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Women Can Keep the Vote: No Evidence that Hormonal Changes during the Menstrual Cycle Impact Political and Religious Beliefs

Christine R. Harris

University of California, San Diego

&

Laura Mickes

Royal Holloway, University of London

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Correspondence:
charris@ucsd.edu
Christine R. Harris, Ph.D.
Psychology Department
University of California, San Diego
9500 Gilman Dr. #0109
La Jolla, CA 92093-0109

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Recently, Durante, Rae, and Griskevicius (2013) reported that menstrual cycle phase affected women's religiosity, voting preferences, social (but not fiscal) political attitudes and preferences for US Presidential candidates. The direction of these effects seemingly depended upon women's relationship status. The authors argued that during the fertile phase of the menstrual cycle, women in committed relationships become more religious and socially conservative, which causes them to shift towards preferring the more conservative presidential candidate (relative to the infertile phase). In contrast, women who are not in committed relationships reportedly show the opposite effect; namely, during peak fertility, single women shift to being less religious and more socially liberal, and therefore prefer the more liberal presidential candidate.

Durante et al. suggest: "Because ovulation might lead married women to become more sexually interested in men who are not their partner, and because it is especially costly for such women to cheat on their partner, changes in religiosity and conservatism might function to decrease behaviors that may harm the relationship" (p. 3). This reasoning contrasts with most evolutionary psychologists' theorizing, which generally contends that pair-bonded females are *more* likely to engage in extra-pair sex during peak fertility phases in order to acquire better genes for offspring (e.g., Penton-Voak et al., 1999).

We attempt to directly replicate Durante et al. (2013). Assessing the robustness of their findings seems warranted for several reasons. First, the findings depart strikingly from commonsense ways of thinking about political and religious behavior, implying markedly greater fickleness in women's attitudes relative to those of men--something that, to our knowledge, has not been noted by pollsters and political scientists. Second, criteria for fertility classification across menstrual cycle preferences studies vary greatly (e.g., there is variability in number of

days categorized as fertile and infertile, the specific days counted in each category, and which days are excluded altogether) as do moderators. Such inconsistency potentially introduces flexibility into analytic methods, endangering replicability (Harris, Chabot, & Mickes, 2013; Pashler & Wagenmakers, 2012; Simmons, Nelson, & Simonsohn. 2011).

The current work employed the measures reported in Durante et al. (2013). We faithfully reproduced their described analytical strategies, including categorization of relationship status and fertility status[1], and employed their exclusionary criteria for the sample and the primary analyses. As in Durante et al., subjects were recruited from Amazon's MTurk, although our sample was much larger (n = 1206). Our first phase of data collection occurred before the 2012 US Presidential elections (women were asked for whom they wanted to vote). Unlike Durante et al., we also performed a second wave of data collection after the elections, asking women for whom they voted and about menstrual cycle at time of voting.

Durante and colleagues' primary predictions are interactions between relationship status and menstrual cycle phase, such that during peak fertility women in relationships become more socially conservative and religious while single women become more socially liberal and less religious. We conducted a 2 (relationship status) x 2 (fertility status) between-subjects ANOVA on each attitude type (religious, social, and fiscal). Statistics and means are presented in Table 1. None of the predicted interactions for attitude measures were reliable (see lower portion of Table 1). There were no significant main effects of cycle phase on attitudes. As expected, however, women in relationships were more socially and religiously conservative.

In a logistic regression of hypothetical voting preferences, the interaction between

[1] Durante et al. inaccurately described their fertility categorization method. We employed their actual method as provided by Durante (see supplemental for details and for analyses using a continuous fertility risk calculation).

fertility and relationship status did not reach significance ($\beta = 0.23$, Wald = 3.16, $df = 1$; $p = .08$). However, following Durante et al., we performed additional chi-square analyses. Counter to their hypothesis, preference for Obama was identical among high (77.6%) and low fertility (77.4%) single women: $\chi^2(1, N = 138) = 0.001$, $p = .98$, $d = .01$. Among paired women, there was a significant effect (77.4 % of low and 58.5 % of high fertility women preferred Obama): $\chi^2(1, N = 221) = 9.11$, $p = .003$, $d = .41$.

For actual voting behavior, the interaction between fertility and relationship status also did not reach significance ($\beta = 0.26$, Wald = 3.02, $df = 1$; $p = .08$). Additional chi-squares showed a different pattern from hypothetical responses. Fertility did not affect paired women's voting for Obama (68.3% low vs. 69.2% high fertility, difference in incorrect direction): $\chi^2(1, N = 182) = .02$, $p = .89$, $d = .02$. There was, however, an effect for single women (74.6% low vs. 89.8% high fertility), $\chi^2(1, N = 126) = 4.86$, $p = .03$, $d = .40$.

