a person can selectively focus on experiences that took place at different times or in different contexts. For example, a man might give more importance to his long-term relationship with his wife than to a fleeting same-sex affair that happened years ago. Additionally, ambiguity in the meaning of a sexual experience may also contribute to motivated cognition. For instance, while some may classify a same-sex kiss shared at a party as relevant to their sexual orientation, others may discount this behavior, reasoning that it was attributable to alcohol instead of to their sexual orientation. The meaning that people assign to sexual experiences varies by the context in which the experience occurs and the nature of the experience (e.g., Randall & Byers, 2003; Sanders & Reinisch, 1999). Indeed, among heterosexually identified men and women, the line between a same-sex sexual attraction and a passionate level of admiration is often sufficiently blurry that it has prompted the coinage of new phrases: "girl crush" (see Rosenbloom, 2005) and "man crush" (see McKee, 2009).

Individual differences may also contribute to the impact of motivation on self-perceived sexual orientation. In a recent study, Preciado and Thompson (2012) found that the association between how much same-sex behavior women reported and their sexual identity was stronger among women who were more certain about and committed to their sexual orientation identity. For example, if high certainty and commitment women reported some same-sex behavior, they were more likely to identify as "mostly straight" or bisexual rather than as exclusively heterosexual. In contrast, women who were low in certainty and commitment showed no relationship between the amount of same-sex behavior they reported and the likelihood of identifying as "mostly straight" or bisexual. These results raise the possibility that some people, for instance those who are uncertain and uncommitted to their sexual identity, may be particularly susceptible to the influence of contextual factors on the interpretation of their sexual experiences' relevance to their sexual orientation.

In summary, we predict that people's self-perceived sexual orientation is directly influenced by contextual cues of stigma and support. We believe that this occurs because people are motivated to avoid

stigma and seek support, thus interpreting their sexual orientation in self-serving ways consistent with that motivation. Ambiguity in the evidentiary basis of self-perceived sexual orientation facilitates motivated interpretations. Finally, because the proposed effects are grounded in basic social cognitive mechanisms, we predict that these effects will be the same for men and women.

We tested our prediction that cues of support for same-sex sexuality impel self-perceived sexual orientation toward more same-sex sexuality than do cues of stigma against same-sex sexuality for both male and female participants in three experiments using different methods and samples. In study 3, we also tested whether individual differences in certainty and commitment about one's sexual identity affect the impact of cues of support and stigma on self-perceived sexual orientation.

### Study 1

Study 1 tested the impact of cues of stigma and support on self-perceived sexual orientation, measured using self-reports and a broad internet sample.

#### Method

Participants included 101 heterosexually identified individuals (37 men, 64 women;  $M_{Age} = 40$  years,  $SD = 13.87$ ). Participants responded online to advertisements (posted on [www.facebook.com](http://www.facebook.com) and [www.craigslist.org](http://www.craigslist.org)) that described the study as testing opinions about a socially relevant news article. All data were collected online via survey hosting websites.

Participants were randomly assigned to read one of three "news articles" created for the study. The articles used the same basic format but key phrases were changed in each. The Stigma article, titled "Study Reveals American Anti-Homosexual Attitudes," emphasized that Americans stigmatize same-sex sexuality. The Support article, titled "Study Reveals Americans are Comfortable with Homosexuality," indicated that Americans support same-sex sexuality. The Control article, titled "Study Reveals Older Americans Still Enjoy Sex," focused on sex, but did not mention stigma or support for same-sex sexuality and did not reference sexual orientation at all. All articles were text only and included no photographs.

After reading the article, participants completed several questions that measured their perceptions of the purpose, quality, and truthfulness of the article. Participants then completed measures of attitudes towards same-sex sexuality and other individual difference measures.

At the end of the survey, 3 dependent measures that assessed self-perceived sexual orientation were embedded in a demographics questionnaire. Participants characterized their personal experiences for each of three items, "My Sexual Behaviors," "My Sexual Attractions," and "My Sexual Fantasies," by using a continuous, unnumbered 13-point scale. The scale's endpoints and midpoint were anchored by "Exclusively Heterosexual" (1), "Equally Homosexual and Heterosexual" (7), and "Exclusively Homosexual" (13). These items were adapted from typical measures used to assess sexual orientation (e.g., Klein, Sepekoff, & Wolf, 1985). Because the effects described below were in the same direction for all three items, these three items were averaged to create one Same-Sex Sexuality Score (Cronbach's  $\alpha = .66$ ). Higher numbers on the score indicate greater self-reported same-sex sexuality than lower numbers.

Not surprisingly, given our recruitment of heterosexually identified participants, this composite score was positively skewed (Skewness = 1.26). Our data set included 3 outliers (values greater than 1.5 times the interquartile range, identified using box plots). To ensure that these outliers did not exert undue influence, we stratified our outcome variable by condition and Winsorized it at 2.5 SDs (Wilcox & Keselman, 2003). Details of the Winsorization process are included in the Supplementary Material available online. The final Same-Sex Sexuality Score variable had a mean of 1.83 ( $SD = .10$ ; range 1–5), indicating that, on

average, participants rated their same-sex sexuality as just under 1 point above the lowest possible score on the 13-point scale.

Upon completion, participants were told the purpose of the study, debriefed, and given an opportunity to send questions to the experimenter.

