



Beyond Sex Differences: Predictors of Negative Emotions Following Casual Sex

Jessica A. Hehman¹ · Catherine A. Salmon¹

Published online: 30 October 2019
© Springer Nature Switzerland AG 2019

Abstract

Recently, much attention has been focused on understanding casual sex, or hooking up, among college students. The current study uses an adaptationist approach to go beyond sex differences in casual sex behavior, examining predictors of emotional reactions and including a community sample (39 females, 84 males) in addition to a typical college sample (103 females, 62 males). If males and females possess different emotional mechanisms designed to evaluate the consequences of sexual behavior, we would expect sex differences in emotional reactions as well as in motivations for engaging in casual sex. Individual differences in motivation may influence whether emotional reactions to casual sex are positive or negative. Early environmental cues of relationship stability may also have an impact on emotional responses. Results indicate that in addition to sex differences, factors such as early environmental cues of relationship instability, individuals' motivation for engaging in casual sex, and the number of their casual sex partners contribute to the positive or negative nature of their response to casual sex experiences. In addition, results from the community sample suggest that there may be life stage-specific effects.

Keywords Casual sex · Sex differences · Motivation · Father absence · Life stage-specific effects

Introduction

Recent research on sexual relationships has highlighted the frequency as well as the costs and benefits of engaging in casual sex, or hooking up, particularly among college students (Bendixen et al. 2017; Garcia et al. 2012; Lewis et al. 2012; Woerner and Abbey 2017). Over the past 10 to 20 years, the majority of college students have engaged in casual sexual relationships, some leading to longer term relationships (Kuperberg and Padgett 2016). The high frequency of casual sex in the college setting indicates engaging in casual sex has largely replaced dating as a means to establish and engage in sexual relationships. Indeed, studies indicate that about a quarter of casual sexual relationships lead to long term ones (Kuperberg and Padgett 2016; Timmermans and Courtois 2018). Some researchers have suggested that such hooking up is a compromise between male and female sexual strategies

such that males can obtain greater sexual access at low cost while females can obtain opportunities to assess potential long-term mates (Jonason et al. 2009). This suggests that males and females may be engaging in the same behavior with different motivations (i.e., low-cost sexual opportunity vs. opportunity for long-term relationship) which may have an impact on whether their casual sex experiences produce positive or negative emotional outcomes. There are a number of additional factors which would be predicted to also influence positive or negative reactions to casual sex including one's own sex and early environmental influences as will be discussed below. The majority of research on casual sex and its consequences has focused on sex differences in college undergraduates. However, one would expect within sex variation as well, due to within sex variation in mating strategies and environmental effects. The current study uses an adaptationist approach to investigate sex differences in motivations for engaging in (and emotional reactions to) casual sex. It also extends previous research by investigating individual differences that may explain within sex variability in emotional reactions, including early environmental cues of relationship stability. Finally, the current study includes a community sample to extend findings in this area beyond typical college undergraduate samples.

✉ Jessica A. Hehman
jessica_hehman@redlands.edu

¹ Department of Psychology, University of Redlands, Redlands, CA 92373, USA

Positive and Negative Effects of Casual Sex

While long-term sexual relationships are seen as providing significant health benefits (Levin 2007), casual sex has often been perceived as less beneficial and more costly in terms of well-being (Flack et al. 2007; Townsend and Wasserman 2011; Townsend et al. 2015). Townsend and Wasserman (2011) reported increased levels of worry and vulnerability in college women with a greater number of casual sex partners relative to their college male counterparts. Paul and Hayes (2002) and Kennair et al. (2018) reported more anger and regret on the part of women. Salmon et al. (2016) also reported that women experienced more worry and vulnerability as well as concerns about their sexual partner's intentions/emotional attachment to them. Campbell (2008) reported the largest sex differences for negative reactions to casual sex were women reporting greater feelings of being used, letting themselves down, and damaging their reputation. A prospective study of adolescents (Dubé et al. 2017) that investigated psychological well-being examined two forms of casual sexual relationships, friends with benefits, and one night stands, reporting a decrease in well-being for women only with these casual sexual relationships. The effect size, however, was very small. Overall, the majority of negative effects have been more frequently noted in women compared with men (Fielder and Carey 2010), though some have reported decreased self-esteem in men as well (Vrangalova 2015). These findings are consistent with emotional reactions to casual sex serving as a regulation system to constrain what may be maladaptive behavior (Campbell 2008). For example, if a woman's most adaptive mating strategy is to find a long-term mate willing to invest in her and their potential shared offspring, negative emotional reactions to casual sex that does not lead to a long-term relationship may serve to decrease that behavior of engaging in short-term mating relationships without commitment.

However, a number of studies have also reported positive effects of engaging in casual sex. For example, some studies have reported positive associations for both sexes between casual sex and confidence, self-esteem, and sexual satisfaction (Campbell 2008; Owen and Fincham 2011). It should be noted, however, that while positive associations have been found for both men and women, the general trend has been women reporting feeling less positive and more negative than men (Campbell 2008). If people are actively pursuing a short-term mating strategy and are being successful in obtaining sexual access to desired partners, the sociometer theory of self-esteem would predict that self-esteem would rise with increasing numbers of casual sex partners (Schmitt and Jonason 2019). Some of the sex differences found in emotional reactions to casual sex may thus be accounted for by sex differences in the pursuit of short-term mating (Buss and Schmitt 1993; Symons 1979). However, since both men and

women pursue long- and short-term mating, individual differences in sexual strategies within sexes may also play a role in the psychological outcomes of casual sex.

Vrangalova (2015) and others (Campbell 2008; Townsend et al. 2019; Townsend et al. 2015) have suggested that these mixed results may be due to individual difference factors, including the different motivations that can promote the pursuit of casual sexual relationships both between and within sexes. College females are more likely to engage in post-coital behaviors related to bonding with both their short-term and long-term partners; whereas college males are more likely to engage in behaviors that are either extrinsically rewarding or may lead to more sex (Hughes and Kruger 2011). Haselton and Buss (2001) reported that college women experience positive affect shifts following first time intercourse with a partner, reporting increased feelings of love and commitment, presumably to facilitate a longer term committed relationship. In contrast, college men pursuing a short-term mating strategy experience a negative affective shift following first time intercourse and report lower levels of love and commitment (Haselton and Buss 2001). These findings highlight the role of sexual motivation in terms of sex differences in post-coital behaviors and emotions. The literature on rumination and sexual regret points towards sex differences in sexual strategies with men more likely to regret sexual opportunities they did not take and women more likely to regret sexual opportunities that they did take (Kennair et al. 2018; Roese et al. 2006). Sexual attitudes have also been implicated in sex differences in positive feelings after casual sex (Woerner and Abbey 2017) and both low sexual disgust and high sociosexuality have been shown to predict the motivation to use Tinder for casual sex (Sevi et al. 2018).

