

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/316739120>

Sexual regret in US and Norway: Effects of culture and individual differences in religiosity and mating strategy

Article in *Personality and Individual Differences* · October 2017

DOI: 10.1016/j.paid.2017.04.054

CITATIONS

0

READS

1,003

5 authors, including:



Mons Bendixen

Norwegian University of Science and Technol...

30 PUBLICATIONS 383 CITATIONS

SEE PROFILE



Joy P. Wyckoff

University of Texas at Austin

3 PUBLICATIONS 5 CITATIONS

SEE PROFILE



David M Buss

University of Texas at Austin

303 PUBLICATIONS 28,824 CITATIONS

SEE PROFILE



Leif Edward Ottesen Kennair

Norwegian University of Science and Techno...

76 PUBLICATIONS 358 CITATIONS

SEE PROFILE

Some of the authors of this publication are also working on these related projects:



Morality [View project](#)



Sexual Regret [View project](#)

Elsevier Editorial System(tm) for
Personality and Individual Differences
Manuscript Draft

Manuscript Number: PAID-D-17-00435R1

Title: Sexual Regret in US and Norway: Effects of Culture and Individual Differences in Religiosity and Mating Strategy

Article Type: Full Length Article

Section/Category: Research Paper (<5000 words)

Keywords: Sexual regret; religiosity; sociosexual orientation; culture; sexual strategies; one night stands

Corresponding Author: Professor Leif Edward Ottesen Kennair, Ph.D.;
cand.psychol

Corresponding Author's Institution: Norwegian University of Science and Technology

First Author: Mons Bendixen, PhD

Order of Authors: Mons Bendixen, PhD; Kelly Asao; Joy P Wyckoff; David M Buss, PhD; Leif Edward Ottesen Kennair, Ph.D.; cand.psychol

Abstract: Sexual regret was investigated across two disparate cultures: Norway (N = 853), a highly secular and sexually liberal culture, and the United States (N = 466), a more religious and more sexually conservative culture. Sex differences, individual differences in preferred mating strategy, religiosity, and cultural differences in sexual regret were analyzed. Men were significantly less likely to regret having had casual sex than women and were significantly more likely to regret passing up casual sexual opportunities than women. Participants who were more religious regretted having had casual sex more and regretted passing up casual sex less. Sexually unrestricted participants were less likely to regret having had casual sex and were more likely to regret passing up casual sex. Finally, North Americans and Norwegians did not differ significantly in overall amount of sexual regret nor in patterns of sex differences in sexual regret. Discussion focuses the robustness of sex differences across cultures, the importance of explaining individual differences within cultures, and on future directions for cross-cultural research.

Sexual Regret in US and Norway: Effects of Culture and Individual Differences in Religiosity and Mating Strategy

Mons Bendixen^a

Kelly Asao^b

Joy P. Wyckoff^b

David M. Buss^b

Leif Edward Ottesen Kennair^{a*}

*Corresponding author. Email: kennair@ntnu.no telephone: (+47) 7359 1956,
Department of Psychology, Norwegian University of Science and Technology, 7491
Trondheim, Norway

^aDepartment of Psychology, Norwegian University of Science and Technology,
Trondheim, Norway

^bDepartment of Psychology, University of Texas at Austin, Austin, Texas, USA

Running head: Sexual regret

Introduction

The counter-factual cognitive processing and emotion of regret is hypothesized to be an evolved information-processing mechanism designed to motivate avoidance of past errors in decision making (Galperin et al., 2013). Through anticipatory scenario-building, emotional regret could function to avoid errors before they occur. From an evolutionary perspective, regret might motivate individuals to alter current or future decisions to avoid errors that are costly in terms of fitness. Since nothing is more central to the process of natural selection than sex, regret may be a uniquely important within the domain of sexual conduct (Kennair, Bendixen, & Buss, 2016).

According to Sexual Strategies Theory (Buss & Schmitt, 1993), based on differences between the sexes in minimum obligatory parental investment (Trivers, 1972), men and women will differ in the types of sexual decisions that they regret. Since women have a higher obligatory parental investment in offspring (e.g., 9-month internal gestation), poor sexual decisions are, on average, costlier for women than for men. With this higher cost, women are hypothesized to regret some classes of poor sexual decisions—sex with low quality partners, sex at unpropitious times, and sex in unfavorable circumstances. In contrast, men's reproductive success historically has been limited heavily by access to fertile, sexually receptive women. Therefore, men are hypothesized to regret missed sexual opportunities, especially those involving low cost, low commitment, and few risks. According to the logic of Sexual Strategies Theory, women are more likely to regret decisions to engage in casual sex whereas men are more likely to regret decisions *not* to engage in casual sex.