### Results and discussion

All statistical models reported below were checked for violations of normality and homogeneity in the distribution of errors. All indices fell within acceptable ranges.

We initially used hierarchical regression to test whether participant sex moderated the effect of condition. As expected, the effect of condition (dummy coded into 2 vectors) did not vary by participant sex,  $R^2\Delta = .01$ ,  $F(2, 94) = .33$ ,  $p = .719$ . However, Same-Sex Sexuality Scores marginally differed by sex such that women had higher Same-Sex Sexuality Scores than men,  $t(96) = 1.94$ ,  $p = .060$ . Consequently, we controlled for participant sex in the subsequent analysis.

We predicted that higher Same-Sex Sexuality Scores would be obtained in the Support Condition than in the Stigma Condition. To test this, we regressed Same-Sex Sexuality Score onto condition.

Same-Sex Sexuality Scores varied significantly by condition,  $R^2 = .07$ ,  $F(2, 96) = 3.47$ ,  $p = .035$ . Note that the effect of condition is significant even without controlling for participant sex,  $R^2 = .07$ ,  $F(2, 97) = 3.60$ ,  $p = .031$ . As predicted and seen in Fig. 1, Same-Sex Sexuality Scores were significantly higher in the Support Condition ( $EM = 1.76$ ,  $SE = .29$ ) than in the Stigma Condition ( $EM = 1.17$ ,  $SE = .29$ ),  $t(96) = 2.42$ ,  $p = .017$ .

Because we did not have specific predictions about the difference between the experimental conditions and the control condition, we adjusted for multiple comparisons to test differences relative to the control condition (Sidak, 1967). With this adjustment, the Support Condition was marginally higher than the Control Condition ( $EM = 1.25$ ,  $SE = .27$ ),  $t(96) = 2.16$ ,  $p = .065$ , but the Stigma Condition did not differ significantly from the Control Condition,  $t(96) = .34$ ,  $p = .931$ .

These findings provided initial support for our hypothesis that situational cues of Stigma/Support for Same-Sex Sexuality would influence self-perceived sexual orientation among both men and women, as measured using self-report measures often used in research on sexual orientation. Although the evidence from Study 1 is consistent with our hypothesis, we remained sensitive to the fact that self-reported same-sex sexuality might be particularly prone to demand characteristics.<sup>1</sup> We examined self-perceived sexual orientation in a less direct way in Study 2.

### Study 2

Study 2 tested the impact of cues of stigma and support on perceived attractiveness of same-sex targets. This outcome measure was less direct than the explicit self-reports of same-sex attraction used in Study 1, yet it tapped participants' motivation to report same-sex attraction.

### Method

Participants included 106 heterosexually identified college students (40 men, 66 women;  $M_{Age} = 19$  years,  $SD = 1.34$ ). Participants were recruited for a laboratory study of opinions about different aspects of college life.

<sup>1</sup> We sought to disguise the true purpose of our study by the subtle placement of the dependent measures within the demographic question items. Comments by our participants suggested that this technique was successful. During debriefing, participants indicated their thoughts about the purpose of the study. Many had no insight whatsoever, but those who did stated that they thought the study sought to examine attitudes towards same-sex sexuality. No participant indicated that self-reports of sexual orientation were the focus of the study.

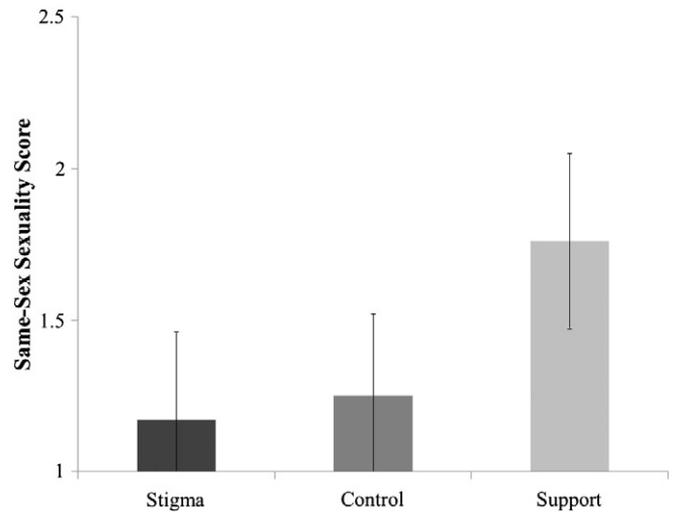


Fig. 1. Predicted means of Same-Sex Sexuality Score by condition, estimated collapsed across participant sex in Study 1.

Participants were randomly assigned to read one of three sets of statistics about college life. These statistics were accompanied by an illustrative picture (e.g., a statistic regarding physical assault was accompanied by a picture of a young man with a black eye). In the Stigma Condition, statistics indicated that same-sex sexuality is stigmatized (e.g., “A recent study found that over 90% of non-straight students who drop out of college report that they were verbally or physically assaulted by another student because of their sexuality.”). In the Support Condition, statistics indicated that same-sex sexuality is supported (e.g., “A recent study found that over 90% of non-straight college students report that they feel very accepted on their college campus.”). In the Control Condition, statistics presented neutral information about college (e.g., statistics about meal plans).

After reading the statistics, participants completed items that measured their attitudes about the statistics. Following these items, participants completed measures of attitudes towards same-sex sexuality and a demographics questionnaire.