The Role of Sex and Motivation in Influencing Positive Versus Negative Effects

As previously mentioned, there is a vast literature on sex differences in sexual strategies (e.g., Buss and Schmitt 1993; Salmon and Symons 2001) that suggests that males and females have differed in the specific problems they have had to solve in the mating domain due to differences in minimum obligatory parental investment (Trivers 1972) as well as the different traits that make a man or a woman a "good" mate. Female mate choice mechanisms, for example, are more focused on a man's ability and willingness to invest in her and any resulting offspring while a man's mechanisms are more focused on cues of reproductive ability and, when pursuing short-term mating, willingness to engage in sex without commitment. Emotions play a key role in this process. They motivate behavior and draw attention to relevant cues and contexts, allowing us to ruminate on poor choices or missed opportunities (Roese et al. 2006; Symons 1979). If men and

women possess different emotional mechanisms that are designed to motivate sexual behavior and evaluate its consequences, we would expect sex differences in both motivations and emotional reactions to casual sexual relations. Garcia and Reiber (2008) reported that, compared with men, women hooked up more frequently with people they knew and women were more likely to hope for traditional romantic relationships. Owen and Fincham (2011) also found that women were more likely to desire their hookups to lead to commitment.

As a result of such differences in motivation, casual sex may be related to positive well-being, whereas in other circumstances, it correlates inversely with well-being. For example, in short-term mating, females can realize the goals of assessing a partners' investment potential, testing their own attractiveness or mate value, gaining the opportunity to acquire higher investment, and acquiring superior genes (Buss and Schmitt 1993; Haselton and Buss 2001). However, women using short-term mating to achieve a long-term relationship may not have as positive an experience, especially if/when that goal is not realized (though see Timmermans and Courtois (2018) for data on casual sex leading to committed relationships in the social media age). Men's emotions are more likely to motivate them to engage in low-cost sex with a variety of women when the opportunities present themselves and, as a result, to be less concerned about long-term intentions (Salmon and Symons 2001), though men are not exclusively short-term focused.

The Impact of Early Environment on Casual Sex Behavior

An additional factor that may influence the effects of casual sex is early environmental cues of relationship instability (e.g., father absence while growing up). Psychosocial acceleration theory (Ellis et al. 2012; James et al. 2012) suggests that stressful childhood environments can result in accelerated puberty and increased adult promiscuity for females. Consistent with this theory, a number of studies have reported that for girls, earlier puberty, earlier sexual activity, and early pregnancy are all associated with father absence (Boothroyd et al. 2013; Gaydosh et al. 2018; Kanazawa 2001; Maestripieri et al. 2004). Some studies have also reported that a lack of investment or involvement from fathers is associated with similar effects in boys (Bogaert 2005; Sheppard and Sear 2011), though the developmental timing of when father absence occurs has been found to differentially affect boys and girls in terms of their sexual behavior (Hehman and Salmon 2019). These results suggest that father absence may affect the sexual behavior of males and females and by influencing their sexual strategies may modify their positive or negative responses to engaging in casual sex.

It is important to note that recent work has suggested genetic confounding, not necessarily early environmental experiences, may explain the link between father absence and pubertal timing as well as sexual behavior (Barbaro et al. 2017). Specifically, Barbaro and others (Barbaro et al. 2017) posit that gene/environment correlations have led to spurious correlations between father absence and females' age at menarche and first birth. This work, however, was based on mathematical modeling versus actual genetic data. Gaydosh et al. (2018) recently tested the genetic confounding hypothesis using molecular genetic data and found that father absence and polygenic scores each contributed to explaining unique variance in female reproductive timing. That is, there was no evidence to support the genetic confounding hypothesis regarding the spurious effect of father absence on females' sexual maturity and behavior. These findings suggest that (at least for females) father absence, as an index of early environmental stress and instability, independently explains variance in sexual behaviors beyond genetic inheritance. The current study investigated whether father absence, as an early environmental marker of relationship instability, also predicts negative emotional reactions to casual sex.

The Current Studies

We conducted two studies to replicate and extend previous research on sex differences in negative emotional reactions to casual sexual behavior. If negative emotional reactions to casual sexual behavior are part of an emotional regulation system designed to encourage women to seek out a long-term mate who is willing/able to invest in her and her potential offspring, then we would expect women to report greater negative emotional reactions with increasing casual sexual behavior. No such effect, however, would be expected for men. Therefore, in addition to replicating previously documented sex differences in negative emotional reactions following casual sexual behavior, study 1 was designed to extend those findings and investigate whether (i) an interaction exists between sex and casual sexual behavior (i.e., whether females' negative emotion reactions increase with greater casual sexual experiences, whereas males' negative emotion reactions do not), and (ii) different childhood experiences as well as motivation for engaging in casual sex moderate negative emotional reactions to casual sexual behavior (extension of Salmon et al. 2016). Cues to relationship stability in early childhood may influence how individuals' react to casual sexual experiences. Individuals whose childhood experiences signaled relationship stability may experience increasing negative emotional reactions to casual sex as those encounters increase. However, for individuals whose childhood experiences signaled relationship instability, negative emotional reactions may not increase as a

function of casual sex encounters. The underlying motivation for engaging in casual sexual behavior should also moderate how individuals react to those experiences. An individual engaging in casual sex with the hope the encounter may turn into a long-term committed relationship should experience more negative emotional reactions to casual sex the longer that strategy is unsuccessful (i.e., having more casual sex without those encounters becoming committed relationships) relative to an individual who is engaging in casual sex purely for the experience and/or pleasure. Since most of the research on this topic has been conducted with college undergraduates and/or young adults only, the purpose of study 2 was to investigate whether the effects under investigation in study 1 extend to a community sample with more age diversity (i.e., rather than a typical college undergraduate sample). Specifically, study 2 investigated whether the sex differences in negative emotional reactions (and potential moderators of those reactions) influence individuals beyond young adulthood. Therefore, both studies were based on the general hypothesis that there are sex differences in reactions to (and motivations for) engaging in casual sex. Furthermore, reactions to casual sex are expected to be moderated by childhood cues to relationship stability as well as individuals' motivations for engaging in short-term casual sexual behavior. The specific predictions tested in study 1 and study 2 were as follows:

Prediction 1: Although females will have more negative emotional reactions to casual sex than males, females' negative reactions will increase as casual sexual behavior increases whereas males' negative reactions will not increase. Specifically, there is an interaction between sex and casual sexual behavior on negative emotional reactions following casual sexual encounters.