Previous research has provided empirical support for sex differences in regret about sexual conduct consistent with Sexual Strategies Theory. Eshbaugh and Gute (2008) found that engaging in casual sexual intercourse (e.g., having sex with someone only once) predicted regret in women, but that non-coital sexual behavior (e.g., oral sex) did not predict

regret in women. Fisher, Worth, Garcia, and Meredith (2011) reported that women regret having had casual sex more than men did. Roese and colleagues (2006) found that, while there was no overall sex difference in regrets about having had sex, men regretted missed sexual opportunities more than women did.

Cultural differences and sexual regret

A recent study suggests that these sex differences may be robust across at least some cultures. If sex differences in sexual regret were primarily due to different social roles imposed upon men and women, then the findings would not be replicable in more egalitarian cultures. Kennair et al. (2016) investigated whether sex differences in sexual regret were replicable in Norway, one of the least religious and most sexually liberal countries in the world. They found that women regretted their most recent casual sex experience more than men did, while men regretted having missed their most recent chance to have casual sex more than women. This finding suggests that differences in sexual regret between men and women may be a universal feature of human sexual psychology grounded in fundamental differences between men and women in reproductive biology and constraints on reproductive success. Following this logic, we predicted that women in both Norway and the United States will regret having had casual sex more than men do and men will regret passing up casual sex more than women do.

Individual differences in sexual regret

Individual differences in sexual regret have been neglected in the literature, with the exception of Kennair et al. (2016). However, individual differences in sexual regret may help to explain both within and between culture variations in sexual regret. Religiosity is a good candidate for explaining individual differences in sexual regret. Weedon and Kurzban (2013), for example, found that highly restrictive sexual morals were correlated with degree of religiosity. Indeed, most religious scriptures include prohibitions against certain sexual

actions, notably promiscuous or casual sex. Religions often advocate regret and repentance as routes to divine forgiveness for past sexual transgressions. Thus, individuals' religiosity could influence their experience of sexual regret. We predicted that individuals higher in religiosity would regret having had casual sex more and regret passing up casual sex less.

Sociosexual orientation is another key individual difference variable that likely influences people's experience of sexual regret. Across all cultures studied, relative to men, women report more restricted sociosexual orientation (Schmitt, 2005). Kennair et al. (2016) found that more restricted sociosexual orientation was associated with greater regret for casual sex, both within the sexes and between the sexes. Thus, we expect both men and women with a restricted sociosexual orientation will regret casual sex more and regret passing up casual sex opportunities less, while those with an unrestricted sociosexual orientation will show the opposite pattern of effects.

Although we did not predict that Norway would differ from the U.S. in the direction of sex differences in sexual regret, we investigated whether cultural differences between Norway and the U.S. in religiosity and sociosexual orientation would affect levels of sexual regret or sex differences in sexual regret.

The current study

The first goal of the current study was to investigate whether sex differences in sexual regret are robust across two extremely different cultures: Norway, a highly secular and sexually liberal culture, and the U.S., a highly religious and more sexually conservative culture. If the pattern of sex differences is consistent across the two cultures, this lends support to the idea that sex differences in sexual regret are universal features of human psychology that stem from fundamental differences between men and women's reproductive biology. If, however, the pattern of sex differences is not consistent across culture, as predicted by social role theory, then findings of sex differences could be due to differential

cultural socialization of men and women, as predicted by social role theory (Buss & Barnes, 1986; Eagly & Wood, 1999). Our second goal was to determine whether the individual differences variables of religiosity and sociosexual orientation influence levels of sexual regret and sex differences in sexual regret within cultures.

Hypotheses

General expectation. We expect that there will be differences between Norwegian and North American students in their reported religiosity. The World and European Value Surveys (Gallup, 2010) suggest that Europeans and Scandinavians score far lower on religiosity than North Americans. We also expect cultural differences in sociosexuality. Prior cross-cultural studies of sexually liberal attitudes toward pre-marital sex, extra-marital sex, and homosexuality suggest that Scandinavians are far more liberal than North Americans (Scott, 1998).

Hypothesis 1. Feelings of regret over having had casual sex and feelings of regret over having passed up casual sex will be associated with religiosity and sociosexual orientation. We expect participants high in religiosity and restricted sociosexual orientation to regret casual sex more and regret passing up casual sex less.

Hypothesis 2. Women will regret having had casual sex more than men (Fisher, Worth, Garcia, & Meredith, 2011; Galperin et al., 2013; Kennair et al., 2016), but if social role theory (Buss & Barnes, 1986; Eagly & Wood, 1999) is correct this sex difference will be attenuated in a highly sexually egalitarian culture.

Hypothesis 3. Men will regret having passed up casual sex more than women (Galperin et al., 2013; Kennair et al., 2016; Roese et al., 2006), but if social role theory (Buss & Barnes, 1986; Eagly & Wood, 1999) is correct this sex difference will be attenuated in a highly sexually egalitarian culture.

