

# **Hormonal contraceptive use during relationship formation and sexual desire during pregnancy**

Kelly D. Cobey<sup>1,\*</sup> Jan Havlíček<sup>2</sup>, Katerina Klapilová<sup>3</sup>  
and S. Craig Roberts<sup>1</sup>

<sup>1</sup> School of Natural Sciences, University of Stirling, Scotland

<sup>2</sup> Faculty of Science, Charles University, Prague, Czech Republic

<sup>3</sup> Faculty of Humanities, Charles University, Prague, Czech Republic

\*To whom correspondence should be addressed:

[kelly.cobey@stir.ac.uk](mailto:kelly.cobey@stir.ac.uk)

Department of Psychology

University of Stirling

Scotland

FKL 4LA



**Abstract**

Women who are regularly cycling exhibit different partner preferences than those who use hormonal contraception. Preliminary evidence appears to suggest that during pregnancy women's partner preferences also diverge from those prevalent while regularly cycling. This is consistent with the general assertion that women's mate preferences are impacted by hormonal variation. During pregnancy women's preferences are thought to closely resemble those displayed by women who are using hormonal contraception. Here, based on this literature, we compare levels of sexual desire among pregnant women who met their partner while using hormonal contraception and pregnant women who met their partner while regularly cycling. We predicted that women who met their partner while using hormonal contraception would experience higher levels of in-pair sexual desire during pregnancy since these women will have partner preferences that more closely match those prevalent at the time of their partner choice. Our results provide support for the idea that previous contraceptive use/non-use may impact subsequent sexual desire for the partner during pregnancy. Pregnant women who met their partner while using hormonal contraception were shown to have higher levels of in-pair sexual desire than those who met while regularly cycling. In contrast, levels of extra-pair desire were not related to previous use/non-use of hormonal contraception. These findings were robust when controlling for a number of relevant individual difference variables known to impact sexual desire. Our results thus provide a more fine grained understanding of factors affecting relationship functioning during pregnancy.

**Keywords:** Congruency Hypothesis; pregnancy; oral contraception; desire; menstrual cycle

## Introduction

In the past decade researchers have begun to closely consider what impact hormonal contraceptive use may have on women's mating psychology. Hormonal contraceptive use reduces naturally occurring cyclical hormonal variance and, as a consequence, women who use hormonal contraception have been shown to display different mating preferences and behaviours than women who are regularly cycling (e.g., Alvergne & Lummaa, 2010; Jones et al., 2008; Penton-Voak et al., 1999). For example, work by Little, Burriss, Petrie, Jones, & Roberts (2013) has demonstrated that upon initiation of hormonal contraception women prefer lower levels of masculinity in their male partners. Moreover, these researchers showed that women who met their partner while using hormonal contraception were actually paired with men who had lower levels of masculinity as assessed via both facial measurements and perceptual judgments. This suggests that hormonal contraceptive use has the potential to influence women's (adaptive) mate preferences (Alvergne & Lummaa, 2010; Roberts, Gosling, Carter, & Petrie, 2008).

Classic research on the impact of hormonal contraceptive use on women's sexual desire has exclusively examined the impact of current use. Interestingly, these types of studies have produced a very mixed set of findings, with positive, negative and null results all having been documented (reviewed in: Burrows, Basha, & Goldstein, 2012; Pastor, Holla, & Chmel, 2013). Given the importance of sexual satisfaction for relationship quality and overall well-being, lack of knowledge and mixed associations on this topic are clearly dissatisfying. In light of these findings, we recently proposed the *Congruency Hypothesis* as a new prediction for how hormonal contraceptive use might impact women's partner-specific sexual desire (Roberts, Cobey, Klapilová, & Havlíček, 2013; Roberts, Cobey, Klapilová, & Havlíček,

2014). We proposed that because partner preferences differ when regularly cycling and when using hormonal contraception, a woman's current level of sexual desire for her partner may be partially dependent on whether her current use/non-use of contraception is congruent to the time at which she began her relationship. Thus, if a woman's hormonal contraceptive use has changed since the time of partner choice, her mate preferences will be subtly different, and therefore we predicted she may experience moderate decrease in sexual desire for her partner since he may no longer match her preferences as closely. However, we predicted that hormonal contraceptive congruency would not impact women's sexual desire for extra-pair men since women can easily adjust the target of their extra-pair interest or fantasy. To examine this, it is necessary to distinguish the object of sexual desire (partner-focused versus extra-pair), a distinction that is rarely made in existing research (Roberts, Cobey, Klapilová, & Havlíček, 2014).