Prediction 2: Individuals who grew up with their biological father present in their lives (signaling relationship stability) will experience increasing negative emotional reactions with more casual sex experiences, whereas those who grew up with their biological father absent (signaling relationship instability) would not experience increasing negative emotions. This would be expected if negative emotional reactions to casual sex are moderated by individuals' childhood experiences of relationship stability (indexed by father absence).

Prediction 3: Individuals who report engaging in casual sexual behavior with long-term relationship goals will report more negative emotional reactions with increasing casual sex encounters, whereas those who do not report long-term motivations will not experience increasing negative reactions as a function of number of casual sex partners. This would be expected if negative emotional reactions to casual sexual behavior are moderated by motivations underlying the behavior.

Method

Study 1

Participants

Participants included 165 undergraduate students (103 females, 62 males) who were recruited from psychology courses at a private university in the southwestern USA and completed an online survey for course credit. Participants' ages ranged from 17 to 22 ($M = 19.04$, $SD = 1.15$). Approximately 59% of participants self-reported their ethnicity as being Caucasian, 13% Hispanic, 10% Asian, 5% Latina/o, 4% African American, 2% Middle Eastern, 1% Native American, 1% South Asian, and 6% "other." Approximately 85% of participants self-reported being heterosexual, 10% bisexual, 3% gay/lesbian, and 2% "other."

Measures

Demographics Participants were asked to self-report their age, sex, and ethnicity. In order to obtain a continuous measure of father absence, family composition was measured consistent with the method utilized in Salmon et al. (2016). Participants were asked to indicate who (and at what ages) they lived with each of the following people as they were growing up: biological mother and/or father, adoptive mother and/or father, stepmother and/or stepfather, and/or extended family (e.g., aunt/uncle, grandparents). Using the ages at which participants reported living with their biological father, we computed a score for how long each participant lived with their biological father during their childhood. A score of 0 would indicate complete father absence for that participant, while a score of 18 would indicate complete father presence.

Sexual Behavior We used two questions from the revised Sociosexuality Inventory (Penke and Asendorpf 2008) to measure casual sexual behavior: "With how many different partners have you had sexual intercourse *on one and only one* occasion?" "With how many different partners have you had sexual intercourse without having an interest in a long-term committed relationship with this person?" These questions have nine possible response options ranging from "0" to "20 or more." Scores were created by summing the responses to these questions for a possible range of scores from 0 to 18, with higher scores indicating more casual sexual behavior.

Emotional Reactions Emotional reactions to casual sexual behavior were measured with three questions previously utilized in Salmon et al. (2016), Townsend and

Wasserman (2011), and Townsend et al. (2015). Using a 9-point Likert scale (1 = strongly disagree, 9 = strongly agree), participants were asked to indicate their level of agreement with the following statements: (1) “Whenever I have sex with someone, I wonder if sex was all he/she was after,” (2) “If I have sex with someone I don’t really know, I feel vulnerable afterwards,” and (3) “If I have sex with someone I don’t really know, I would at least like to know he/she cares.” Higher scores on these questions indicate (1) more wonder (or worry) about their partners’ intentions, (2) greater feelings of vulnerability following casual sex experiences, and (3) greater concern over whether their casual sex partners care for them.

Motivation To assess possible long-term motivation for engaging in casual sexual behavior, participants were asked to consider their casual sexual experiences and indicate on a 7-point scale how many of those experiences they were “hoping would lead to a long-term relationship” where 1 indicated “none” and 7 indicated “all.”

Procedure

Participants were sent a link to complete an online survey. Participants first responded to the demographic questions, followed by the sexual behavior questions, the emotional reaction questions, and the motivation question. After completion of the survey, participants were compensated for their time.

All procedures and measures were approved by the IRB. Participants gave informed consent before participating in the study, and no deception was used. Parental consent was also received for participants under the age of 18.

Study 2

Participants

Participants included 123 adults (39 females, 84 males) who were recruited from Amazon Mechanical Turk (M-Turk) and received \$2 (USD) in compensation for completing an online survey. Participants’ ages ranged from 20 to 62 ($M = 32.70$, $SD = 8.67$). Approximately 74% of participants self-reported their ethnicity as being Caucasian, 10% Asian, 8% Hispanic, 5% African American, 2% Latina/o, and 2% “other.” Approximately 89% of participants self-reported being heterosexual, 5% bisexual, 6% gay/lesbian, and less than 1% “other.”

The measures and procedure used in study 2 were the same as those used in study 1.

Results

Study 1

The means (and standard deviations) for age until which the respondent lived with his/her biological father, number of casual sexual partners, emotional reaction questions (worry, vulnerability, and wondering if their casual sex partner cares for them), and motivation question (using short-term casual sex as a strategy to obtain a long-term committed relationship) as a function of sex of respondent appear in Table 1. Inspection of the independent samples *t* tests reported in the table indicates that there was no significant difference between males and females with regard to how long they lived with their biological father or in the motivation of engaging in casual sex with the hope that it will become a long-term relationship. Females, however, did report significantly fewer casual sex partners than males as well as significantly more wonder about their partners’ intentions, more vulnerability following casual sex experiences, and more worry over whether their casual sex partner cares for them.

A hierarchical linear regression was used to test the three predictions for negative emotional reactions to casual sexual behavior. The control variables of age, sex, and length of time the respondent lived with their biological father were entered in step 1; the main effects of motivation and number of casual sexual partners were entered in step 2; and the predicted two-way interactions between sex of respondent and number of casual sexual partners, motivation and casual sexual behavior, and number of years lived with biological father and casual sexual behavior were entered in step 3. Results from this analysis are summarized in Table 2.