Hypothesis 4. Sex differences in sexual regret are expected to be influenced by level of sociosexuality (Kennair et al., 2016) and religiosity. Due to previous findings showing large sex differences in sociosexuality relative to sex differences in having had casual sex, we predict individual differences in sociosexuality to account for the sex difference in regret for having had casual sex (Kennair et al., 2016). As the sex difference in passing up casual sex is relatively large, we do not expect sociosexuality to fully account for this sex difference (Kennair et al., 2016). As noted by Kennair et al. (2016) one needs to avoid naïvely controlling for fundamental aspects of being male or being female, and thereby erroneously drawing the conclusion that sex does not explain differences (See also, Schmitt et al., 2012). Therefore, interpretation of this finding has to be tempered by an understanding of how sexual desire is a fundamental aspect of biological sex. If individual differences in sociosexuality account for the sex difference in sexual regret, we cannot assume that biological sex is not driving the effect. The magnitude and universality of sex differences in sociosexuality suggest that mating orientation is a fundamentally differentiated aspect of biological sex. While we expect a sex difference in religiosity, this is not equally conceptually tied to biological sex.

Method

Participants

Norway. Nine hundred and twenty-nine students (60.3% women) were recruited from multiple lectures at the faculties of Social, Natural and Human Sciences at a large public Norwegian university to participate in a four-page questionnaire on sexual regret. After removing participants who did not self-report heterosexual orientation (4.8%), 853 heterosexual students between the ages of 19 and 30 years old reported on their most recent casual sex incidence. Mean ages for women ($N = 513$) and men ($N = 340$) were 21.4 ($SD =$

2.0) and 21.7 (SD = 2.3) respectively. Fifty percent of the women and 59% of the men reported their relationship status as “single.”

United States. Five hundred and twenty-four students (61.3% women) were recruited from the undergraduate research subject pool at a large public university in the Southwestern United States to complete the English version of the above questionnaire on sexual regret. After removing participants who did not self-report heterosexual orientation (9.8%), 466 heterosexual students between the ages of 18 and 29 years old reported on their most recent casual sex incidence. Mean ages for women (N = 297) and men (N = 169) were 19.1 (SD = 1.3) and 19.4 (SD = 1.4) respectively. Fifty-six percent of the women and 62% of the men reported their relationship status as “single.”

Materials

Translations. A bilingual Norwegian coauthor translated the Norwegian original survey questions to English. The translations were then edited by the three American coauthors. Lastly, the Norwegian group did a final edit of all survey items.

Casual sex regret. We assessed regrets relating to participant’s *most recent* casual sexual incidence with a measure used by Galperin and colleagues (2013) and Kennair and colleagues (2016). Instructions read: “Think about the last time you had the experiences listed below. How do you feel about your actions/decisions?” The experiences were: (1) “I had casual sex with someone,” and (2) “I passed up a chance to have casual sex with someone.” For both items, participants responded to the following answer-options: *I didn’t have the chance for casual sex / to pass up casual sex (not coded), I had the chance, but I did not have*

*casual sex/pass up casual sex (not coded); I'm glad I did it (coded 0); Neutral – neither glad nor have regrets (1); I regret it somewhat (2); and I regret it very much (3).*¹

Religiosity. Two items were used to measure religiosity: (1) “I consider myself religious”, and (2) “I believe it's important to live by religious doctrines (rules and ideas).” Participants responded by rating each of these items on a scale from 1 (*Strongly disagree*) to 5 (*Strongly Agree*). The scores correlated substantially ($r = .80$) and were multiplied to form a composite measure of religiosity.

Sociosexuality. Participants completed the revised *Sociosexuality Orientation Inventory* (SOI-R; Penke & Asendorpf, 2008). Internal consistency was good for the 9-item measure ($\alpha = .87$) as well as for each of the three components: SOI-Behavior ($\alpha = .86$), SOI-Attitudes ($\alpha = .85$), and SOI-Desire ($\alpha = .89$). Scaling and scoring were identical to Penke & Asendorpf (2008).

All analyses were performed using Stata/IC 14.2 for Mac (StataCorp, 2015)

Procedure

Norway. Two research assistants, one male and one female, gave a short oral presentation of the study, “A study of sexual experiences and regret” during a lecture break at multiple different lectures. Instructions read: “The purpose of this survey is to gain more knowledge on possible sexual regret among students. The study is part of a larger collaboration among Norwegian and American researchers.” Participants were informed of the content of the questionnaire and were invited to participate. Participation was fully voluntary and students were assured that their responses would remain completely

¹ Similar to the previous studies, only participants reporting on their level of regret (scores 0 – 3) for having had, or passing up, casual sex was analyzed. For regretting having had casual sex this included 65% (women) and 64% (men) in the Norwegian sample, and 44% (women) and 50% (men) in the American sample. Correspondingly, for passing up casual sex this included 79% (women) and 74% (men) in the Norwegian sample, and 74% (women) and 70% (men) in the American sample.

anonymous. Participants were instructed to write no personal identification on their questionnaire, and not to respond if they had partaken previously. Participation occurred during the 15-minute lecture break. Completed questionnaires were folded and returned to a box at the podium. No course credit was given for participation.