Recent empirical research testing the *Congruency Hypothesis* has provided support for its premises. Roberts et al. (2014) showed that women whose current contraceptive use was congruent with use status at the start of the relationship had higher levels of sexual satisfaction in their relationship. Importantly, effects of congruency in this study did not extend to non-sexual aspects of the relationship. This finding supports earlier work by Roberts et al. (2012) who found that among women who were currently regularly cycling, those who met their partner on the pill were less sexually satisfied and had lower levels of partner attraction than those who met while regularly cycling. Interestingly, however, these same women who met their partner on the pill were more satisfied with his provision of parental care than were those women who met their partner while regularly cycling. This finding may be explained by the fact that masculine traits, which are preferred at reduced levels when using hormonal contraception, tend to be associated with lower levels of paternal

care (Boothroyd, Jones, Burt, & Perrett, 2007). These results appear to suggest that contraceptive use/non-use at the start of the relationship has implications for subsequent relationship satisfaction. In other work, we have also provided preliminary evidence that contraceptive congruency may impact other aspects of one's relationship beyond satisfaction, including levels of sexual jealousy (Cobey, Roberts, & Buunk, 2013).

The current research was developed as an extension of the literature outlined above and in wake of the ideas presented in the *Congruency Hypothesis*. Here, we aim to test how use/non-use of hormonal contraception at the time of relationship initiation relates to sexual desire levels during subsequent pregnancy. Pregnancy is a truly distinctive time for couples, and the combination of physical and emotional changes occurring may have consequences for both general and sexual aspects of the relationship. Pregnancy is maintained by hormonal changes, perhaps most notably it is characterised by rapid changes in levels of estrogen and progesterone. Previous research has demonstrated mixed results with respect to how pregnancy influences relationship quality and sexual satisfaction. For example, meta-analyses indicate that women exhibit remarkable inter-individual variability, particularly in the second trimester, with respect to their sexual responsiveness, coital frequency and sexual satisfaction during pregnancy (von Sydow, 1999). We suggest that the *Congruency Hypothesis* could potentially contribute towards explaining this variance.

Since hormonal changes across the cycle or as a result of hormonal contraceptive use impacts women's sexual desire and mating preferences, it is reasonable to presume that pregnant women also experience changes in their social perception and thus partner preferences as a result of hormonal variation. At present, there is preliminary evidence to suggest that partner preferences when pregnant resemble those predominant during hormonal contraceptive use.

For example, Jones et al. (2005) showed that women who were using hormonal contraceptives, or who were pregnant, have a stronger preference for health in faces than women who were regularly cycling. Thus, based on this literature, we hypothesized that a pregnant woman who met her partner while using hormonal contraception would have partner preferences that were more congruent than a pregnant woman who met her partner while regularly cycling. As a consequence, we expected that: (1) Women who met their partner while using hormonal contraception would display higher levels of sexual desire towards their partner during pregnancy than those who met their partner when regularly cycling; (2) In contrast, women's sexual desire during pregnancy for extra-pair men would not relate to contraceptive congruency since women can adjust the target of their extra pair interest.

## **Methods**

### *Participants*

Participants were recruited via a month-long advertisement posted in the pregnancy section of a British social networking site for expectant mothers and entered into a draw to win a £40 gift card in exchange for their time. We excluded women who indicated they were not pregnant, were presently single, non-heterosexual, or who indicated they were receiving hormonal treatment throughout their pregnancy ( $N = 23$ ). Of the sample, 96.4% indicated they were residing in the United Kingdom. Participants who clicked on our advertisement were redirected to a website where they were briefed about the study and subsequently completed informed consent. Participants were 84 pregnant women expecting a singleton birth. Participants ranged in age from 19-43 ( $M = 31.71$ ,  $SD = 4.63$ ) and were between 7 and 40 weeks pregnant ( $M = 23.80$ ,  $SD = 8.09$ ), the majority of women were in their second trimester. We also collected demographic information with respect to highest levels of



education (5 categories: less than secondary school; secondary school; vocational training; undergraduate degree; postgraduate degree). This research project received ethical approval from the University of Stirling Psychology Ethics Committee.