Our dependent measure followed in a separate task at the end of the study. Participants were told that they would be rating sexualized photographs taken from advertisements. They were shown 5 sexualized, though fully clothed, images of same-sex individuals, and they rated the physical attractiveness of each photo on a 5-point scale ranging from 1 (Not at All) to 3 (Somewhat) to 5 (Very). We asked participants to rate the physical attractiveness of the individual in each photo (as opposed to how physically attracted they personally were to the person in the photograph) because we were concerned about creating a threat response among heterosexually identified male participants. We reasoned that phrasing the measures more impersonally would promote honest responding. Photos were obtained from advertisements including models in sexualized positions or with sexualized clothing and from adult entertainment websites.

We used sexualized same-sex photos to create an ambiguous sexual experience and to avoid priming participants with heterosexuality, which might have counteracted the experimental manipulation. Ratings of attractiveness were high in internal consistency across the 5 photos (Cronbach's  $\alpha = .91$  for male photos,  $.85$  for female photos). We created a Same-Sex Attractiveness Score by averaging each participant's rating across the 5 photographs. This score was normally distributed but had 2 outliers in the Support Condition (values greater than 1.5 the interquartile range, identified using box plots).

To account for the outliers, we stratified the outcome by condition and Winsorized the data at 2.5 SDs (Wilcox & Keselman, 2003). However, there were no values above 2.5 SDs above the mean, thus the process replaced no values. Thus, the final outcome variable had a

mean of 2.80 ( $SD = 1.05$ ), indicating that, on average, participants rated photographs close to “somewhat” attractive.

Upon completion, participants were told the purpose of the study, debriefed, and given an opportunity to ask questions.

### Results and discussion

All statistical models reported below were checked for violations of normality and homogeneity in the distribution of errors. All indices fell within acceptable ranges.

We initially used hierarchical regression to test whether the effect of condition varied by participant sex. As in Study 1, the impact of condition (dummy coded into 2 vectors) did not vary by participant sex,  $R^2\Delta = .002$ ,  $F(2, 91) = .105$ ,  $p = .901$ . However, there was a main effect of participant sex such that women participants gave higher Same-Sex Attractiveness Score ratings than did men, controlling for the effect of condition,  $t(95) = 3.87$ ,  $p < .001$ . We controlled for participant sex in the subsequent analysis to account for its influence on the outcome.

We predicted that participants in the Support Condition would have higher Same-Sex Attractiveness Scores than would participants in the Stigma Condition. To test this, we regressed Same-Sex Attractiveness Score onto condition. This model was checked for heterogeneity and normality of error variance.

As seen in Fig. 2, Same-Sex Sexuality Scores differed significantly by condition,  $R^2\Delta = .06$ ,  $F(2, 93) = 3.389$ ,  $p = .038$ . Note that the effect of condition is even stronger without controlling for participant sex,  $R^2 = .10$ ,  $F(2, 94) = 4.92$ ,  $p = .009$ . As predicted, Same-Sex Attractiveness Scores were significantly higher in the Support Condition ( $EM = 2.20$ ,  $SE = .32$ ) than in the Stigma Condition ( $EM = 1.61$ ,  $SE = .29$ ),  $t(93) = 2.51$ ,  $p = .014$ .

To compare the experimental conditions to the control condition, we adjusted for multiple comparisons (Sidak, 1967). Neither the Support Condition,  $t(93) = 1.84$ ,  $p = .133$ , nor the Stigma Condition,  $t(93) = .60$ ,  $p = .553$  differed significantly from the Control Condition ( $EM = 1.75$ ,  $SE = .28$ ), though trends were similar to Study 1. Specifically, the Support Condition elicited higher Same-Sex Attractiveness Scores relative to the Control Condition but the Stigma Condition's Same-Sex Attractiveness Scores were only slightly lower than in the Control Condition.<sup>2</sup>

Studies 1 and 2 supported our hypothesis that cues of stigma and support would differentially impact self-perceived sexual orientation for both men and women. We found this pattern among samples of heterosexually identified adults and college students and using different manipulations and measures of self-perceived sexual orientation. The measure of perceived same-sex attractiveness in Study 2 was phrased objectively and, thus, was somewhat removed from personal perceptions of the attractiveness of targets. However, that we found effects with the more objective measure suggests that results might be even stronger with a more subjective measure of same-sex attractiveness. Although the outcome measure in Study 2 was less direct than in Study 1, we remained aware that our findings may have been vulnerable to demand characteristics.<sup>3</sup> We further addressed this issue in Study 3.

### Study 3

Study 3 tested the impact of subliminal cues of stigma and support on self-perceived sexual orientation. We predicted that, relative to subliminal cues of stigma, subliminal cues of support would shift

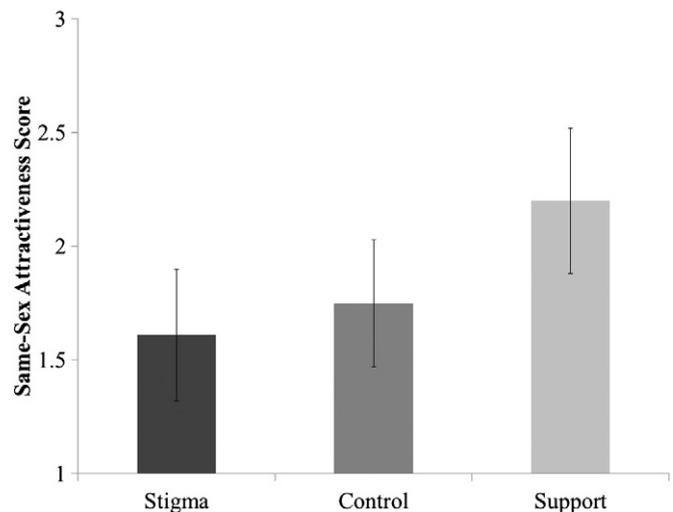


Fig. 2. Predicted means of Same-Sex Attractiveness Score by condition, estimated collapsed across participant sex in Study 2.

