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Partner Choice, Relationship Satisfaction, and Oral Contraception:

The Congruency Hypothesis

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Abstract

Hormonal fluctuation across the menstrual cycle explains temporal variation in women's judgment of the attractiveness of members of the opposite sex. Use of hormonal contraceptives could therefore influence both initial partner choice and, if contraceptive use subsequently changes, intrapair dynamics. Associations between hormonal contraceptive use and relationship satisfaction may thus be best understood by considering whether current use is congruent with use when relationships formed, rather than by considering current use alone. In the study reported here, we tested this congruency hypothesis in a survey of 365 couples. Controlling for potential confounds (including relationship duration, age, parenthood, and income), we found that congruency in current and previous hormonal contraceptive use, but not current use alone, predicted women's sexual satisfaction with their partners. Congruency was not associated with women's nonsexual satisfaction or with the satisfaction of their male partners. Our results provide empirical support for the congruency hypothesis and suggest that women's sexual satisfaction is influenced by changes in partner preference associated with change in hormonal contraceptive use.

Keywords

menstrual cycle, mate choice, romantic relationships, sexual desire, hormonal contraception, major histocompatibility complex, MHC, masculinity

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Psychological processes that shape the formation and maintenance of human romantic relationships are influenced by variation in hormonal levels. For example, women's assessments of the attractiveness of members of the opposite sex are sensitive to hormonal fluctuation across the menstrual cycle (for reviews, see Gangestad & Thornhill, 2008; Jones et al., 2008; Roberts & Little, 2008). The use of exogenous hormones, such as those contained within combined oral

contraceptives (OCs), might therefore alter women's mate preferences because they disrupt typical levels of, and cyclical variation in, sex-steroid and other hormones (Alvergne & Lummaa, 2010; Jones et al., 2005; Puts, 2006; Roberts, Gosling, Carter, & Petrie, 2008; Wedekind, Seebeck, Bettens, & Paepke, 1995).

Prospective tests have shown that initiating OC use alters women's partner preferences, at least for odor cues of genetic dissimilarity (Roberts et al., 2008) and for facial masculinity (Little, Burriss, Petrie, Jones, & Roberts, 2013). OC use could therefore potentially influence both a woman's initial partner choice (if she uses OCs during relationship formation) and changes in her subsequent satisfaction with that choice (if she subsequently discontinues or initiates OC use; Roberts et al., 2012). Furthermore, because women's attractiveness to men also varies with menstrual cycle phase and OC use (Cobey, Buunk, Pollet, Klipping, & Roberts, 2013; Haselton & Gildersleeve, 2011; Havlíček, Dvorakova, Bartos, & Flegr, 2006; Kuukasjärvi et al., 2004; Puts et al., 2013), men's relationship satisfaction might also be influenced by changes in their partners' OC use.

Although the influence of menstrual cycle phase or OC use on attractiveness assessments is well documented and can be measured relatively easily in the laboratory, the extent to which OC use plays a role in shaping relationship satisfaction in actual relationships has hardly been explored, and tests of this influence are more challenging to design. However, one solution is to test the prediction that levels of satisfaction in romantic relationships are associated with congruency in OC use or nonuse across time. If OC use has an influence beyond the laboratory, we would expect more positive assessments of relationship satisfaction in women (and their partners) whose current OC use or nonuse matches their previous OC use (or nonuse) at the time of relationship formation, and particularly for sexual aspects of relationship satisfaction, because these are more directly related to women's assessments of attractiveness than nonsexual satisfaction (Roberts, Cobey, Klapilová, & Havlíček, 2013; Roberts et al., 2012).

In the current study, we directly tested the congruency hypothesis in a large sample of established couples. Both partners in each couple assessed their relationship satisfaction independently, and the women provided information about both their current and their previous OC use. The study design has three notable features.