United States. Students enrolled to participate in the study titled “College Student Relationships and Sexuality Survey” using Sona, an online subject pool management website. Participants came to the research lab for their designated appointment and were greeted by a research assistant. The research assistant told participants the purpose of the study and discussed the informed consent with them. Participants were told that participation was fully voluntary, and students were assured their responses would remain completely anonymous. After signing the informed consent, participants were led to a private room to complete their survey. Participants were given 30 minutes to respond but the majority finished in 15 minutes or less. After completing the survey, participants were debriefed, and given course credit for the participation. Before leaving, the participants returned their completed survey to the research assistant, who then placed the surveys in a locked file cabinet.

Results

Consider Table 1 for descriptive statistics.

Table 1. *Means and SD's for Religiosity, Sociosexuality Dimensions, and Regret Outcomes*

Variable	Norway		US	
	Women	Men	Women	Men
Religiosity	4.51 (4.66)	3.40 (4.35)	11.76 (7.09)	10.70 (7.54)
SOI-Behavior	3.10 (1.75)	3.03 (1.91)	2.08 (1.33)	2.34 (1.67)
SOI-Attitudes	5.15 (2.16)	6.45 (1.97)	3.98 (2.21)	5.34 (2.34)
SOI-Desire	3.20 (1.73)	4.65 (1.98)	3.32 (1.79)	5.12 (2.02)
Regret sex	1.22 (1.07)	0.81 (0.91)	1.37 (1.11)	1.00 (1.11)

Regret passing up	0.28 (0.52)	0.76 (0.85)	0.29 (0.57)	0.88 (0.88)
-------------------	-------------	-------------	-------------	-------------

Are American students more religious and Norwegian students more sexually liberal?

We examined the level of religiosity and the level of sociosexuality (SOI-R) for each of the three dimensions applying 2×2 ANOVA's with participant sex and culture as predictors. American students ($M = 11.4$) reported far stronger religious beliefs than Norwegian students ($M = 4.1$), $F(1,1312) = 466.73$, $p < .001$, $\eta_p^2 = 0.262$ ($d = 1.19$).² Women ($M = 7.2$) reported being significantly more religious than men ($M = 5.8$), $F(1,1312) = 10.43$, $p < .001$, but the effect size was small ($\eta_p^2 = 0.01$). The participant sex \times culture interaction effect was not significant, $F(1,1312) = 0.00$, suggesting that the effect of culture was not moderated by participant sex.

Relative to American students ($M = 2.2$), Norwegian students ($M = 3.1$) reported less restricted sociosexual behavior, $F(1,1305) = 71.94$, $p < .001$, $\eta_p^2 = 0.052$ (medium effect). However, there was no sex difference in reported casual sex, $F(1,1305) = 0.86$, *ns.*, and the culture difference was similar for women and men (non-significant culture by participant sex interaction effect: $F(1, 1305) = 2.64$, $p = .105$). Relative to American students ($M = 4.5$), Norwegian students ($M = 5.7$) also reported less restricted sociosexual attitudes, $F(1,1308) = 79.74$, $p < .001$, $\eta_p^2 = 0.057$ (medium effect), and men ($M = 6.1$) reported less restricted attitudes toward casual sex than women ($M = 4.7$), $F(1,1308) = 107.87$, $p < .001$, $\eta_p^2 = 0.076$ (medium effect). The effect of culture was not moderated by participant sex, $F(1,1308) = 0.08$. Relative to American students ($M = 4.0$), Norwegian students ($M = 3.8$) reported lower levels of sexual desire, $F(1,1304) = 7.43$, $p < .001$, $\eta_p^2 = 0.01$ (small effect). Men ($M = 4.8$) reported far more sexual desires than women ($M = 3.2$), $F(1,1304) = 216.17$, $p < .001$, $\eta_p^2 =$

² The sex and culture effects were equally strong for both indicators of religiosity (i.e., religious beliefs, and to live by religious doctrines).

0.142 (large effect). The sex difference was similar for the two samples (non-significant culture by participant sex interaction effect: $F(1,1304) = 2.49, p = .115$).

Associations between religiosity, sociosexuality and sexual regret

We next examined men and women, and Norwegian and American students separately for associations between religiosity, sociosexuality and sexual regret. As seen in Table 2, religiosity was not consistently associated with either regret for having had casual sex or regret for passing up casual sex. The associations were small and variable across the four groups (men/women, Norway/US). Although students high in religiosity reported more restricted attitudes toward casual sex, religiosity showed weak and inconsistent associations with the behavioral and desire components of SOI. Of the three SOI components, unrestricted attitudes showed most consistent associations with regret for having had casual sex (ranging from $r = -.19$ to $r = -.45$) and regret for passing up casual sex (ranging from $r = .16$ to $r = .34$). Relative to restricted students, unrestricted students were less likely to regret their most recent casual sex experience, and more likely to regret passing up their most recent casual sex opportunity. The correlational pattern for the desire component of SOI was similar, but associations were less strong. The pattern of associations did not differ systematically across the four groups.