self-perceived sexual orientation toward same-sex sexuality. We also assessed individual differences that might influence this process. Drawing on prior work (Preciado & Thompson, 2012) we assessed individual differences in participants' certainty about, commitment to, exploration of, and integration of their sexual orientation identity. We also assessed the tendency to think about and reflect on one's sexuality. We predicted that participants with a weaker sense of how to interpret their sexual experiences' relevance to their sexual orientation (i.e., those with high uncertainty, low commitment, high exploration, low integration, and little time spent thinking about their sexuality) would be most likely to be affected by subliminal cues of stigma and support.

### Method

Participants included 130 heterosexually identified college students (38 men, 92 women;  $M_{Age} = 20$  years,  $SD = 2.55$ ). Participants were recruited for a laboratory study of attitudes and perceptions.

We adapted our manipulation from Murphy and Zajonc (1993). We described the manipulation as a test of rapid judgments of social targets. Participants were randomly assigned to one of four conditions: a Same-Sex/Angry Condition, Same-Sex/Happy Condition, a Furniture/Angry Condition, or a Furniture/Happy Condition. In each condition, participants completed 20 trials in which they viewed a fixation cross (1 s), a subliminal prime (~16 ms), a visual mask (500 ms), and an image of either a male or female same-sex couple (in the Same-Sex Conditions) or a piece of furniture (in the Furniture Conditions; see Fig. 3). Participants then indicated how much their peers would like that couple or piece of furniture on a scale from 1 (Strongly Dislike) to 4 (Strongly Like) (self-paced). The prime in the Angry Conditions depicted an angry face (selected randomly from a set of 4 angry male and 4 angry female faces); the prime in the Happy Conditions depicted a happy face (selected randomly from a set of 4 happy male and 4 happy female faces). All faces were taken from The NimStim set of facial expressions (Tottenham et al., 2009).

Immediately following the task, participants responded to 6 mood items (agitation, anger, calmness, happiness, pleasantness, and unhappiness) adapted from the Profile of Mood States (Pollock, Cho, Reker, & Volavka, 1979). Participants rated the degree to which they felt each mood at that moment on a scale of 1 (Not at All) to 4 (Extremely).

We reasoned that pairing either an angry or a happy face with the notion of peer attitudes towards same-sex couples, as indicated by the question regarding their peers' attitudes towards the same-sex couple viewed following the prime, would subliminally prime a sense of negative and positive attitudes towards same-sex sexuality, respectively. We

<sup>2</sup> Expected means for this analysis differed from the overall mean of the outcome because the expected means are adjusted for the effect of participant sex.

<sup>3</sup> As in Study 1, during debriefing, many participants provided no comments, but those who did indicated that they thought that the study examined attitudes towards same-sex sexuality. No participant indicated that self-reports of sexual orientation were the primary focus.

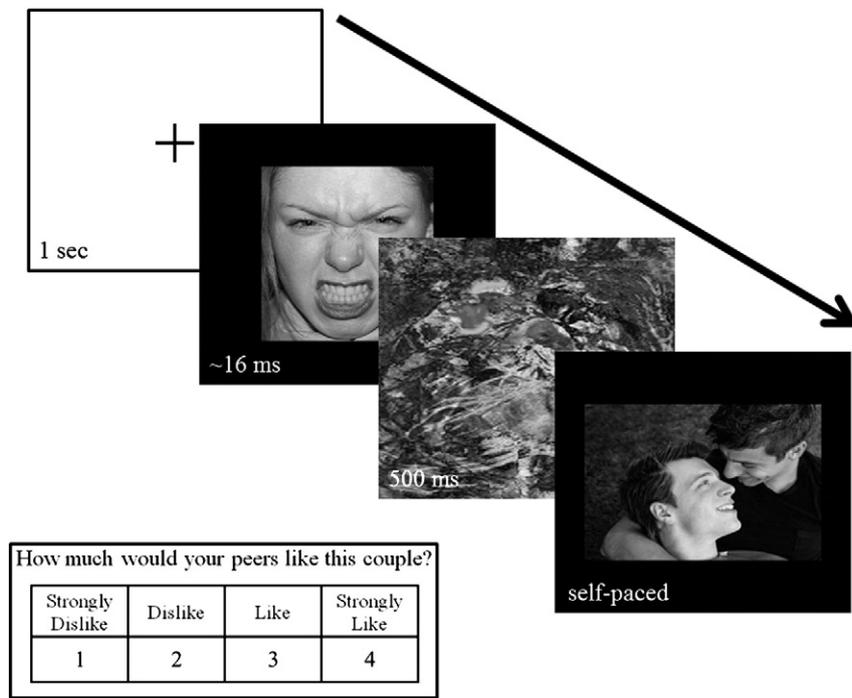


Fig. 3. An illustrative trial from the subliminal manipulation in Study 3.

utilized photos of furniture coupled with the angry and happy faces to test whether the effects were merely due to a manipulation of mood or a generalized response to perceived negativity/positivity. Based on our debriefing, our manipulation appeared to be subliminal. Only 3 of the 130 participants stated that they saw any image prior to each photograph of a same-sex couple. These participants were dropped from analyses.