First, it allowed us to compare the power of women's OC use during partner choice, current OC use, and the congruency between OC use at these two critical times to predict aspects of current relationship satisfaction. On the basis of the congruency hypothesis (Roberts et al., 2013), we predicted that the last of these three variables would best explain variation in women's sexual satisfaction, but that it would not directly affect their nonsexual satisfaction. Second, the design allowed us to compare differences in relative satisfaction associated with different routes to congruency in OC use. That is, in addition to testing effects of congruency per se, we could compare women who were using OCs when they met their partners and who remained users with women who were not using OCs when they met their partners and who remained nonusers. Finally, because we collected data from both the male and the female partner in each couple, we could compare how congruency in OC use affected women's and men's relationship assessments. If effects were driven by changes in women's partner preferences rather than by changes in women's attractiveness to men, we would expect congruency-associated effects to be limited to women or at least to be more evident in female than in male partners.

Method

Participants

We recruited 427 heterosexual couples from visitors to the Glasgow Science Centre, a public science exhibition venue. Of these, 62 couples were excluded because the women did not provide complete information about their current or previous use of hormonal contraception (i.e., when their relationships began; 16 couples), were currently pregnant or suspected that they were (8 couples), or had undergone a hysterectomy (3 couples), or because one or both partners declined to answer questions on sexual satisfaction (35 couples).

For the remaining 365 couples (women: mean age = 34.1 years, *SD* = 9.9; men: mean age = 36.1 years, *SD* = 10.5), we coded women's responses about their previous and current contraceptive use into three categories: (a) nonusers of hormonal methods (couples using no contraception, couples using condoms or other barrier methods, and couples relying on surgical sterilization), (b) users of combined OCs, and (c) users of other hormonal methods (couples using progestogen-only pills; hormonal intrauterine devices; implants; or injections). Women who used both a hormonal and a nonhormonal method were coded as using a hormonal method. Sample sizes in each category are given in Table 1. Over several weekends at the Glasgow Science Centre, we aimed to collect data from approximately 150 couples who met while the woman was using OCs and 150 couples who met while the woman was using no hormonal contraception. We stopped data collection at the end of the weekend during which we reached these targets.

Table 1. Number of Sampled Couples According to the Woman's Contraceptive Method When the Couple Met and The Couple's Current Method

Contraceptive method when the couple met	Current contraceptive method			Total
	No hormonal contraceptive	Combined oral contraceptive	Other hormonal contraceptive	
No hormonal contraceptive	**112**	19	16	147
Combined oral contraceptive	111	**47**	35	193
Other hormonal contraceptive	4	3	**18**	25
Total	227	69	69	365

Note: Numbers in boldface indicate those couples whose previous and current contraceptive use were congruent (*n* = 177; noncongruent use: *n* = 188).

Procedure

Participants were invited to take part in a study about relationship experiences. After providing informed consent, couples were assigned a code number, and each partner completed a sex-specific questionnaire. To ensure confidentiality and to facilitate honest responses, we told partners beforehand that they would complete the questionnaires separately, and that the completed questionnaires should be folded and dropped into a sealed ballot box. Questionnaires

for women contained items about both previous and current contraceptive use (e.g., “When you began your relationship with your current partner, which forms of contraceptive methods did you use?”) and current pregnancy.

For men and women, we scored both sexual and nonsexual relationship satisfaction. The two items that targeted sexual satisfaction (“How satisfied are you with your partner’s sexual adventurousness?” and “How satisfied are you with your partner’s ability to arouse you sexually?”) were based on those in the study by Garver-Apgar, Gangestad, Thornhill, Miller, and Olp (2006), as were the two items that targeted nonsexual satisfaction (“How satisfied are you with your partner’s financial provision/intelligence?”). In both cases, responses to the two items were averaged to create a composite score. Although other items were potentially available from this study, we chose only four, because the venue at which data collection took place was suited only to a brief survey. The two items targeting sexual satisfaction were key in the study by Garver-Apgar et al., and responses to them differed significantly between OC users and nonusers in our own previous work (Roberts et al., 2012); in the current sample, responses to the two items were highly correlated, $r(360) = .741$, $p < .0001$. Responses to the two items targeting nonsexual satisfaction were the ones that differed most between OC users and nonusers in our previous study. In the current sample, responses to the nonsexual items were also positively correlated, $r(359) = .474$, $p < .0001$.