Table 2. Zero-order Correlations between Religiosity, Sociosexuality Dimensions and Regret Outcomes. Women above the Diagonals, Men below the Diagonals

Norway	1	2	3	4	5	6
1. Religiosity	–	-.20**	-.37**	-.11*	.06	-.05
2. SOI-Behavior	-.12*	–	.57**	.37**	-.09	.04
3. SOI-Attitudes	-.36**	.47**	–	.40**	-.45**	.16**

4. SOI-Desire	-.20**	.33**	.42**	–	-.25**	.08
5. Regret sex	.16*	.00	-.19**	-.09	–	-.15**
6. Regret passed up	-.03	.12*	.21**	.17**	-.07	–
US	1	2	3	4	5	6
1. Religiosity	–	-.18**	-.53**	-.21**	.14	-.16*
2. SOI-Behavior	.07	–	.52**	.37**	.02	.25**
3. SOI-Attitudes	-.33**	.47**	–	.47**	-.44**	.34**
4. SOI-Desire	-.04	.30**	.47**	–	-.12	.33**
5. Regret sex	.01	-.22*	-.37**	-.18	–	-.24**
6. Regret passed up	-.06	.07	.30**	.36**	-.24**	–

Note. * $p < .05$, ** $p < .01$

Sex differences in regret: Omnibus test

In the Norwegian sample, the pattern of responses in having either engaged in or having passed up causal sex clearly differed between women and men. As can be seen from the upper panel of Table 3, more women (41%) than men (25.7%) regretted their most recent incident of casual sex. The pattern was significantly different for women and men, $\chi^2(3, N = 547) = 23.34, p < .01, r_{\text{tau}} = -.17$ (Cohen's $d = 0.41$ [95% CI: 0.23 – 0.58]). On the other hand, far more men (23.6%) than women (3.3%) regretted passing up casual sex the last time they had the chance. Only half of the men were glad they passed up casual sex compared to 75% of the women. The pattern was significantly different for the two sexes, $\chi^2(3, N = 638) = 73.13, p < .001, r_{\text{tau}} = .29$ (Cohen's $d = 0.71$ [95% CI: 0.54 – 0.88]).

In the American sample, women differed less clearly in their sexual regret responses than men. As can be seen from the lower panel of Table 3, more women (49.6%) than men (35.3%) regretted their most recent incident of casual sex. Although the pattern was in the

expected direction, the effect was only marginally significant, $\chi^2(3, N = 216) = 6.50, p = .09$, $r_{\text{tau}} = -.15$ (Cohen's $d = 0.32$ [95% CI: 0.05 – 0.60]). In line with the findings in the Norwegian sample, far more men (27.5%) than women (5.6%) regretted passing up casual sex the last time they had the chance. A little over 43% of the men were glad they passed up casual sex compared to 76.6% of the women. The pattern was significantly different for the two sexes, $\chi^2(3, N = 335) = 49.35, p < .001, r_{\text{tau}} = .36$ (Cohen's $d = 0.86$ [95% CI: 0.61 – 1.10]).

Table 3. Percentages of Norwegian and American Women's and Men's Responses to Most Recent Engagement in Casual Sex Incident and Most Recent Passing Up Casual Sex Incident

	Glad I did it	Neutral	Regret it somewhat	Regret it very much
<i>Engaged in Casual Sex</i>				
Norway				
Women (n=329)	34.0%	24.9%	26.4%	14.6%
Men (n=218)	48.6%	25.7%	22.0%	3.7%
US				
Women (n=131)	31.3%	19.1%	31.3%	18.3%
Men (n=85)	48.2%	16.5%	22.4%	12.9%
<i>Passed up Casual Sex</i>				
Norway				
Women (n=393)	75.1%	21.6%	3.3%	0.0%
Men (n=245)	49.8%	26.5%	22.0%	1.6%
US				
Women (n=218)	77.0%	18.0%	4.6%	0.5%
Men (n=120)	42.4%	29.6%	25.4%	2.5%

Are sex differences robust across samples/cultures?