In step 1, respondents’ age, sex, and the number of years the respondent lived with their biological father explained approximately 16% of the variance in negative emotional reactions to casual sex experiences, $F(3, 151) = 9.76$, $p < .001$. Inspection of the standardized regression coefficients (β s) indicates that, whereas age of respondent was not a significant predictor, sex of respondent and years the respondent lived with their biological father were significant unique predictors of negative emotional reactions to casual sex. The main effect of sex indicates that males have significantly less negative emotional reactions to casual sex than females. The main effect of years the respondent lived with their biological father indicates that individuals who lived longer with their biological father while growing up experienced significantly less negative emotional reactions to casual sex.

In step 2, motivation for engaging in casual sex and number of casual sex partners explained an additional 3% of the variance in negative emotional reactions to casual sex, $F(2, 149) = 2.85$, $p = .05$. Inspection of the standardized regression coefficients (β s) indicates that, although number of casual sexual partners was not a significant predictor, motivation

Table 1 Means (and standard deviations) for age until which the respondent lived with his/her biological father, number of sexual partners in the last 12 months, number of one night stands, number of casual sex

partners, worry, vulnerability, and wondering if the sex partner cares for them as a function of respondents' sex and sample

Measure	Undergraduate sample		Community sample	
	Males Mean (SD)	Females Mean (SD)	Males Mean (SD)	Females Mean (SD)
Age until which the respondent lived with his/her biological father ^a	16.18 (6.27)	15.49 (6.47)	17.40 (9.57)	14.00 (9.11)
Number of casual sex partners	2.53 (1.84)	1.75** (1.37)	3.18 (2.22)	2.90 (2.02)
“Whenever I have sex with someone, I wonder if sex was all he/she was after.” ^b	3.85 (2.11)	5.10** (2.60)	2.90 (2.08)	3.00 (2.32)
“If I have sex with someone I feel vulnerable afterwards.” ^b	3.55 (2.01)	5.48*** (2.87)	3.20 (2.09)	4.82** (2.93)
“If I have sex with someone I don't really know, I would at least like to know he/she cares.” ^b	4.39 (2.24)	6.08*** (2.71)	4.55 (2.40)	5.87** (2.54)
Motivation (“hoping it would lead to a long-term relationship”) ^c	2.33 (1.51)	2.77 (2.00)	3.30 (1.81)	3.21 (2.05)

^a The range of both males' and females' responses on this variable was from 0 to 18 years, indicating there was a full range of responses from complete father absence to complete father presence. ^b These questions were asked on a 9-point Likert scale with 1 indicating agree strongly and 9 indicating strongly disagree. ^c This question was asked on a 7-point Likert scale with 1 indicating for none of their casual sex partners and 7 indicating for all of their casual sex partners. Independent samples *t* tests were used to test for sex differences within each sample. ***p* < .01. ****p* < .001

for engaging in casual sex was a significant unique predictor of negative emotional reactions to casual sex. The main effect of motivation indicates that as motivation for engaging in casual behavior in the hopes that it will be a long-term relationship increases, negative emotional reactions to casual sex also increase.

In step 3, the addition of the three interaction terms explained an additional 5% of the variance in negative emotional reactions to casual sex, $F(3, 146) = 2.77, p = .05$. Inspection of the standardized regression coefficients (β s) indicates that the only significant predictor in this step was the interaction

between sex of respondent and number of casual sex partners. As can be seen in Fig. 1, females' negative emotional reactions decrease as number of casual sex partners increase, whereas males' negative emotional reactions increase as number of casual sex partners increase. The two-way interactions between “years lived with biological father and number of casual sex partners” and between “motivation and number of casual sex partners” did not explain unique variance in negative emotional reactions to casual sex.

Overall, approximately 24% of the variance in negative emotional reactions to casual sex was explained by the model,

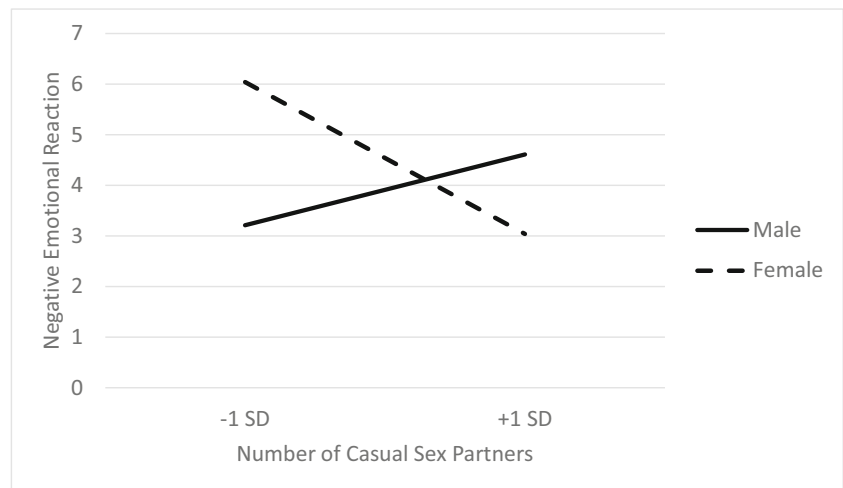
Table 2 Hierarchical regression analysis predicting negative emotional reactions as a function of respondent age, sex, number of years the respondent lived with his/her biological father, motivation, number of

casual sex partners, and interactions between number of casual sex partners (CS partners) with sex of respondent, motivation, and number of years lived with biological father for undergraduate sample (study 1)

Step	Variable	<i>B</i>	<i>SE (B)</i>	β	<i>sr</i>	<i>sr</i> ²	ΔR^2
Step 1	Age of respondent	.09	.09	.08	.075	.006	.16***
	Sex of respondent ^a	-1.95	.43	-.35***	-.342	.117	
	Years lived with Bio Dad	-.08	.03	-.19**	-.194	.038	
Step 2	Motivation	.26	.12	.17*	.167	.028	.03*
	CS partners	-.04	.08	-.04	-.038	.001	
Step 3	Sex × CS partners	.41	.16	.50**	.186	.034	.05*
	Motivation × CS partners	.08	.05	.26	.102	.010	
	Bio Dad × CS partners	-.02	.01	-.30	-.123	.015	

^a Coded as 0 = female, 1 = male; **p* < .05, ***p* < .01, ****p* < .001

Fig. 1 Interaction between sex of respondent and number of casual sex partners on negative emotional reactions to casual sex for college undergraduates (study 1)



$F(8, 146) = 5.61, p < .001, R^2 = .235$. Inspection of the semi-partial correlation coefficients (sr^2) indicates that, controlling for all other variables in the model, sex of respondent by itself explained approximately 11.7% of unique variance in negative emotional reactions to casual sexual behavior; number of years lived with biological father explained approximately 3.8% of unique variance; motivation explained approximately 2.8% of unique variance; and the interaction between sex of respondent and number of casual sex partners explained approximately 3.4% of unique variance.