### *Procedure*

We first asked participants to complete some basic demographic questions (age, education level, relationship status) and then to respond to some pregnancy specific questions (e.g., number of weeks pregnant, current use of fertility drugs or hormonal treatment). Participants were also asked to indicate whether they were using any form of hormonal contraception when they started their relationship with their current romantic partner. Specifically, we asked “When you first met your partner what type of hormonal contraception were you using?” with options ‘none’, ‘combined oral contraceptive pill’, ‘progesterone only pill’, and ‘other hormonal contraceptive’. In total, 37 women indicated that they were using hormonal contraception at the time their relationship began, while 47 indicated they were regularly cycling. We also confirmed that the participants’ current partner was the same person who fathered her pregnancy.

Finally, we assayed our participants’ sexual desire via two target specific items. Specifically, we asked participants: (1) In the past week, how much sexual desire did you feel towards your partner; (2) In the past week, how much sexual desire did you feel towards men other than your partner. Participants indicated their response to each of these items on a 100-point scale with endpoints ‘much lower than average’ and ‘much higher than average’ with higher scores denoting higher levels of desire. We used these two target specific questions rather than a general measure of sexual desire since failing to make this distinction potentially conflates two diverse types of sexual desire and experience (Roberts, Cobey, Klapilová, &

Havlíček, 2013; Roberts et al., 2013). A reference frame of ‘in the past week’ was used in order to minimize bias related to longer retrospective reporting and circumvent bias from specifying responses to a single day. Participants then completed a series of personality individual difference measures which were not central to the current results.

## Results

We conducted two univariate ANOVA's to examine the impact of women's use/non-use of hormonal contraception at the time of relationship formation on subsequent levels of sexual desire during pregnancy. We first examined the impact of women's use/non-use of hormonal contraception on partner specific sexual desire. We entered scores on the partner specific sexual desire item as the dependent variable and entered contraceptive use status as the fixed-factor. We found that women who met their partner while using hormonal contraception had significantly higher levels of partner specific sexual desire ( $M = 61.19$ ,  $S.E. = 3.92$ ) than those who had met when regularly cycling ( $M = 47.05$ ,  $S.E. = 4.42$ ) ( $F_{1,82} = 5.74$ ,  $p = .02$ , Partial Eta Squared = .07; see Figure 1). We then individually added participant age, education level (5 groups;  $N = 1$  missing data) and gestation stage (in weeks,  $N = 1$  missing data) to the ANOVA as covariates to control for these factors. These additions did not change the overall pattern of results, and none of these variables had a significant main effect on the model (all  $F < 2.88$ , all  $p > .09$ ). To control for potential differences between different formulations of hormonal contraception, we subsequently restricted our analysis to women who indicated that they were using a combined oral contraceptive pill ( $N = 31$ ). We then repeated the above analyses and results, though marginal due to reduced power, were similar ( $F_{1,66} = 3.62$ ,  $p = .06$ ).

We then examined the impact of women's use/non-use of hormonal contraception on levels of extra pair interest during pregnancy via a second univariate ANOVA. We entered scores on the extra-pair sexual desire item as the dependent variable and again entered contraceptive use status as the fixed-factor. Levels of desire for extra pair men were higher among those women who met their partner while regularly cycling ( $M = 18.89$ ,  $S.E. = 3.90$ ) than among those who met while using hormonal contraception ( $M = 17.55$ ,  $S.E. = 3.46$ ), but this difference was not statistically significant ( $F_{1, 82} = .07$ ,  $p = .80$ ).

In spite of the fact that ANOVA is robust to violations of normality (Stonehouse & Forrester, 1998; Subrahmaniam, Subrahmaniam, & Messeri, 1975) we conducted further analysis with use of non-parametric tests since normality was violated for the extra-pair desire variable and transformations were unsuccessful. However, results of non-parametric Mann-Whitney test showed similar pattern ( $p = .79$ ).