More robust tests of regret for engaging in casual sex and regret for passing up casual sex respectively were performed using Ordered Logistic Regression analyses with participant sex and culture as predictors. This statistical technique is applicable under the assumption that the levels of the dependent variable have a natural ordering (low to high), but the distances between adjacent levels are unknown. The proportional odds assumption was checked for all analyses. This is a likelihood-ratio test of proportionality of odds across response categories. For models that did not meet the parallel regression assumption, the generalized ordered logistic model was applied and interpreted.³

Predicting casual sex regret from participant sex and culture showed that men were significantly less likely to regret casual sex than women, $Z = -4.24$, $p < .001$, $OR = 0.51$, suggesting that men's likelihood of regret was approximately half that of women. There was no difference between cultures in level of regret ($Z = 1.36$, ns) nor did culture moderate the above sex effect ($Z = -0.01$, ns).⁴

Predicting regret for passing up casual sex from participant sex and culture showed that men were far more likely to regret this than women, $Z = 7.41$, $p < .001$, $OR = 3.51$. There was no difference between cultures in level of regret passing up casual sex ($Z = -0.37$, ns) nor did culture moderate the above effect of sex ($Z = 1.29$, ns). The proportional odds assumption was not met for this analysis, but the generalized ordered logistic model underscores the lack of cultural effect on regret for passing up casual sex held up across all levels of regret. However, relative to low levels of regret for passing up, the effect of participant sex was less strong for higher levels of regret.

³ <http://www.ats.ucla.edu/stat/stata/dae/ologit.htm>

⁴ Despite the reproductive nature of the theory behind sexual regret, we ran additional analyses including sexual minorities. Overall, there were no significant changes, and the sample of sexual minorities was too small for separate analyses. However, there was a tendency for less casual sex regret among sexual minorities. For passing up there was no effect.

Are sex differences robust across samples/cultures when controlling for level of religiosity and SOI?

When we accounted for individual differences in religiosity in the above prediction of casual sex regret, we still found that men were significantly less likely to regret having had casual sex than women, $Z = -4.09$, $p < .001$, $OR = 0.52$, and that there were still no effect of culture, nor did culture moderate the above effect of sex. However, religiosity was significantly associated with casual sex regret, $Z = 2.09$, $p < .05$, $OR = 1.03$, suggesting that those scoring higher on religiosity regretted casual sex more.

When we accounted for individual differences in religiosity in the above prediction of regret for passing up casual sex, we still found that men were significantly more likely to regret passing up casual sex than women, $Z = 7.17$, $p < .001$, $OR = 3.39$, and that there were still no effects of culture, nor did culture moderate the effect of sex. However, more religiosity was significantly associated with less regret for having passed up on casual sex, $Z = -2.78$, $p < .01$, $OR = 0.96$. The proportional odds assumption was not met for this analysis. The generalized ordered logistic model confirms the lack of cultural effect on regret for passing up casual sex held up across various levels of regret, while the effect of participant sex and religiosity was stronger for lower levels of regret for passing up than for higher.

Finally, we accounted for individual differences in the three sociosexuality dimensions in predicting regret for having had casual sex and regret for passing up casual sex. For casual sex regret, the sex effect was no longer significant when controlling for sociosexuality, $Z = -0.42$, $p = .675$. Higher levels of sociosexuality were strongly associated with *less* regret for having had casual sex (SOI-attitudes, $Z = -9.80$, $p < .001$; SOI-desire, $Z = -2.52$, $p < .05$). For regret for passing up casual sex, controlling for sociosexuality only slightly attenuated the above sex difference, $Z = 4.94$, $p < .001$. The proportional odds assumption was not met for this analysis. The effect of SOI-behavior was not similar across levels of regret. While the

overall effect was not significant over and above the effect of the other predictors, the generalized ordered logistic model suggests effects of SOI-behavior primarily for high regret participants.

Higher levels of sociosexuality were clearly associated with more regret for passing up casual sex (SOI-attitudes, $Z = 6.06$, $p < .001$; SOI-desire, $Z = 2.55$, $p < .05$). Unrestricted sociosexual behavior did not predict regret for passing up casual sex over and beyond the effects of the sociosexual attitudes and sociosexual desire dimensions. The proportional odds assumption was also not met for this analysis. Relative to low regret participants, the effect of participant sex was lower for those who regretted more. In addition, the effect of both SOI-behavior and SOI-desire regret for passing up casual sex was not equal across various levels of regret. The generalized ordered logistic model did not identify any systematic pattern of effect for increasing levels of regret for passing up.

Discussion

As expected, North American students reported markedly stronger religious beliefs and moderately more restricted sociosexuality than Norwegian students. How well the characteristics of these student samples generalize to the general population of North Americans and Norwegians is not known, but the current findings suggest that the two samples largely reflect extant fundamental cultural differences in religious and sexual values expected to be apparent between North America and Norway (Gallup, 2010; Scott, 1998). Cultural disparity is critical for examining how psychological adaptations operate across different environments. From an anthropological perspective, the US and Norway may differ only in minor respects compared to, say differences between Norway and a traditional hunter-gatherer culture. However, these Norway-US cultural differences are indeed relevant to sexual regret. As such, it may be easier to draw conclusions than if these cultures differed markedly

on several anthropological relevant aspects. Small relevant cultural differences may therefore be considered a strength rather than a weakness.