Study 2

The means (and standard deviations) for age until which the respondent lived with his/her biological father, number of casual sexual partners, emotional reaction questions (worry, vulnerability, and wondering if their casual sex partner cares for them), and motivation question (using short-term casual sex as a strategy to obtain a long-term committed relationship) as a function of sex of respondent appear in Table 1. Inspection of the independent samples t tests reported in the table indicates that there was no significant difference between males and females with regard to how long they lived with their biological father, number of casual sex partners, wonder about partners' intentions, or in the motivation of engaging in casual sex with the hope that it will become a long-term relationship. Females, however, did report significantly more vulnerability following casual sex experiences as well as significantly more worry whether their casual sex partner cares for them compared with males.

A hierarchical linear regression analysis was used to test the three predictions for negative emotional reactions to casual sexual behavior for the community sample. The variables were entered into the model following the same procedure used in study 1 (i.e., control variables entered in step 1, main effects entered in step 2, and the predicted two-way

interactions entered in step 3). Results from this analysis are summarized in Table 3.

In step 1, respondents' age, sex, and the number of years the respondent lived with their biological father explained approximately 9% of the variance in negative emotional reactions to casual sex experiences, $F(3, 118) = 3.98, p = .01$. Inspection of the standardized regression coefficients (β s) indicates that neither age of respondent nor years the respondent lived with their biological father were significant predictors, but sex of respondent was a significant predictor of negative emotional reactions to casual sex. The main effect of sex indicates that males have significantly less negative emotional reactions to casual sex than females.

In step 2, motivation for engaging in casual sex and number of casual sex partners explained an additional 15% of the variance in negative emotional reactions to casual sex, $F(2, 116) = 11.42, p < .001$. Inspection of the standardized regression coefficients (β s) indicates that both motivation for engaging in casual sex and number of casual sexual partners were significant unique predictors of negative emotional reactions to casual sex. The main effect of motivation indicates that as motivation for engaging in casual behavior in the hopes that it will be a long-term relationship increases, negative emotional reactions to casual sex also increase. The main effect of number of casual sex partners indicates that negative emotional reactions to casual sex decrease as the number of casual sex partners increases.

In step 3, the addition of the three interaction terms did not explain any additional variance in negative emotional reactions to casual sex, $F(3, 113) = 1.66, p = .18$.

Overall, approximately 27% of the variance in negative emotional reactions to casual sex was explained by the model, $F(8, 113) = 5.31, p < .001, R^2 = .273$. Inspection of the semi-partial correlation coefficients (sr^2) indicates that, controlling for all other variables in the model, sex of respondent by itself explained approximately 8.3% of unique variance in negative emotional reactions to casual sexual behavior; motivation

Table 3 Hierarchical regression analysis predicting negative emotional reactions as a function of respondent age, sex, number of years the respondent lived with his/her biological father, motivation, number of casual sex partners, and interactions between number of casual sex partners (CS partners) with sex of respondent, motivation, and number of years lived with biological father for community sample (study 2)

Step	Variable	<i>B</i>	<i>SE (B)</i>	β	<i>sr</i>	<i>sr</i> ²	ΔR^2
Step 1	Age of respondent	-.004	.03	-.01	-.012	.000	.09**
	Sex of respondent ^a	-1.64	.50	-.31***	-.288	.083	
	Years lived with Bio Dad	.003	.03	.01	.008	.000	
Step 2	Motivation	.36	.11	.27**	.259	.067	.15***
	CS partners	-.26	.10	-.22**	-.210	.044	
Step 3	Sex × CS partners	.16	.21	.15	.059	.003	.03
	Motivation × CS partners	.10	.07	.28	.126	.016	
	Bio Dad × CS partners	-.01	.01	-.20	-.078	.006	

^a Coded as 0 = female, 1 = male. * $p < .05$, ** $p < .01$, *** $p < .001$

explained approximately 6.7% of unique variance; and number of casual sex partners explained approximately 4.4% of unique variance.

Discussion

The purpose of the current studies was to replicate and extend previously found sex differences in emotional reactions to engaging in casual sexual behavior by investigating individual differences in motivation as well as early environmental cues of relationship stability as potential moderators of those emotional reactions. As an additional goal, we also investigated whether the sex differences and individual difference measures related to engaging in casual sex extended beyond the typical college undergraduate population. Overall, we found the expected sex differences in casual sexual behavior as well as reactions to that behavior, though there were some differences between the undergraduate sample and the community sample. Consistent with previous studies (Hehman and Salmon 2019; Salmon et al. 2016), in the undergraduate sample, men reported having more casual sex partners than women; though, in the community sample, there was no sex difference in number of casual sex partners. In both samples, we found the expected sex differences with women reporting more concern over their partners' feelings for them and feeling more vulnerable following casual sex than men. Women also reported more concern over their partners' intentions (i.e., wondering whether their casual sex partner was only after sex) than men; however, this sex difference was only found in the undergraduate sample. In the community sample, there was no sex difference in concern over their partners' intentions. This suggests that, although the women in the community sample were not any more concerned about their casual

sexual partners' intentions than the men, the women were still more concerned about their partners' feelings for them and still felt more vulnerable following casual sex than the men. This may imply that with age and experience comes the realization that casual sex is just that—most likely an opportunity to have sex without commitment. Even though women may have come to that realization, they may not have come to its acceptance. That is, even though there was no sex difference in number of casual sexual partners or concern over their partners' intentions, women in the community sample still reported feeling more vulnerable and more concerned over their partners' feelings towards them than the men. This is consistent with an adaptationist and sexual strategies perspective that such emotional reactions were designed to make females more cautious about engaging in sexual relationships with males that are unwilling to invest time, affection, or resources (Buss 1989; Symons 1979). Such emotional reactions would encourage individuals to alter their own behavior or attempt to alter the behavior of others by alerting us to (and reducing) potential interference with our evolved mating goals (Haselton et al. 2005). Future studies should investigate at what age (or life stage) this emotional regulation system comes online and if/how it changes over reproductive life. For example, do females differ in how negative they feel following casual sex as a function of their reproductive value, mate value, and/or life history strategy?