## **Discussion**

Our study is the first to examine sexual desire during pregnancy in relation to hormonal contraceptive use/non-use at the initiation of the relationship. As predicted, we found that women who met their partner while using hormonal contraception have significantly higher levels of sexual desire towards their partner during pregnancy. This result was robust to women's education level, age, and gestation stage, factors which have previously been shown to relate to sexual desire and function (DeLamater & Sill, 2005; Hällström & Samuelsson, 1991; Sagiv-Reiss, Birnbaum, & Safir, 2012; Güleroglu & Beşer, 2014). We hypothesize that these findings are likely the result of the fact that women's partner preferences during pregnancy and during contraceptive pill use may resemble one another and be distinct from preferences displayed by regularly cycling women (Jones et al., 2005). As predicted, we also

show that contraceptive use at the time of relationship initiation did not relate to levels of sexual desire for extra-pair men during pregnancy. Lastly, our results further indicated that women's reported sexual desire for their partner during pregnancy was significantly higher than their reported desire for extra-pair men. This is consistent with previous findings examining partner specific versus extra-pair sexual desire among regularly cycling women, with women reporting higher levels of overall desire to their partner during luteal phase, especially if they were highly satisfied in their relationship (e.g., Gangestad et al., 2005).

These findings contribute to a growing number of recent studies examining changes in sexual desire and behaviour during pregnancy. Since pregnancy is a time of both physical and psychological transition, and is impacted by cultural and social factors, we acknowledge that there is a broad variety of variables that are likely to impact sexual desire beyond contraceptive use history. Previous research in this area has, for example, examined factors including women's body image (Pauls, Occhino, & Dryfhout, 2008) and fear of sexual intercourse in pregnancy (Babazadeh, Najmabadi, Mirzaii, & Masomi, 2013), showing that these factors can be important contributors to women's sexual desire and function during pregnancy. Nonetheless, our results provide the first evidence that contraceptive use status at the initiation of the relationship at least explains some of the variance in partner specific sexual desire during pregnancy.

Our findings are in line with the premises of the *Congruency Hypothesis*, and more generally confirm the notion that hormonal processes across the female lifespan may influence the formation and maintenance of romantic relationships. Truly comprehensive research addressing the precise hormone, or group of hormones, responsible to maintaining partner preferences is absent from the literature. Future work assaying multiple hormones and testing

women's mating preferences across the lifespan is thus still needed. We are hesitant to speculate what specific commonalities in the hormonal profile in pregnancy and during hormonal contraceptive use may generate similar partner preferences which we believe underpin the described effect. Previous research has suggested progesterone may be important for the maintenance of these preferences (Jones et al., 2005), yet until research is conducted which assays a broader range of hormones and considers the impact of both exogenous and endogenous hormones, conclusions on this topic are premature.

A limitation of our work that should be considered is the lack of measurement of actual preferences. As a result, the mechanism for our effect remains undocumented. Though logistically challenging, longitudinal research which assesses women's mating preferences and hormone levels at the start of their relationship and then during subsequent pregnancy would be an obvious follow-up to the current research. Similarly, future research could improve on our findings by conducting repeated measures of in-pair/extra-pair sexual desire throughout women's pregnancy and by including corresponding standardized measures of general relationship satisfaction. Specifically, research could address whether or not the effect of congruency is specific to sexual aspects of the relationship, or if it has corresponding effects on general satisfaction (e.g., Roberts et al., 2012).

Since our study only examined the female partner's self-reported sexual desire, future research could also build on these findings by examining the male partner's self-reported sexual desire. Based on the lack of influence of women's contraceptive congruency on male sexual satisfaction among non-pregnant women (Roberts et al., 2014), we would predict that there would be no effect of congruency on male sexual desire during pregnancy. However, male partners could further report on their perceptions of their female partner's sexual desire

towards them and towards extra-pair men. This sort of measure would help speak to whether or not differences in women's sexual desire during pregnancy, as a consequence of contraceptive use at the initiation of the relationship, actually have an impact on relationship functioning or overall satisfaction. As it stands, we cannot be certain that differences in women's desire actually relate to differences in levels of relationship quality or impact relationship functioning. Finally, future research could also examine variables beyond sexual desire. This will speak to whether or not hormonal contraceptive pill use at the time of relationship formation impacts other aspects of relationship functioning during pregnancy.