Participants then completed a demographics questionnaire that included three dependent measures. Participants rated their own sexual behaviors, attractions, and fantasies on unnumbered 101-point visual analog scales, anchored at the endpoints and midpoint by “Exclusively Heterosexual” (0), “Equally Homosexual and Heterosexual” (50), and “Exclusively Homosexual” (100). As in Study 1, the effects were in the same direction for all three items, so they were averaged to create one Same-Sex Sexuality Score (Cronbach’s  $\alpha = .57$ ). Higher Same-Sex Sexuality Scores indicated that participants reported greater same-sex sexual behaviors, attractions, and fantasies than did lower scores. This variable was positively skewed (Skewness = 2.41) with 12 outliers (values greater than 1.5 the interquartile range, identified using boxplots).

To ensure that analyses were not unduly influenced by these outliers, the outcome variable was stratified by condition and Winsorized at 2.5 SDs (Wilcox & Keselman, 2003). Details of the Winsorization process are included in the Supplementary Material available online. The final Same-Sex Sexuality Score variable had a mean of 2.29 ( $SD = 4.67$ ; range 0–18.60), indicating that participants on average reported a low degree of same-sex sexuality.

Finally, participants completed two individual difference measures included to test whether the impact of condition was strongest among participants unlikely to have a strong sense of how to interpret the meaning of their sexual experiences. The Measure of Sexual Identity Exploration and Commitment (MoSIEC; Worthington, Navarro, Savoy, & Hampton, 2008) is composed of four scales assessing uncertainty (Chronbach’s  $\alpha = .565$ ), commitment (Chronbach’s  $\alpha = .695$ ), exploration (Chronbach’s  $\alpha = .829$ ), and integration (Chronbach’s  $\alpha = .816$ ). People high in uncertainty do not have clearly defined beliefs about their sexual orientation (sample item: “My sexual orientation is clear to me” [reverse coded]). People high in commitment are strongly committed to their current beliefs about their sexual orientation (sample

item: “I have a firm sense of what my sexual needs are”). People high in exploration actively explore different conceptions of their sexual orientation (sample item: “I am actively trying new ways to express myself sexually”). People high in integration have a strong desire for cohesiveness among different aspects of their sexual orientation such as their identity and behavior (sample item: “My sexual orientation is compatible with all the other aspects of my sexuality”). We also included the Sexual Consciousness scale of the Sexual Awareness Questionnaire (SAS; Snell, Fisher, & Miller, 1991) as a measure of participants’ tendency to think about and reflect on their sexuality (Chronbach’s  $\alpha = .870$ ). Sample items include: “I’m very aware of my sexual feelings” and “I know what turns me on sexually.” Thus, individuals with lower sexual consciousness would be less likely to have a strong sense of how to interpret their experiences.

Upon completion, participants were told the purpose of the study, debriefed, and given an opportunity to ask questions.

### Results and discussion

All statistical models reported below were checked for violations of normality and homogeneity in the distribution of errors. All indices fell within acceptable ranges. We initially tested whether the judgments of the photographs differed as a function of condition. The interaction of stimulus type (Furniture or Same-Sex photos) and mood prime (Angry or Happy) did not interact to predict perceived peer attitudes towards the couple in the photograph,  $F(1, 125) = .26, p = .61$ . Moreover, judgments did not differ between the Angry and Happy Conditions for Same-Sex photos,  $F(1, 81) = .53, p = .47$ .

We then used ANOVA to test whether the stimulus type (Furniture or Same-Sex photos) and mood prime (Angry or Happy) interacted with participant sex to predict the Same-Sex Sexuality Scores. Analyses revealed a significant main effect of sex,  $F(1, 116) = 4.86, p = .03$ , with female participants reporting more same-sex sexuality ( $EM = 2.89, SE = .83$ ) than male participants ( $EM = .83, SE = .79$ ), but sex did not interact significantly with condition in any of the following analyses. Because of the main effect, we maintained sex as a covariate in the following analyses.

We first examined whether there was a difference in Same-Sex Sexuality Scores between the Furniture and Same-Sex Conditions (collapsing across mood prime). Participants in the Furniture Conditions ( $EM = 4.30, SE = .70$ ) reported significantly more same-sex sexuality than did participants in the Same-Sex Conditions ( $EM = .59, SE = .52$ ),  $F(1, 128) = 4.33, p = .040, \eta^2 = .033$ . We then tested whether Same-Sex Sexuality Scores differed by mood prime. There was no significant difference in reports of same-sex sexuality between the Angry and Happy Conditions (collapsing across stimulus type),  $F(1, 127) = .19, p = .666$ .

However, the interaction of stimulus type and mood prime was significant,  $F(1, 113) = 5.76, p = .02, \eta^2 = .049$ . We deconstructed the interaction by examining the difference between the Angry and Happy Conditions within the Furniture and Same-Sex Conditions, separately. Within the Furniture Conditions, the difference between the Angry and Happy Conditions in reports of same-sex sexuality was not significant,  $F(1, 43) = 1.55, p = .220$ .