As pointed out in Salmon et al. (2016), the sex difference found in the number of casual sex partners on college campuses could be due to differential perception and/or reporting of those encounters. Specifically, men and women in the undergraduate sample could be reporting the same type of encounter differently as a result of their different goals. That is, due to their motivation and intentions for engaging in the behavior. While the men in that sample may perceive the

encounters as unequivocally casual and/or limited to a single encounter, some of the women may perceive those encounters more ambiguously as less casual and limited. Although we did not find sex differences in self-reported motivation of engaging in casual sex with long-term relationship goals, this is consistent with the sex difference in the concern over their partners' intentions in the undergraduate sample, but not in the community sample. With age and experience, doubt over the partners' intentions decreases (i.e., men and women do not differ in their perception that the encounter may be just about sex), which may lead to more accurate reporting of casual sex encounters. This also would explain the lack of the sex difference found in number of casual sex partners in the community sample.

Beyond Sex Differences in College Students

Negative emotional reactions following casual sex appear to be driven not only by evolved sex differences, but (depending on the sample) also by the number of years individuals lived with their biological father (i.e., a proxy for early environmental cues of relationship stability), the degree to which their casual sex behavior was motivated by long-term relationship goals, and by how many casual sex partners they have. Across both studies, it was found that as long-term relationship goal motivation for engaging in casual sex increased, so did the negative emotional reactions to the experience. This makes sense as long-term motivation would be inconsistent with following a short-term mating strategy; therefore, not very surprising that having long-term relationship goals would lead to negative feelings following casual sexual behavior.

For the undergraduate young adults, individuals' own sex and the number of years they lived with their biological father predicted the most unique variance in feelings of vulnerability and concern over their partners' intentions and feelings. Interestingly, as the cue to relationship stability increased (i.e., the longer individuals lived with their biological father across the first 18 years of life), the negative emotional reactions associated with casual sex decreased. One possible explanation for this finding is that those who grew up with cues of relationship stability are more self-confident (or secure) in their mating relationships, both short term and long term. Therefore, when they make the decision to engage in short-term mating behavior, they are making that decision based on their genuine desire for low-cost sex without commitment. Perhaps those from intact families are okay with that decision because, for them, it represents a temporary mating strategy specific to their current life stage. For many young adults, college is not a life stage where they are focusing on long-term relationships (Garcia and Reiber 2008; Garcia et al. 2012). While the current studies did not find the predicted interaction between numbers of years individuals lived with

their biological father and the number of their casual sex interactions, a follow-up study should investigate whether it is the case that young adults who grow up with their biological father present differ in terms of motivations for engaging in casual sex from those that grow up in father absent homes. Are those from father absent homes more likely engage in casual sex with the hope it will turn into a long-term relationship (i.e., attempting to use sex as tool to obtain long-term relationship) whereas those from father present homes are more likely to just want the experience/pleasure? It is important to point out, however, that the current studies suggest that outside of (and beyond) college, father absence (as a cue to relationship instability) does not predict negative emotional reactions to casual sex. It could be that, at reaching sexual maturity and in the absence of extensive relationship experience one's self, individuals rely more heavily on other cues (e.g., relationship stability of one's parents). However, with age and one's own experience, it is one's own experience that drives reactions to casual sex. For the wider (and more age diverse) community sample, the individual difference factors that together explained the most unique variance in negative reactions to casual sex included being motivated by long-term relationship goals and the number of their casual sex partners. Unexpectedly, within the community sample, having more casual sex partners predicted lower negative reactions to casual sex for both sexes. The pattern of results across the two studies (i.e., different individual difference factors explaining the most variance in reactions) suggests that the factors that influence negative emotional reactions following casual sex may be life stage-specific. In addition to examining these relationships in college students, future studies utilizing more age diverse community samples are necessary to investigate this further.

The predicted interaction between sex of respondent and casual sexual behavior was only found in the undergraduate sample, and not in the expected direction. Rather than females' negative reactions increasing with increasing casual sex partners, we found that the college females' self-reported negative emotional reactions to casual sex decreased as the number of their casual sex experiences increased, whereas the males reported more negative emotional reactions as the number of their casual sex partners increased. If sexual experimentation, especially for females, conflicts with evolved mechanisms to promote successful long-term mate selection (Hamilton and Armstrong 2009; Townsend et al. 2015), it could be that this system downregulates when it is not effective (i.e., a self-protection factor). Specifically, it could be that for females who fail to change their behavior as a function of the emotional feedback loop (i.e., designed to shape their behavior in pursuit of a high investment, long-term relationship), the negative emotions triggered following casual sex experiences lessen over time to protect the women from suffering serious mental health problems such as clinical depression.

Since this interaction was not found for the community sample, it could be that this finding is specific to the college life stage and the extended period of sexual experimentation observed on college campuses (Garcia et al. 2012; Townsend and Wasserman 2011; Townsend et al. 2015). Future research should explore this interaction to see if it holds for other college samples. Future research should also investigate other factors (e.g., measures of overall mental health, use of self-deception and/or self-protection coping strategies, life history strategy) that could account for the observed apparent reversal of sex differences in negative emotional reactions to casual sex with women feeling less negative feelings (and men feeling more) with increased levels of casual sex behavior.

Limitations

The current studies have a few limitations. As with any study in which individuals self-select to participate, there is the possibility that our samples are not representative of young adult college students and/or the community at large in terms of their engagement in (and reactions to) casual sexual behavior. It is also possible that some individuals were influenced by social desirability in providing their answers, despite the anonymity provided by the online survey methodology.

Another limitation involves the retrospective nature of the measures and the possibility of an order effect. Individuals were asked to report their casual sexual behavior, then report their feelings about that behavior, and finally report their motivations for engaging in that behavior. This may have resulted in biased responses, which could explain the lack of sex difference in long-term motivation for engaging in casual sex. That is, while ruminating over their past casual sex experiences, individuals may have protected themselves from negative psychological consequences of their unsuccessful attempts to use casual sex to obtain a long-term mate by using self-deception (i.e., retrospectively revising the way they perceive their motivation going into those encounters; Hrgovic and Hromatko 2018; Trivers 2011).

