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Reported jealousy differs as a function of menstrual cycle stage and contraceptive pill use: a within-subjects investigation

Kelly D. Cobey[a,*], Abraham P. Buunk[a,b], S. Craig Roberts[c], Christine Klipping[d], Nicole Appels[e], Yvette Zimmerman[e], Herjan J.T. Coelingh Bennink[e], Thomas V. Pollet[f]

[a]Department of Psychology, University of Groningen, Grote Kruisstraat 2/1, Groningen 9712 TS, The Netherlands
[b]Royal Netherlands Academy of Arts and Sciences, Amsterdam, The Netherlands
[c]Department of Psychology, University of Stirling, FK9 4LA Scotland, UK
[d]Dinox BV, Hanzeplein 1, Groningen 9713 GZ, The Netherlands
[e]Pantarhei Bioscience BV, Boslaan 11, Zeist 3701 CH, The Netherlands
[f]VU University Amsterdam, Van der Boechorststraat 1, Amsterdam 1081BT, The Netherlands

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Abstract

Previous research suggests that female jealousy is sensitive to hormonal variation and, more specifically, potentially moderated by estrogen levels. Here, we tracked self-reported jealousy using a within-subjects design, comparing jealousy when the same women were regularly cycling and using hormonal contraceptives. Results show that fertile cycle phases are associated with higher levels of jealousy than nonfertile cycle phases in both single and partnered women. However, patterns of jealousy reported when using hormonal contraceptives, as compared to when regularly cycling, differed between single and partnered women. In single women, levels of jealousy while on the pill fell between those reported when fertile and nonfertile but were not significantly different from either. In partnered women, levels of jealousy while using the pill were significantly higher than those reported during the nonfertile cycle phase and similar to those during the brief period of fertility. We discuss possible reasons for differences between single and partnered women in reported jealousy while using the pill. This research is the first to definitively show that a psychological characteristic, for example, jealousy, may be influenced differentially by endogenous hormones vs. exogenous hormones administered via hormonal contraceptives.

Keywords: Jealousy; Menstrual cycle; Within-subject design; Hormonal contraceptive pill; Oral contraception

1. Introduction

A growing body of literature suggests that women have evolved subtle changes in behavior and preferences across the menstrual cycle as a function of conception risk (e.g., Jones et al., 2008; Penton-Voak et al., 1999). Many of these studies focus on testing cyclical shifts in preferences for indicators of male genetic quality (reviewed in Garver-Apgar, Gangestad, & Thornhill, 2008; Roberts & Little, 2008). For example, masculinity and body odor are argued to function as honest signals of genetic health (e.g., Roberts et al., 2005; Thornhill & Gangestad, 1999; but see also Getty, 2002). Female attraction toward these "good gene" traits is thought to increase during the fertile phase of the cycle because during this time, obtaining genetic benefits for future offspring is most relevant (e.g., Thornhill & Gangestad, 1999).

Research has also documented shifts in female attractiveness across the menstrual cycle. For instance, female faces (Roberts et al., 2004), voices (Pipitone & Gallup, 2008), and choice of dress (Haselton, Mortezaie, Pillsworth, Bleske-Rechek, & Frederick, 2007) are judged to be most attractive when women are at fertile cycle stages. Heightened attractiveness during fertility could be seen as adaptive as it may allow women to attract a larger pool of potential partners, or partners of higher quality, when conception risk is highest (Roberts et al., 2004). Evidence indicating that men show increased mate guarding toward fecund female partners suggests that menstrual shifts in attractiveness have consequences for male behavior as well (Flinn, 1988;

* Corresponding author. Tel.: +31 0 50 363 9707.
E-mail address: k.d.cobey@rug.nl (K.D. Cobey).

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Gangestad, Thornhill, & Garver, 2002). Similarly, the literature suggests that male mate guarding of fecund partners is moderated by female attractiveness: with more attractive women experiencing higher degrees of mate guarding (Haselton & Gangestad, 2006). In line with these findings, women in relationships, particularly those who assess their male partner not to have "good genes," are more likely to report extrapair flirtation when fertile (Garver-Apgar, Gangestad, Thornhill, Miller, & Olp, 2006).

The plethora of recent studies documenting female menstrual cycle shifts, and corresponding male behavioral adjustment prompts a key question: do these hormonally induced adaptive changes in preferences or behavior matter, in the sense that they have consequences within relationships? If there is a benefit to cyclical variation in preferences and behavior, it becomes important to ask what consequences hormonal contraceptive use has on these processes.