However, in the Same-Sex Conditions, there was a significant difference between the Angry and Happy Conditions,  $F(1, 69) = 5.95, p = .020, \eta^2 = .079$ . As expected, participants reported more same-sex sexuality in the Happy Condition ( $EM = 1.33, SE = .36$ ) than in the Angry Condition ( $EM = .02, SE = .41$ ). This difference remained significant without controlling for sex,  $F(1, 70) = 5.87, p = .018, \eta^2 = .077$ .

We also tested whether, within the Same-Sex Conditions, the difference between the Angry and Happy Conditions was due to a manipulation of mood. We examined the correlations between Condition (0 = Angry, 1 = Happy) and the mood items. The only items to show a significant relationship with condition were happiness,  $r = -.231, p = .034$ , and pleasantness,  $r = -.219, p = .045$ . However, neither of these mood measures was significantly related to reports of same-sex sexuality, all  $r_s < .15$ , all  $p_s > .15$ , and the effect of condition remained strong and significant, even after controlling for mood,  $F(1, 67) = 5.19, p = .026, \eta^2 = .072$ .

In a secondary analysis, we also tested whether the effect of the support/stigma manipulation was strongest among participants who were likely to experience ambiguity regarding the interpretation of their sexual experiences. We did this by examining the difference between the Angry and Happy Conditions for the Same-Sex photos, as moderated by each of the five individual differences we measured. It should be noted that the mean scores of the individual difference measures did not vary by condition, all  $t_s < .80$ , all  $p_s > .400$ .

Using multiple regression, we found a significant interaction of Condition and the Uncertainty subscale of the MoSIEC,  $b_{int} = 2.80 (SE = 1.08)$ ,  $t(67) = 2.61, p = .011, R^2\Delta = .073$ . Specifically, we found that for participants who scored average or high in Uncertainty (1 SD above the mean), the difference between the Angry and Happy Conditions was significant, all  $t_s > 3.50$ , all  $p_s < .005$ . However, for those participants low in Uncertainty (1 SD below the mean), the difference between the Angry and Happy Conditions was not significant,  $t(67) = -.05, p = .961$ . See Fig. 4. No other interactions were statistically significant.<sup>4</sup>

Study 3 provides evidence that cues from the social environment impact self-perceived sexual orientation among men and women, even when they are perceived subliminally. While the subliminally perceived angry and happy faces did not significantly impact the judgments of individual same-sex couples, the coupling of the concept of same-sex sexuality and happy/angry faces did significantly impact self-perceived sexual orientation. While participants reported less same-sex sexuality in the same-sex conditions than in the

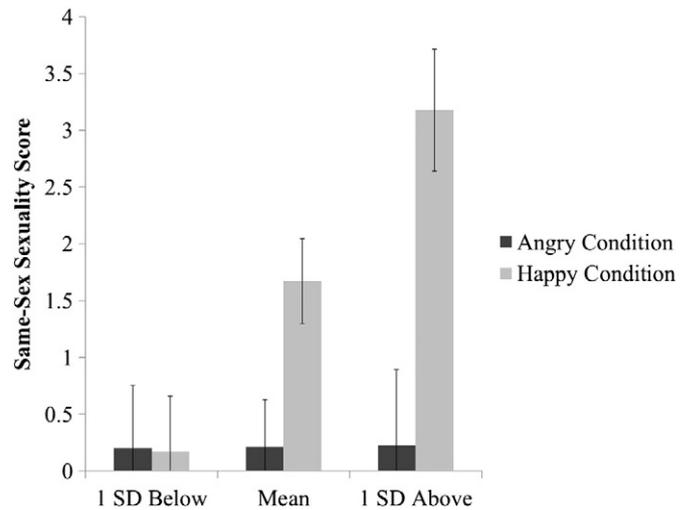


Fig. 4. Predicted means of Same-Sex Sexuality Score by condition, stratified by level of sexual identity uncertainty, controlling for participant sex in Study 3.

furniture conditions, within the same-sex condition, participants reported more same-sex sexuality in response to a subliminally primed happy face than a subliminally primed angry face.

Moreover, Study 3 provided preliminary evidence supporting the proposed mechanisms of these effects: contextual cues can motivate people to interpret their sexual experiences in a particular way, leading to self-perceived sexual orientation consistent with a motivated perception. We found that participants who reported uncertain regarding their understanding of their sexuality were especially likely to show an effect of condition on their self-perceived sexual orientation, indicating that those without well-formed beliefs about their sexual orientation are particularly susceptible to motivated interpretations of their sexual experiences.

## General discussion

We have provided the first experimental evidence that factors outside of actual sexual experience causally shape self-perceived sexual orientation. The fact that our short manipulations, delivered via text and images, affected self-report measures of sexual orientation is noteworthy. In everyday life, cues of societal stigma or support, such as actually hearing homophobic statements uttered by close friends or family members (e.g., Anhalt & Morris, 1998), are likely to have a larger impact on people's self-perceived sexual orientation than reading statistics on a computer screen or experiencing a subliminal priming manipulation.