Other possible limitations include the way relationship stability and motivation were operationalized. The current study used number of years individuals lived with their biological father as a marker of relationship stability. While father absence is one possible factor that may influence evaluations of relationship stability, there are many other factors in one's early environment that possibly contribute to those evaluations. Future research should investigate other possible environmental cues, including measures of the quality of familial relationships, parents' mental health, substance abuse, and levels of conflict within the household.

There are many possible motivating factors that may lead someone to engage in casual sex (e.g., boost to self-esteem, reputational gain, increase in confidence, and sexual

satisfaction). The current study focused on one possible motivation—engaging in casual sex with long-term relationship goals. That specific motivation seems particularly important when considering emotional reactions following casual sex since it would be inconsistent with a short-term mating strategy. The retrospective nature of the measure, however, may call into question the validity of the responses. Campbell (2008) pointed out that women are engaging in casual sex, even though they report the experience as being more negative than positive. Therefore, when entering into the experience, they must have some positive expectations for the encounter that then changes after the experience (Campbell 2008). In future research, it will be important to separate sexual motivations at the time of the experience from the later evaluation of the experience to control for possible rumination and/or memory reconstruction.

It is also important to note that life stage effects are confounded with cohort effects. This is a limitation of the methodology as those two effects are always entwined in cross-sectional studies. In order to tease the two apart, future research using longitudinal methodology is necessary. Those longitudinal studies should also assess the role of relationship status on individuals' casual sex behavior and their reactions. It is likely that relationship status would be more relevant for community samples as most traditional age undergraduate college students are not yet in long-term committed relationships (e.g., marriage). Previous research suggests that individuals who engage in extra-pair copulations report feeling more negative, though not less positive, about their casual sex experiences than those that were single at the time (Campbell 2008). Those in relationships also reported greater sexual satisfaction from those encounters than did the singles. It would be interesting to see how feelings of positivity, negativity, and sexual satisfaction regarding casual sex fluctuate across the life span as a function of individuals' age as well as their relationship status.

Conclusions

Negative psychological consequences of casual sex have typically been investigated in college students, focusing primarily on sex differences between men and women in their reactions. Findings from the current studies suggest that beyond sex differences, factors such as early environmental cues of relationship instability, individuals' motivation for engaging in casual sex, and the number of their casual sex partners contribute to understanding how individuals (male or female) respond to their casual sex experiences. The addition of a community sample in the current studies demonstrated sex differences in feelings of vulnerability and concern over their casual sex partners' feelings extend beyond the typical college population. Sex differences in the number of casual sex

partners and concern about partners' intentions, however, do not. Findings from the current studies also suggest that, in college and beyond, there are no sex differences in self-reported motivation of engaging in casual sex with long-term relationship goals. Furthermore, factors (beyond evolved sex differences) that influenced negative emotional reactions following casual sex appear to be life stage-specific. For college students, negative emotional reactions were being driven mainly by their early experiences of relationship instability as well as an interaction between casual sex experiences and their sex. Outside of and beyond college, however, those early experiences of relationship instability did not predict negative emotional reactions to casual sex. Rather, those reactions were being driven mainly by engaging in casual sex with long-term relationship goals (i.e., motivation inconsistent with a casual sex mating strategy) and their own experience. Beyond college, it appears that the more casual sex one has, the less negative men and women feel following those experiences. Future studies are necessary to further investigate the life stage-specific effects as well as the possible role of self-deception and other individual difference factors that may help explain additional within sex variability in reactions to casual sex.