In sum, these results suggest that hormonal contraceptive use/non-use at the start of the relationship has potential implications for subsequent partner specific sexual desire during pregnancy. More broadly, our results speak to the need for a broader range of controlled studies examining the impact of hormonal contraceptive use on inter-personal psychological variables (Cobey & Buunk, 2012). Given that pregnancy is a great transition, knowledge of factors which affect relationship quality at this time is of considerable value. We certainly are not advocating for or against hormonal contraceptive use based on these findings, naturally the decision to use/not use hormonal contraception is a complex choice that is a personal decision involving the relative weighting of several different variables of individually relative importance. One important consideration is what impact knowledge of potential changes in sexual desire and function during pregnancy could have for a couple. It may be that awareness of possible changes in levels of sexual desire during pregnancy is sufficient to thwart any negative effects, if these exist (e.g., Serati et al., 2010). We hope this research stimulates further work in this area and prompts the consideration of the broader hormonal mechanisms that underpin women's mating preferences across the lifespan.

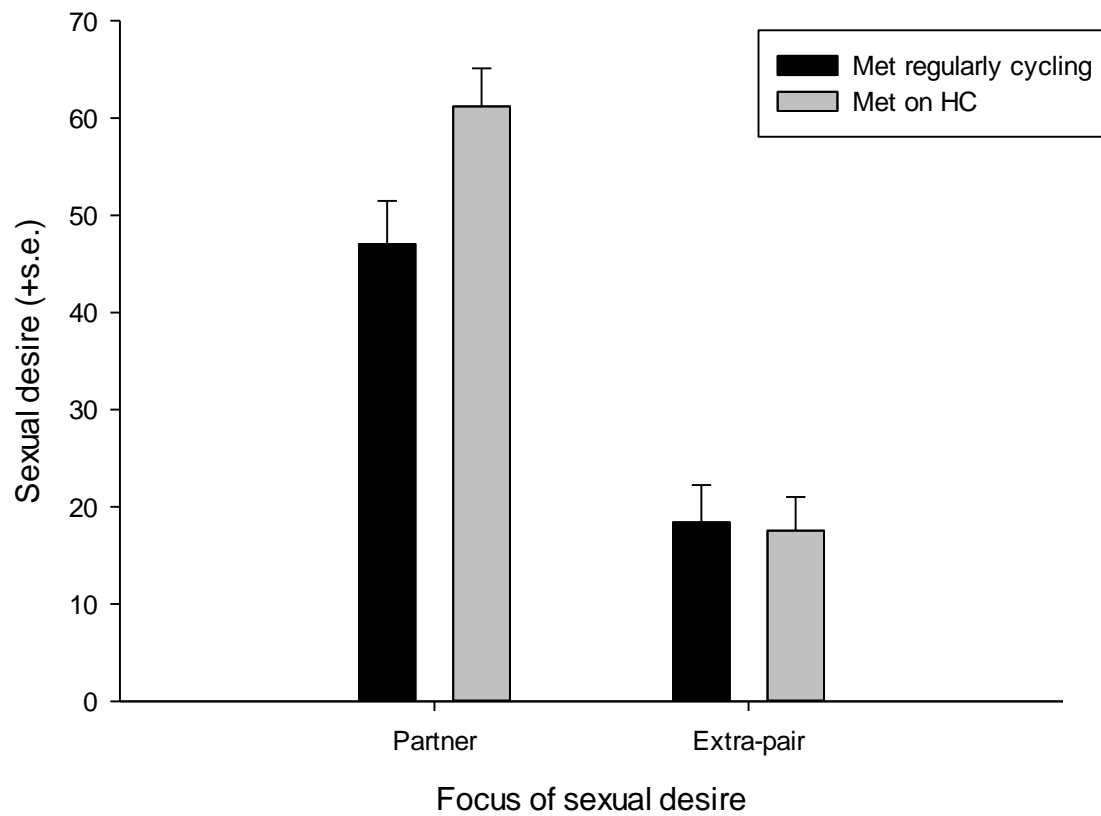
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**Figure 1.** Levels of sexual desire towards the partner and towards extra-pair men among pregnant women who met their partner while regularly cycling (black) or while using hormonal contraception (grey).