In all three studies, situational cues of stigma/support for same-sex sexuality altered self-perceived sexual orientation. In Study 3, this effect was shown to occur only when cues of positive and negative peer attitudes were linked to same-sex sexuality. We did not find an effect of situational cues on self-perceived sexual orientation when they were linked to photographs of furniture. In Studies 1 and 2 in which the control condition was intended to be a baseline to which the experimental conditions could be compared, only support cues led to differences relative to a control condition. This asymmetric effect may be in part explained by the relatively small size of our samples, reducing our power to detect small but significant differences between cues of stigma and the control conditions. However, it also seems likely that our stigma manipulations were similar to participants' expectations, especially given that stigma against same-sex sexuality is widespread in the U.S. today (CBS, 2011). Supporting this view, in Study 1, the stigma article was rated as significantly more believable ( $M = 5.00, SE = .27$ ) than was the support article ( $M = 4.10, SE = .27$ ),  $t(61) = 2.38, p = .021$ . Perhaps the best way to assess the relative impact of cues of stigma and

<sup>4</sup> Two interactions were marginally significant. The interactions of Condition and Sexual Consciousness,  $b_{int} = -1.59 (SE = .89)$ ,  $t(67) = -1.79, p = .077, R^2\Delta = .038$ , and the interaction of Condition and Integration,  $b_{int} = -1.69 (SE = .97)$ ,  $t(67) = -1.74, p = .087, R^2\Delta = .038$ . Neither the interactions of Condition and Commitment,  $b_{int} = -.801 (SE = .99)$ ,  $t(67) = -.809, p = .422$ , nor the interaction of Condition and Exploration,  $b_{int} = .778 (SE = .72)$ ,  $t(68) = 1.084, p = .282$ , was statistically significant.

support would be to look for change within participants over time, accounting for participants' baseline levels of same-sex sexuality and perceived stigma/support. Future research should utilize both longitudinal and experimental methods to assess the differential impact of cues of stigma and support relative to baseline.

The present research also obtained effects using both explicit and implicit manipulations of perceived stigma against and support for same-sex sexuality. The implicit manipulation in Study 3 helps assuage concerns about demand characteristics and also suggests that less overt cues of stigma and support in one's social context may contribute to self-perceived sexual orientation. While openly anti-gay sentiment may certainly motivate people's interpretations of their sexual experiences, the results of Study 3 suggest that even subtle facial expressions indicating distaste for same-sex sexuality may impact self-perceived sexual orientation.

Interestingly, while subliminally presented happy and angry faces coupled with same-sex couples in Study 3 did affect self-reported sexual orientation, they did not impact reported peer attitudes towards the individual same-sex couples. It is possible that other factors likely to influence judgments of individuals (e.g., attractiveness; Dion, Berscheid, & Walster, 1972) were stronger than the effect of the subliminally primed faces. Alternately, participants' perceptions of their peers' attitudes, with which they are likely to have much experience, may have been less easily influenced by our manipulation than their perceptions of broader attitudes towards same-sex sexuality. Future research should investigate the relative impact of perceived peer attitudes and broader societal attitudes towards same-sex sexuality on self-perceived sexual orientation.

A strength of our research is that all three studies used different measures of self-perceived sexual orientation. Study 1 used a 13-point self-reported same-sex sexuality scale; Study 2 used a measure of perceived attractiveness of same-sex targets; and Study 3 used a 101-point self-reported same-sex sexuality visual analog scale. Because previous research has found that self-reported sexual orientation can vary depending on the method of measurement (Hayes et al., 2012; Savin-Williams, 2006), the fact that we found consistent effects across three different measures is noteworthy. Moreover, in Study 3, tangential to our predictions, we found a large difference in self-reported sexual orientation between those participants who had just viewed pictures of furniture relative to those who had just viewed pictures of same-sex couples. Given that participants were heterosexually identified, viewing pictures of same-sex couples may have made them feel that they experienced relatively less same-sex sexuality as compared to those couples, suppressing what they would have reported had they seen pictures of furniture. This suggests that self-reported sexual orientation is highly sensitive to information that may be perceived as irrelevant to measurement. Those wishing to assess sexual orientation using self-reports should pay particular attention to the cues of social stigma and/or support created by the measurement context or other information included in the survey or study. For instance, research that first assesses perceived stigma towards same-sex sexuality in respondents' social context and then assesses the respondent's own sexual orientation may inadvertently motivate participants to avoid reporting same-sex experiences.

Another strength of our research is that the effects of stigma and support were found among samples of heterosexually identified individuals of varying ages recruited from both college and the Internet. While prior research on change in self-perceived sexual orientation has focused on those identifying as lesbian or bisexual (e.g., Diamond, 2008), the present research indicates that social context can also impact the self-perceived sexual orientation of heterosexually identified individuals. Indeed, because our proposed effects are situated in basic social cognitive processes, we expect that these effects should extend to those who identify as gay, lesbian, and bisexual, as well. Specifically, we would expect that the effects of stigma and support on self-perceived sexual orientation depend on two factors: (1) an individual's ability to interpret their sexual experiences in self-serving ways and (2) the

type of interpretation that will best support a self-perception that is viewed positively within that individual's current social context. For instance, while many lesbian-identified women have had sexual experiences with men (e.g., Hany, 1983), the fact that these heterosexual relationships occurred in the past allows women to discount their importance for their current identity (Whisman, 1996). This tendency to disregard other-sex experiences may reflect pressure for lesbian women to perceive themselves as "real" lesbians as opposed to women temporarily experimenting with same-sex sexuality (e.g., Rust, 1992).