Compliance with Ethical Standards

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

References

- Barbaro, N., Boutwell, B. B., Barnes, J. C., & Shackelford, T. K. (2017). Genetic confounding of the relationship between father absence and age at menarche. *Evolution and Human Behavior*, *38*, 357–365.
- Bendixen, M., Asao, K., Wyckoff, J. P., Buss, D. M., & Kennair, L. E. O. (2017). Sexual regret in US and Norway: effects of culture and individual differences in religiosity and mating strategy. *Personality and Individual Differences*, *116*, 246–251.
- Bogaert, A. F. (2005). Age at puberty and father absence in a national probability sample. *Journal of Adolescence*, *28*, 541–546.
- Boothroyd, L. G., Craig, P. S., Crossman, R. J., & Perrett, D. I. (2013). Father absence and age at first birth in a western sample. *American Journal of Human Biology*, *25*, 366–369.
- Buss, D. M. (1989). Conflict between the sexes: strategic interference and the evocation of anger and upset. *Journal of Personality and Social Psychology*, *56*, 735–747.
- Buss, D. M., & Schmitt, D. P. (1993). Sexual strategies theory: an evolutionary perspective on human mating. *Psychological Review*, *100*, 204–232.
- Campbell, A. (2008). The morning after the night before. *Human Nature*, *19*, 157–173.
- Dubé, S., Lavoie, F., Blais, M., & Hébert, M. (2017). Consequences of casual sex relationships and experiences on adolescents' psychological well-being: a prospective study. *The Journal of Sex Research*, *54*, 1006–1017.
- Ellis, B. J., Schlomer, G. L., Tilley, E. H., & Butler, E. A. (2012). Impact of fathers on risky sexual behavior in daughters: a genetically and environmentally controlled sibling study. *Development and Psychopathology*, *24*, 317–332.
- Fielder, R. L., & Carey, M. P. (2010). Predictors and consequences of sexual "hookups" among college students: a short-term prospective study. *Archives of Sexual Behavior*, *39*, 1105–1119.
- Flack, W. F., Daubman, K. A., Caron, M. L., Asadorian, J. A., D'Aureli, N. R., Gigliotti, S. N., Hall, A. T., Kiser, S., & Stine, E. R. (2007). Risk factors and consequences of unwanted sex among university students: hooking up, alcohol, and stress response. *Journal of Interpersonal Violence*, *22*, 139–157.
- Garcia, J. R., & Reiber, C. (2008). Hook-up behavior: a biopsychosocial perspective. *Journal of Social, Evolutionary, and Cultural Psychology*, *2*, 192–208.
- Garcia, J. R., Reiber, C., Massey, S. G., & Merriwether, A. M. (2012). Sexual hookup culture: a review. *Review of General Psychology*, *16*, 161–176.
- Gaydosh, L., Belsky, D. W., Domingue, B. W., Boardman, J. D., & Harris, K. M. (2018). Father absence and accelerated reproductive development in non-Hispanic white women in the United States. *Demography*, *55*(4), 1245–1267.
- Hamilton, L., & Armstrong, E. A. (2009). Gendered sexuality in young adulthood: double binds and flawed options. *Gender & Society*, *23*(5), 589–616.
- Haselton, M. G., & Buss, D. M. (2001). The affective shift hypothesis: the functions of emotional changes following sexual intercourse. *Personal Relationships*, *8*, 357–369.
- Haselton, M. G., Buss, D. M., Oubaid, V., & Angleitner, A. (2005). Sex, lies, and strategic interference: the psychology of deception between the sexes. *Personality and Social Psychology Bulletin*, *31*, 3–23.
- Hehman, J. A., & Salmon, C. A. (2019). Sex-specific developmental effects of father absence on casual sexual behavior and life history strategy. *Evolutionary Psychological Science*, *5*(1), 121–130.
- Hrgovic, J., & Hromatko, I. (2018). Self-deception as a function of social status. *Evolutionary Behavioral Sciences*, *13*(3), 223–234.
- Hughes, S. M., & Kruger, D. J. (2011). Sex differences in post-coital behaviors in long- and short-term mating: an evolutionary perspective. *Journal of Sex Research*, *48*(5), 496–505.
- James, J., Ellis, B. J., Schlomer, G. L., & Garber, J. (2012). Sex-specific pathways to early puberty, sexual debut, and sexual risk taking: tests of an integrated evolutionary–developmental model. *Developmental Psychology*, *48*, 687–702.
- Jonason, P. K., Li, N. P., & Cason, M. J. (2009). The "booty call": a compromise between men's and women's ideal mating strategies. *Journal of Sex Research*, *4*, 460–470.
- Kanazawa, S. (2001). Why father absence might precipitate early menarche: the role of polygyny. *Evolution and Human Behavior*, *22*, 329–334.
- Kennair, L. E. O., Wyckoff, J. P., Asao, K., Buss, D. M., & Bendixen, M. (2018). Why do women regret casual sex more than men do? *Personality and Individual Differences*, *127*, 61–67.
- Kuperberg, A., & Padgett, J. E. (2016). The role of culture in explaining college students' selection into hookups, dates, and long-term romantic relationships. *Journal of Social and Personal Relationships*, *33*, 1070–1096.
- Levin, R. J. (2007). Sexual activity, health, and well-being: the beneficial roles of coitus and masturbation. *Sexual and Relationship Therapy*, *22*, 135–148.
- Lewis, M. A., Granato, H., Blayney, J. A., Lostutter, T. W., & Kilmer, J. R. (2012). Predictors of hooking up sexual behaviors and emotional reactions among US college students. *Archives of Sexual Behavior*, *41*, 1219–1229.
- Maestripieri, D., Roney, J. R., DeBias, N., Durante, K. M., & Spaepen, G. M. (2004). Father absence, menarche and interest in infants among adolescent girls. *Developmental Science*, *7*, 560–566.

- Owen, J., & Fincham, F. D. (2011). Young adults' emotional reactions after hooking up encounters. *Archives of Sexual Behavior*, *40*, 321–330.
- Paul, E. L., & Hayes, K. A. (2002). The casualties of 'casual' sex: a qualitative exploration of the phenomenology of college students' hookups. *Journal of Social and Personal Relationships*, *19*, 639–661.
- 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*, 1113–1135.
- 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 and Social Psychology Bulletin*, *32*, 770–780.
- Salmon, C., & Symons, D. (2001). *Warrior lovers: erotic fiction, evolution and female sexuality*. New Haven: Yale University Press.
- Salmon, C., Townsend, J. M., & Hehman, J. (2016). Casual sex and college students: sex differences and the impact of father absence. *Evolutionary Psychological Science*, *2*, 254–261.
- Schmitt, D. P., & Jonason, P. K. (2019). Self-esteem as an adaptive sociometer of mating success: evaluating evidence of sex-specific psychological design across 10 world regions. *Personality and Individual Differences*, *143*, 13–20.
- Sevi, B., Aral, T., & Eskenazi, T. (2018). Exploring the hook-up app: low sexual disgust and high sociosexuality predict motivation to use Tinder for casual sex. *Personality and Individual Differences*, *133*, 17–20.
- Sheppard, P., & Sear, R. (2011). Father absence predicts age at sexual maturity and reproductive timing in British men. *Biology Letters*. <https://doi.org/10.1098/rsbl.2011.0747>.
- Symons, D. (1979). *The evolution of human sexuality*. New York: Oxford University Press.
- Timmermans, E., & Courtois, C. (2018). From swiping to casual sex and/or committed relationships: exploring the experiences of Tinder users. *The Information Society*, *34*, 59–70.
- Townsend, J. M., & Wasserman, T. H. (2011). Sexual hookups among college students: sex differences in emotional reactions. *Archives of Sexual Behavior*, *40*, 1173–1181.
- Townsend, J. M., Wasserman, T. H., & Rosenthal, A. (2015). Gender difference in emotional reactions and sexual coercion in casual sexual relations: an evolutionary perspective. *Personality and Individual Differences*, *85*, 41–49.
- Townsend, J. M., Jonason, P. K., & Wasserman, T. H. (2019). Associations between motives for casual sex, depression, self-esteem, and sexual victimization. *Archives of Sexual Behavior*. Advance online publication, <https://doi.org/10.1007/s10508-019-01482-3>.
- Trivers, R. L. (1972). Parental investment and sexual selection. In B. Campbell (Ed.), *Sexual selection and the descent of man: 1871–1971* (pp. 136–179). Chicago: Aldine.
- Trivers, R. (2011). *The folly of fools: the logic of deceit and self-deception in human life*. Arizona: Basic Books.
- Vrangalova, Z. (2015). Does casual sex harm college students' well-being? A longitudinal investigation of the role of motivation. *Archives of Sexual Behavior*, *44*, 945–959.
- Woerner, J., & Abbey, A. (2017). Positive feelings after casual sex: the role of gender and traditional gender-role beliefs. *The Journal of Sex Research*, *54*, 717–727.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.