The emotion and counter-factual cognitive process of sexual regret has been hypothesized (H2 and H3) to show design features or hallmarks of adaptation, in this case sex-differentiated design features. The results of this large-scale study, involving two cultures widely disparate in sexual attitudes and religiosity, support these hypotheses. In both Norway and North America, men more than women regret having passed up their most recent opportunity for casual sex; women more than men regret their most recent incident of casual sex. Contrary to predictions from social role theories, the magnitude of sex differences in sexual regret were not attenuated in Norway, one of the most gender-egalitarian cultures in the world. Moreover, these disparate cultures did not differ in overall levels of sexual regret. These findings contribute to a growing body of research supporting these sex-differentiated design features (Bendixen, Kennair, & Buss, 2015; Fernandes, Kennair, Hutz, Natividade, & Kruger, 2016; Galperin et al., 2013; Grøntvedt & Kennair, 2013; Kennair et al., 2016).

Two hypotheses (H1 and H4) were advanced to explain within-sex and within-culture individual differences in experiences of sexual regret—degree of religiosity and dispositional mating strategy. We found that religiosity was correlated with sexual regret. Those higher on religiosity were more likely to regret having had casual sex and were less likely to regret having passed up on a sexual opportunity compared to their less religious peers. These effects, although statistically significant, were small in magnitude.

In contrast, dispositional mating strategy (sociosexual orientation) showed stronger links with sexual regret and *statistically* accounted for the sex difference in regret for having had casual sex. As mentioned in the introduction, one needs to be careful how one interprets this. Naïvely controlling for basic sex differences in sociosexuality would be akin to throwing the baby out with the bathwater. Sexual desire is a product of sex differentiation, and not the

other way around: Sex does explain sex differences (Kennair et al., 2016; Schmitt et al., 2012). However, as predicted, the strong sex difference in regretting having passed up casual sex was not accounted for by sociosexuality.

Within both cultures, people who preferred a long-term mating strategy (i.e., restricted sociosexual orientation) were more likely to regret having had casual sex. Moreover, they were less likely to experience regret about having passed up opportunities for casual sex.

Limitations and further research

Similar to previous studies (Galperin et al., 2013; Kennair et al., 2016) the regret outcome variables (having casual sex and passing up casual sex) were single-item global measures with unknown reliability. However, regret might be a multidimensional construct, and it may be conceptually, psychometrically and theoretically beneficial to develop a regret scale. As such, measuring regret with a categorical, single item variable may obscure some of the complexity involved in regret processing. There are both counterfactual *cognitive* processes (i.e., considering how things might have turned out) and *emotional* processes (i.e., different valences of negative affect elicited by the cognitive processing), as well as both after the fact and future behavior coordinating functions to such processing. We recommend the development of a scale that combines these dimensions of regret.

There are further limitations to how broad conclusions one may draw from a two-culture comparison. It may be argued that both countries are Western, democratic nations. On the other hand, the expected and relevant differences between these cultures on measures of religiosity and sociosexuality specifically, egalitarianism and sexual liberalism in general, suggest that there are grounds for comparison. As such, the current tests of social role theory are relevant, and part of a growing body of evidence suggesting that greater sexual egalitarianism of a culture does not attenuate the magnitude of most evolved psychological

sex differences (Bendixen et al., 2015; Kennair et al., 2016; Schmitt, 2015). Despite this, we recommend further testing in more cultures even further apart on the dimensions of sexual liberalism, egalitarianism and religiosity.

Conclusions

Men were (1) significantly less likely to regret casual sex than women and (2) significantly more likely to regret passing up casual sex. North Americans and Norwegians did not differ significantly in the level of casual sexual regret, and the sex effect was similar across cultures. Religious participants regretted slightly more having had casual sex more and passing up casual sex less. Unrestricted participants regret having had casual sex less and regretted passing up casual sex more. These effects were strong.

An evolutionary psychological framework, in short, helps to explain both sex differences across cultures and within-culture individual differences in sexual regret (Kennair et al., 2016). The findings also contribute to the broader theoretical framework of evolved emotions as superordinate coordinating mechanisms (Al-Shawaf, Conroy-Beam, Asao, & Buss, 2016; Cosmides & Tooby, 2000).