To control for other potential influences on relationship satisfaction, we also included items on current income (using a scale from 0 to 9, where 0 = *no income*, 1 = < *£20,000*, 2 = *£20,001–29,999*, and so forth up to 9 = *£90,000 or more*; scores were summed within couples for an estimate of household income), relationship duration (in years and months, converted to months), and whether couples had any children together. Occasional nonreporting of these control variables slightly reduced sample sizes in some analyses. The University of Stirling Ethics Committee approved the study.

Results

Contraceptive congruency

We first tested whether relationship satisfaction was influenced by congruency in use or nonuse of hormonal contraception—that is, whether a woman’s current contraceptive method (as categorized in Table 1) matched ($n = 177$) or did not match ($n = 188$) her previously used method. For the two measures of relationship satisfaction, we constructed generalized linear models with congruency as a between-subjects factor. We found a significant effect of congruency on women’s sexual satisfaction, $F(1, 363) = 6.54$, $p = .011$, $\eta_p^2 = .018$, but no significant effects of congruency on women’s nonsexual satisfaction ($p = .871$) or on either satisfaction score of their male partners (ps = .341 and .572, respectively; Fig. 1). Thus, the congruency effect is specific to sexual satisfaction scores and is restricted to women. Within-group comparisons were consistent with this interpretation: Women’s sexual satisfaction scores were significantly lower than their nonsexual satisfaction scores in the noncongruent group, paired $t(187) = –3.94$, $p < .001$, whereas there was no difference between the two satisfaction scores in the congruent group, $t(176) = –0.39$, $p = .697$.

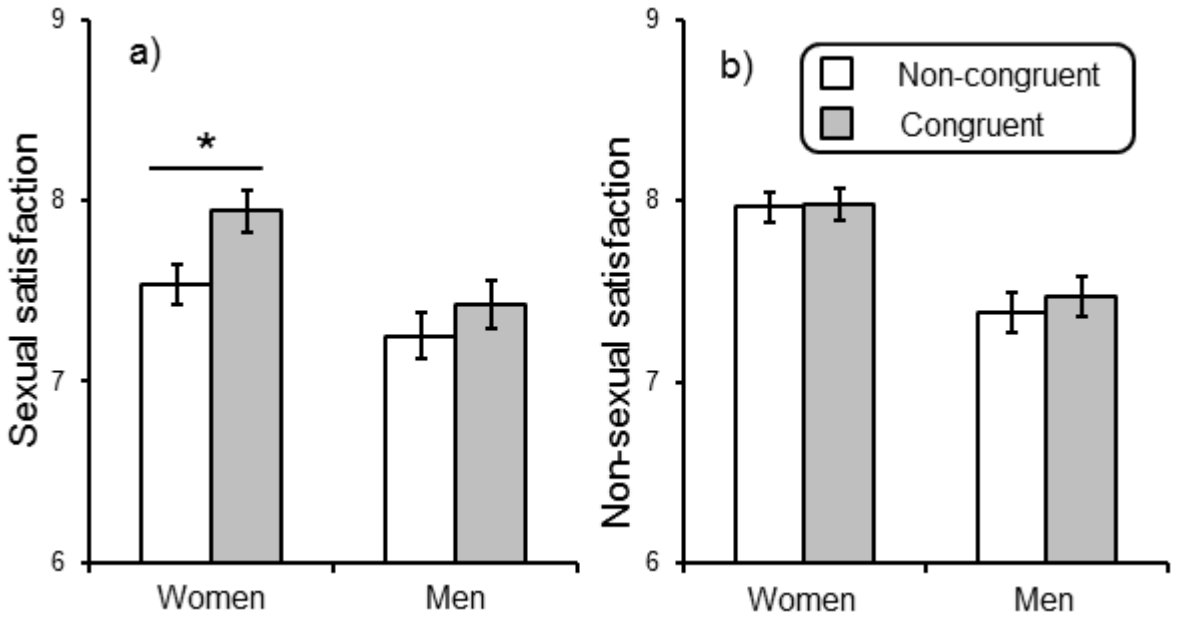

Fig. 1. Sexual satisfaction score (a) and nonsexual satisfaction score (b) as a function of gender and congruency in use or nonuse of hormonal contraception. Error bars indicate ± 1 *SE*.