We predicted and found that men and women responded similarly to situational cues of stigma and support. In contrast, prior correlational research has been interpreted as indicating that men's sexuality is less susceptible to contextual effects than women's (for reviews see Baumeister, 2000; Peplau, 2003). Others have theorized that "one of the fundamental, defining features of female sexual orientation is its fluidity" (Diamond, 2008, pp. 3). To our knowledge, our research provides the first experimental tests of the impact of context on men and women's self-perceived sexual orientation. Our results suggest that men's self-perceived sexual orientation may be subject to the same interpretational process as women's. Social cues appear to influence how both men and women interpret their same-sex experiences.

One possible explanation is that the differences observed between the sexuality of men and women in other studies stems less from individuals' susceptibility to social influence and more from differences in the societal context for men and women. It has frequently been noted that violations of gender norms result in more negative consequences for men than women (e.g., Eisler & Blalock, 1991; Pleck, 1981, 1995). Indeed, heterosexual men's attitudes are more negative toward gay and bisexual men than toward lesbians and bisexual women (Herek, 2002). In our studies, the only gender differences that emerged were main effects such that heterosexually identified men reported less same-sex sexuality than did heterosexually identified women. This difference may reflect general differences between men and women's social contexts, although previous research also suggests that women experience more bisexual patterns of physiological attraction than do men (Chivers, Rieger, Latty, & Bailey, 2004; Chivers, Seto, & Blanchard, 2007). Future research should more closely examine the impact of contextual cues of stigma and support on men's self-perceived sexual orientation.

Finally, in Study 3 we found that those participants who were uncertain about their sexual identity were most susceptible to our manipulation of contextual cues. This result suggests that individuals with a weak sense of the relevance of their sexual experiences to their sexual orientation may be particularly vulnerable to the effect of contextual cues on the motivated interpretation of their sexual experiences. It should be noted, however, that the uncertainty scale had low reliability (Cronbach's  $\alpha = .565$ ), and the other individual difference measures we assessed did not interact with the stigma/support manipulations. So, while the present research provides some suggestive evidence for the role of individual differences in the susceptibility of self-perceived sexual orientation to contextual cues, future research should more closely examine the effect of perceived ambiguity of sexual experiences on self-perceived sexual orientation. It would also be useful to determine whether the moderating effects of individual differences in beliefs about one's sexual orientation identity and sexuality can be replicated from more general individual differences in the tendency to process information clearly and categorically. Previous research has examined the relationship between Personal Need for Structure (Neuberg & Newsom, 1993) and self-perceived sexual orientation, finding that women higher in need for structure report significantly less same-sex sexuality than those lower in need for structure (Preciado & Peplau, 2011). Future research could also examine other related individual differences, such as need for cognitive closure (Kruglanski, Webster, & Klem, 1993; Webster & Kruglanski, 1994). Based on previous research,

we would expect that individuals with a greater preference for order and structure and greater discomfort with ambiguity in information processing and judgment would have a more difficult time interpreting their sexual experiences in self-serving ways, resulting in a diminished relationship with contextual cues of stigma and support.

Likewise, it would be useful to investigate developmental effects on the perceived ambiguity of sexual experiences. We might expect that older individuals would experience less ambiguity regarding their sexual experiences than would younger individuals still developing their understanding of their own sexual orientation. Thus, younger individuals might be more susceptible to contextual cues of stigma and support.

The inclusion of physiological measures in future research could also shed light on the role of ambiguity in the influence of social context on self-perceived sexual orientation. People vary in the specificity of their physiological reactions to same-sex stimuli, other-sex sexual stimuli, or both (e.g., Chivers et al., 2004, 2007; Rieger, Chivers, & Bailey, 2005). A lack of consistency of physiological reactions may offer those individuals greater flexibility in interpreting their sexual experiences of attraction in self-serving ways, thus increasing the effect of contextual cues of stigma and support on self-perceived sexual orientation.

## Conclusion

Prior work has theorized that self-perceived sexual orientation is not a pure reflection of one's sexual experiences, yet until now evidence of the impact of contextual cues on self-perceived sexual orientation was based solely on correlational research. Our experimental studies provide a first step in understanding the process by which factors outside of actual sexual experience influence sexual orientation. These results shed light on the social cognitive mechanisms underlying change in self-perceived sexual orientation across time and context (e.g., Diamond, 2008). While some have proposed that particular individuals may have a unique capacity to experience change in their sexual orientation across time and context (e.g., Diamond, 2008), our research suggests that these changes may also arise from basic processes of motivated cognition in people's beliefs about their sexual orientation.

As researchers attempt to understand the ways in which both biological and situational factors influence sexual orientation (e.g., Hammack, 2005; LeVay, 2011), our cognitive approach may prove useful. While biological factors may influence basic physiological reactions to male and female sexual stimuli, it is important to remember that individuals must give *meaning* to those reactions. The interpretations that individuals give to their experiences of arousal, attraction, and sexual behavior are influenced by social contextual factors, such as the perception of stigma against or support for same-sex sexuality. We believe that both actual sexual experiences and beliefs about those experiences should be studied as important and distinct yet related constructs. This approach offers novel predictions and, importantly, a way to reconcile biological and social contextual research on sexual orientation.

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## Appendix A. Supplementary data

Supplementary data to this article can be found online at <http://dx.doi.org/10.1016/j.jesp.2013.01.006>.

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