Indeed, some research that supports the notion that contraceptive use disrupts mating processes exists. Relative to nonusers, women who use hormonal contraceptives demonstrate decreased preferences for indicators of genetic quality or compatibility in men (e.g., Little, Jones, Penton-Voak, Burt, & Perrett, 2002; Roberts, Gosling, Carter, & Petrie, 2008; Wedekind, Seebeck, Bettens, & Paepke, 1995) and overall decreased attractiveness in their behavior (Miller, Tybur, & Jordan, 2007). If menstrual cycle shifts play a meaningful role in allowing women to select quality partners or to obtain, attract, or retain mates, then the use of hormonal contraception may have consequences for the selection of new partners as well as for the stability of existing pair bonds (e.g., Alvergne & Lummaa, 2009; Roberts et al., 2011).

Apart from influencing partner preferences and attractiveness, research also suggests that hormonal contraceptive use and menstrual cycle shifts in hormones may influence relationship jealousy. Relationship jealousy can be defined as thoughts, emotions, or behaviors that occur as a result of the perceived threat of losing a potential mate to an actual or imagined rival (Buunk, 1991). Jealousy can be adaptive in that it allows women to monitor their partner and to foresee any potential threats to her monopolization of his resources or direct paternal care. While there is no direct evidence, jealousy may be greater during the fertile stage, as it is especially during this stage that women are salient of female–female competition for mates and may therefore monitor their partner to a greater extent. Geary, DeSoto, Hoard, Skaggs Sheldon, and Lynne Cooper (2001) correlated jealousy with estimated levels of estrogen in regularly cycling women. While they found no mean differences in jealousy scores across cycle weeks, levels of estradiol and jealousy were correlated during the fertile window. They also reported that women who used oral contraceptives had higher levels of sexual jealousy than nonusers. Taken together, these findings suggest a role for estrogen in female jealousy responses. However, the interpretation of cyclical shifts in jealousy is not entirely clear. Geary and colleagues hypothesized that this finding might be explained as a result of increased sexual desire during times of high estrogen. It remains an empirical question as to whether such shifts in jealousy are adaptive, or if they are indeed a byproduct of other processes such as sexual desire or intrasexual competition.

Using a within-subject design, we test how female relationship jealousy varies, first, as a function of fertility status across the menstrual cycle and, second, as influenced by the use of hormonal contraceptives. To our knowledge, the vast majority of research on pill-induced behavioral effects, including that of Geary and colleagues (2001), is limited by the fact that they draw conclusions based on between-subject designs. The use of between-subject designs is problematic in that there may be preexisting differences in culture, personality, sexual experience, relationship status, socioeconomic status, and conscientiousness between those women who choose to use hormonal contraception and those who do not (Alvergne & Lummaa, 2009; Roberts et al., 2008). To address these methodological issues, here we use a within-subject design in which participants are tracked both while they are regularly cycling and after they have commenced oral contraceptive use.

This study also benefits from an accurate process of detecting and, therefore, defining periods of fertility. Previous menstrual cycle studies have typically made crude estimates of the timing of ovulation, in many instances, relying on female self-reports of menstrual onset, from which researchers count forward or backward to establish an estimate of fertility. Beyond the potential for errors in self-report, the time frame on which fertility is defined is highly inconsistent across studies (e.g., backward counting to day 15; Garver-Apgar et al., 2008; forward counting to days 9–15, Miller et al., 2007; forward counting to days 6–14, Penton-Voak & Perrett, 2000). More recently, luteinizing hormone (LH) test strips have been used in an effort to better estimate fertility (e.g., Pillsworth & Haselton, 2005). However, this method is limited by the fact that it fails to account for anovulatory cycles in which luteinized follicles remain unruptured (Metcalf & Mackenzie, 1980; Qublan et al., 2006). Furthermore, there is variation in the definition of the duration and timing of the fertile period with reference to the detection of an LH surge (e.g., 1 day prior and 5 days after, Gangestad et al., 2002; 2 days prior and 3 days after, Haselton et al., 2007). Use of transvaginal ultrasonography allowed us to overcome the abovementioned obstacles.

Based on previous results reported by Geary et al. (2001), we predicted that, when regularly cycling, fertility (e.g., phases with relatively high estrogen) would be associated with significantly higher levels of jealousy relative to nonfertile cycle stages. Similarly, based on previous research, we predicted that hormonal contraceptive use would be associated with increased levels of jealousy as compared to scores obtained during nonuse.