In contrast, men's sexual satisfaction scores did not differ significantly from their nonsexual satisfaction scores in either the noncongruent group, $t(187) = -0.99$, $p = .320$, or the congruent group, $t(176) = -0.33$, $p = .740$. Furthermore, although women in the congruent group reported higher sexual satisfaction scores than men in that group, $t(176) = 3.60$, $p < .001$, this difference was not significant in the noncongruent group, $t(187) = 1.82$, $p = .070$. Finally, women's scores on nonsexual satisfaction were higher than men's in both the noncongruent group, $t(187) = 4.11$, $p < .001$, and the congruent group, $t(176) = 3.60$, $p < .001$.

To examine these effects further, controlling for other potential influences on satisfaction, we reran the models for sexual and nonsexual satisfaction including one control factor (presence or absence of children) and several covariates (relationship duration, family income, and age). Sexual satisfaction scores were included as a covariate in the model predicting nonsexual satisfaction, and vice versa (cf. Roberts et al., 2012). We again found a significant main effect of congruency for women's sexual satisfaction scores, $F(1, 335) = 4.02$, $p = .046$, $\eta_p^2 = .012$; higher scores were reported by women whose previous and current contraceptive use was congruent rather than noncongruent (for full results of the models, see Table S1 in the Supplemental Material available online). However, there was no significant effect of congruency on women's nonsexual satisfaction. Furthermore, congruency did not have a significant effect on men's scores for either sexual or nonsexual satisfaction, even though sexual satisfaction scores within couples were positively correlated, $r(365) = .237$, $p < .0001$ (see Table S1 in the Supplemental Material available online). In addition, there was higher sexual satisfaction among women who were in newer relationships ($p = .024$), who reported higher nonsexual satisfaction ($p < .001$), and who were younger (although not significantly; $p = .069$).

Routes to congruency and noncongruency

Next, we explored the different routes to congruency or noncongruency. For the two measures of relationship satisfaction, we ran generalized linear models with two candidate between-subjects factors (previous OC use, current OC use) and the same control variables as in the previous analyses. In these analyses, we excluded users of non-OC hormonal contraception and their partners, because so few women used such methods that we were unable to investigate directional changes in their use. This left 159 women whose previous use and current use were congruent, and 130 whose previous use and current use were noncongruent (Table 1). The congruency hypothesis predicts a significant interaction between previous and current OC use and higher satisfaction scores for respondents whose OC use is congruent than for those whose use is noncongruent.

There was no significant main effect of current OC use, $F(1, 261) = 0.01$, $p = .932$, or of previous OC use, $F(1, 261) = 0.43$, $p = .515$, on women's sexual satisfaction. However, as predicted by the congruency hypothesis, the interaction between previous and current OC use had a significant effect on women's sexual satisfaction with their partners, $F(1, 261) = 4.58$, $p = .033$, $\eta_p^2 = .017$. Women whose OC use was congruent reported higher sexual satisfaction with their partners than did women whose use was noncongruent). Figure 2a illustrates this interaction and shows that although noncongruency via either route was associated with lower sexual satisfaction scores, the difference was greater among women who were using OCs when they met their partners than among those who were not. This pattern was confirmed by post hoc independent-samples *t* tests. The congruency effect was significant in women who had met their partners while using OCs, $t(156) = 2.78$, $p = .007$, such that those who were current OC users reported higher scores than did those who had discontinued their use. In contrast, among women who were not using OCs when they met their partners, there was no significant difference in sexual satisfaction between those who were still nonusers and those who had started using OCs, $t(129) = 0.203$, $p = .84$. Full results are given in Table S2 in the Supplemental Material.