References

- Al-Shawaf, L., Conroy-Beam, D., Asao, K., & Buss, D. M. (2016). Human emotions: An evolutionary psychological perspective. *Emotion Review*, 8(2), 173-186.
doi:doi:10.1177/1754073914565518
- Bendixen, M., Kennair, L. E. O., & Buss, D. M. (2015). Jealousy: Evidence of strong sex differences using both forced choice and continuous measure paradigms. *Personality and Individual Differences*, 86, 212-216. doi:10.1016/j.paid.2015.05.035
- Buss, D. M., & Barnes, M. (1986). Preferences in human mate selection. *Journal of Personality and Social Psychology*, 50(3), 559-570. doi:10.1037/0022-3514.50.3.559
- Buss, D. M., & Schmitt, D. P. (1993). Sexual strategy theory - an evolutionary perspective on human mating. *Psychological Review*, 100(2), 204-232. doi:10.1037/0033-295X.100.2.204
- Cosmides, L., & Tooby, J. (2000). Evolutionary psychology and the emotions. In M. Lewis & J. M. Haviland-Jones (Eds.), *Handbook of emotions* (2 ed.). New York: The Guilford Press.
- Eagly, A. H., & Wood, W. (1999). The origins of sex differences in human behavior. *American Psychologist*, 54, 408-423.
- Eshbaugh, E. M., & Gute, G. (2008). Hookups and sexual regret among college women. *The Journal of Social Psychology*, 148(1), 77-90. doi:10.3200/SOCP.148.1.77-90
- Fernandes, H. B. F., Kennair, L. E. O., Hutz, C. S., Natividade, J. C., & Kruger, D. J. (2016). Are negative postcoital emotions a product of evolutionary adaptation? Multinational relationships with sexual strategies, reputation, and mate quality. *Evolutionary Behavioral Sciences*, 10(4), 219-244. doi: <http://dx.doi.org/10.1037/ebs0000050>
- Fisher, M. L., Worth, K., Garcia, J. R., & Meredith, T. (2011). Feelings of regret following uncommitted sexual encounters in canadian university students. *Culture, Health & Sexuality*, 14(1), 45-57. doi:10.1080/13691058.2011.619579
- Gallup. (2010). *Religiosity highest in world's poorest nations*. Retrieved from <http://www.gallup.com/poll/142727/religiosity-highest-world-poorest-nations.aspx>

- Galperin, A., Haselton, M. G., Frederick, D. A., Poore, J., von Hippel, W., Buss, D. M., & Gonzaga, G. C. (2013). Sexual regret: Evidence for evolved sex differences. *Archives of Sexual Behavior, 42*, 1145-1161.
- Grøntvedt, T. V., & Kennair, L. E. O. (2013). Age preferences in a gender egalitarian society. *Journal of Social, Evolutionary, and Cultural Psychology, 7*, 239-249. doi:10.1037/h0099199
- Kennair, L. E. O., Bendixen, M., & Buss, D. M. (2016). Sexual regret: Tests of competing explanations of sex differences. *Evolutionary Psychology, 1-9*.
doi:10.1177/1474704916682903
- Penke, L., & Asendorpf, J. B. (2008). Beyond global sociosexual orientations: A more differentiated look at sociosexuality and its effects on courtship and romantic relationships. *Journal of Personality and Social Psychology, 95*(5), 1113-1135. doi:10.1037/0022-3514.95.5.1113
- Roese, N. J., Pennington, G. L., Coleman, J., Janicki, M., Li, N. P., & Kenrick, D. T. (2006). Sex differences in regret: All for love or some for lust? *Personality & Social Psychology Bulletin, 32*(6), 770-780. doi:10.1177/0146167206286709
- Schmitt, D. P. (2005). Sociosexuality from argentina to zimbabwe: A 48-nation study of sex, culture, and strategies of human mating. *The Behavioral and Brain Sciences, 28*(2), 247-275; discussion 275-311.
- Schmitt, D. P. (2015). The evolution of culturally-variable sex differences: Men and women are not always different, but when they are...it appears not to result from patriarchy or sex role socialization. In T. K. Shackelford & R. D. Hansen (Eds.), *The evolution of sexuality* (pp. 221-256). Cham: Springer International Publishing.
- Schmitt, D. P., Jonason, P. K., Byerley, G. J., Flores, S. D., Illbeck, B. E., O'Leary, K. N., & Qudrat, A. (2012). A reexamination of sex differences in sexuality: New studies reveal old truths. *Current Directions in Psychological Science, 21*(2), 135-139.
doi:10.1177/0963721412436808
- Scott, J. (1998). Changing attitudes to sexual morality: A cross-national comparison. *Sociology, 32*(4), 815-845. doi:10.1177/0038038598032004010
- StataCorp. (2015). *Stata statistical software: Release 14*. College Station, TX: StataCorp LP.

Trivers, R. (1972). Parental investment and sexual selection. In B. Campbell (Ed.), *Sexual selection and the descent of man, 1871-1971* (pp. 136-179). Chicago: Aldine.

Weeden, J., & Kurzban, R. (2013). What predicts religiosity? A multinational analysis of reproductive and cooperative morals. *Evolution and Human Behavior*, 34(6), 440-445.

doi:<http://dx.doi.org/10.1016/j.evolhumbehav.2013.08.006>