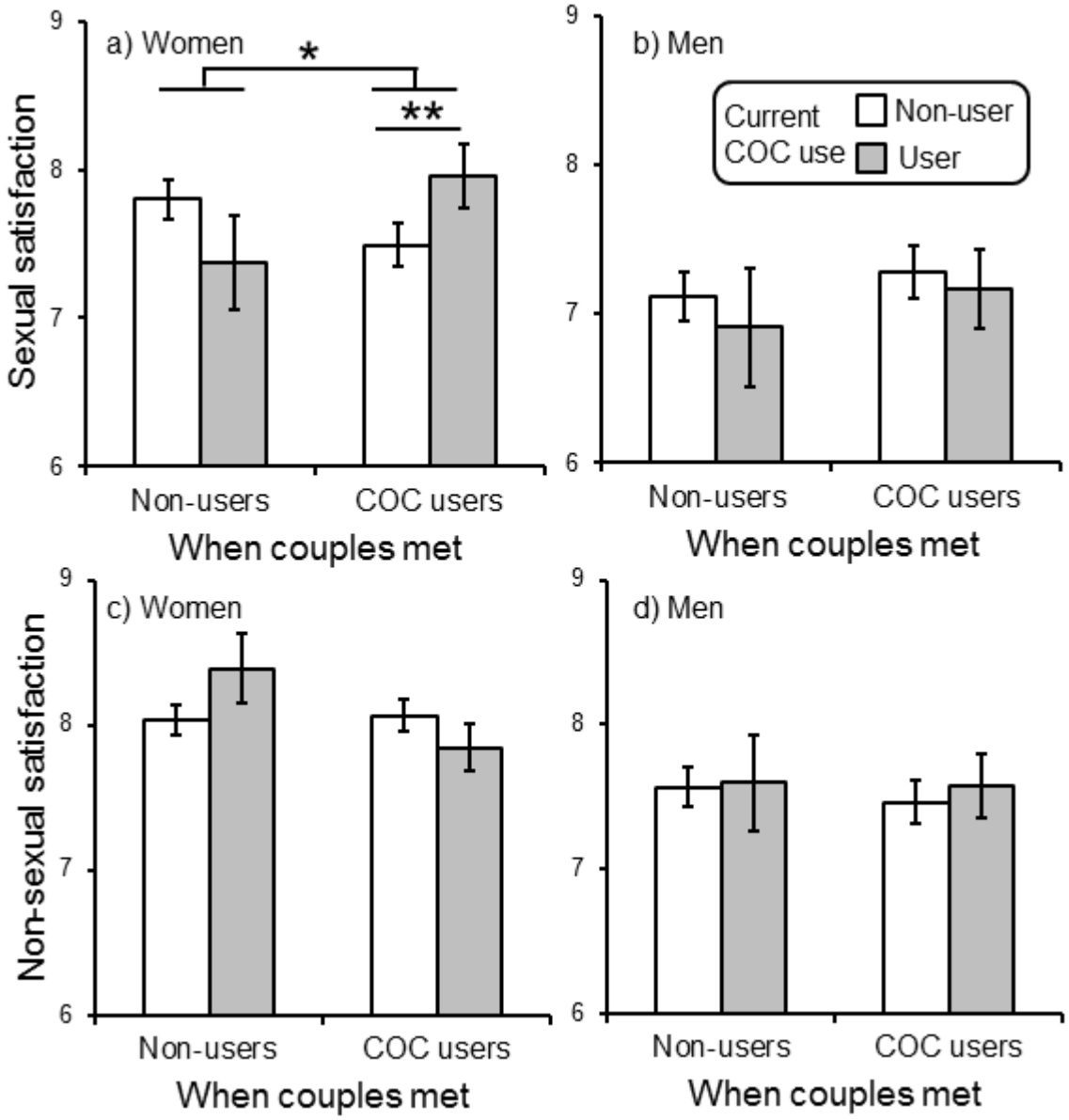

Fig. 2. Sexual satisfaction (a, b) and nonsexual satisfaction (c, d) as a function of women's previous and current use or nonuse of combined oral contraceptives (OCs). Scores are shown for women (a, c) and men (b, d) from the same couples. The graphs present estimated marginal means OC (±1 *SE*).

We found no significant main effects of current or previous OC use and no interaction effect on women's nonsexual satisfaction (Fig. 2c) or on either measure of satisfaction in male partners (Figs. 2b and 2d; full results are in Table S2 in the Supplemental Material).

Finally, we carried out a confirmatory analysis of women's sexual satisfaction without any control variables. This analysis revealed no significant main effects of previous or current OC use but yielded an interaction between previous and current use similar to that found in the full model, $F(1, 285) = 2.74$, $p = .099$. Although this interaction only bordered on statistical

significance, the analysis indicates that the congruency effect was clarified, but not produced, by including these control variables.

Discussion

Our study is the first to compare relationship satisfaction of men and women with regard to current OC use, OC use when the relationship began, and congruency in OC use between these times. Our results indicate that congruency in OC use specifically predicts women's sexual (but not nonsexual) satisfaction with their partners. Furthermore, the effects of OC congruency were evident only in women's satisfaction and not in their male partners' satisfaction. This indicates that the congruency effect on women's sexual satisfaction is likely to be related to changes in women's partner preference when they change their OC use rather than to changes in men's attraction to their partners as a result of changes in their partners' OC use.

Our results are consistent with previous findings indicating that sexual satisfaction was higher among women who used OCs neither OC when they met their partners nor at the time of sampling, compared with women who used OCs when they met their partners but had since discontinued their use of OCs (Roberts et al., 2012). The current study extends these findings to include the alternative route to OC congruency, in which women use OCs at both critical times. The results reveal that although OC congruency (via either route) generally predicts higher sexual satisfaction, sexual dissatisfaction associated with noncongruency is particularly evident in women who met their partners while using OCs. Women who began their relationships using OCs and subsequently discontinued use reported lower satisfaction than did women who used OCs throughout their relationships.

Recent studies indicate that change in OC use influences women's preferences for the odor of genetically dissimilar men (Havlicek & Roberts, 2009; Roberts et al., 2008; Wedekind et al., 1995) and for men's facial masculinity (Little et al., 2013). Such changes could be responsible for the results we observed, either because OC discontinuation leads to realignment of women's preferences to a different baseline state or because it leads to resumption of cyclical changes in preferences and attraction to male partners (Gangestad & Simpson, 2000; Gangestad & Thornhill, 2008; Penton-Voak et al., 1999).

Although we have framed our study in the context of an emerging literature on the influences of hormones on women's partner preferences and potential disruption of these effects by use of hormonal contraception, it is important to note that there are several alternative explanations for our results. For example, a change in use of hormonal contraception might influence women's sexual satisfaction through routes other than their attraction to their partners, such as by influencing other aspects of sexual functioning (e.g., reestablishment of menses, levels of vaginal lubrication). Alternatively, given that our analyses are correlational, noncausal explanations are possible; for example, lower sexual satisfaction may cause, rather than result from, a change in use of hormonal contraception, or another variable (e.g., a change in overall physical health) could influence both sexual satisfaction and use of hormonal contraceptives. Further research is required to test these alternative explanations.

However, what is clear from our results is that studying use (or non-use) of hormonal contraception at the time of relationship formation, as well as subsequent changes in use, may be necessary to reach an understanding of the influence of hormonal contraception on women's relationship satisfaction. Neither previous nor current OC use predicted sexual satisfaction independently. Only when current use and previous use were considered together did significant

effects emerge. Recognizing the importance of this congruency effect may help elucidate associations between OC use and a range of relevant behaviors. For example, congruency in hormonal contraceptive use also predicts women's relationship jealousy (Cobey, Roberts, & Buunk, 2013), and this may explain previously reported differences between OC users and nonusers in behavior related to mate retention (Welling, Puts, Roberts, Little, & Burriss, 2012).

Congruency or noncongruency in hormonal contraceptive use could thus influence a suite of behaviors, beginning with a woman's attraction to and sexual satisfaction with her partner, and leading to other aspects of relationship functioning, including jealousy and perhaps even relationship dissolution. We hope that our results will stimulate further tests of the congruency hypothesis and lead to better understanding of the effects of hormonal contraception on women's mating psychology and behavior.

Author Contributions

S. C. Roberts, A. C. Little, and M. Petrie developed the study concept. All authors contributed to the study design. Testing and data collection were performed by R. P. Burriss and K. D. Cobey. S. C. Roberts and K. D. Cobey analyzed the data. S. C. Roberts drafted the manuscript, and all authors provided critical revisions. All authors approved the final version of the manuscript for submission.

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Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

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Supplemental Material

Additional supporting information may be found at http://pss.sagepub.com/content/by/supplemental-data

Open Practices

Provision of data in a form that would enable replication of the analyses would violate confidentiality because it could enable participants to identify their own and their partner's responses.

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