After seeing our results, reviewer, S. Gangestad, performed a logistic regression (combining hypothetical preferences with actual voting behavior), which produced a significant interaction between relationship status and fertility of the same sort reported by Durante ($p = .013$), plus an unexpected cycle by study interaction ($p = .011$). The former could be taken as partial support for one finding of Durante et al. However, post-hoc combining two different outcome measures into one analysis seems debatable, especially given that the trends in the two samples do not match up qualitatively (i.e., no cycle effect in single women for hypothetical voting; no cycle effect in paired women for actual voting -- see also Figure 1 in supplemental). [2]

Conclusion

[2] Gangestad observed, however, that the three-way interaction of study, fertility, and relationship status was not significant.

We unequivocally failed to confirm two of the three key findings from Durante et al. There was no interactive effect of ovulatory and relationship status on either religious beliefs or social political attitudes. Our full sample size (n = 1206) outnumbered that of Durante and colleagues (e.g., n = 502 for political attitudes and n = 777 for religiosity). Therefore, were an effect to exist, it seems unlikely that the present, more powerful, study would fail to find any hint of it.

With regard to voting data, the current results are more equivocal. The interaction of ovulatory status and relationship status (reported by Durante et al. to affect hypothetical voting preferences) fell short of significance in each of our samples when analyzed as we had intended (hypothetical preferences separate from real voting). However, when the two data types were combined at the recommendation of a reviewer, a significant interaction was found (see above). While it is possible that there is some true nonzero (albeit hard to explain) interaction here, we are inclined to doubt it for two reasons. First, Durante et al. proposed that voting shifts were caused by changes in religiosity and social political attitudes, but we find no evidence of such changes. Second, as noted above, the interaction trends in real and hypothetical voting appear qualitatively different. (For hypothetical voting data, there was no hint of an effect in single women; for actual voting, no hint of an effect in paired women.)

If the voting interactions turn out to be real, one possible explanation might be that women have a tendency to find men they like more attractive (or likeable) during peak fertility. If so, any purported effect on voting preference could be due to the tendency of single women to prefer the liberal candidate and committed women to prefer the conservative candidate more with fertility accentuating this effect. Again, however, this suggestion does not receive strong empirical support from our results and is quite different from the Durante et al. hypothesis.

This study adds to a growing number of failures to replicate several menstrual cycle effects on preferences and attraction (e.g., Harris, 2011; Wood, Kressel, Joshi, & Louie, in press), inviting concerns that this literature as a whole may have a false-positive rate well above the widely presumed 5%. That inflation is expected if data analysis flexibility of the sort cautioned against by Simmons et al. (2011) is present (see discussion in Harris et al., 2013). However, each purported effect should be assessed on its own merits. Researchers in this area can help address the problem by committing to fertility classifications and analysis plans in advance through study preregistration. Not only will this decrease Type-1 errors, but also will help ensure that effects that do exist are revealed, giving the field credibility.

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Table 1. *Main Effects and Interactions of Relationship Status and Fertility Status on Religious and Political Attitudes (SD) and Effect Sizes (d)*

Main Effects

Relationship Status

	Paired (n = 409)	Single (n = 268)	Analysis	Effect Size
Religiosity	5.64 (2.95)	4.86 (2.91)	F(1,673) = 11.41***	(*d* = .27)
Social Attitudes	3.01 (1.69)	2.56 (1.49)	F(1,673) = 12.66***	(*d* = .28)
Fiscal Attitudes[a]	3.10 (1.24)	2.94 (1.17)	F(1,672) = 3.06 *ns*	(*d* = .14)

Fertility Status

	High Fertility (n = 333)	Low Fertility (n = 344)	Analysis	Effect Size
Religiosity	5.27 (2.95)	5.39 (2.96)	F(1,673) = 0.16 *ns*	(*d* = .03)
Social Attitudes	2.86 (1.65)	2.81 (1.61)	F(1,673) = 0.19 *ns*	(*d* = .03)
Fiscal Attitudes	3.09 (1.26)	2.99 (1.16)	F(1,672) = 0.91 *ns*	(*d* = .07)

Interactions	Paired		Single		
	High Fertility (n = 199)	Low Fertility (n = 210)	High Fertility (n = 134)	Low Fertility (n = 134)	Analysis[b]
Religiosity	5.55 (2.94)	5.72 (2.96)	4.85 (2.92)	4.87 (2.90)	F(1,673) = 0.10 *ns*
Social Attitudes	3.03 (1.74)	2.99 (1.65)	2.59 (1.48)	2.52 (1.51)	F(1,673) = 0.01 *ns*
Fiscal Attitudes	3.17 (1.33)	3.04 (1.14)	2.96 (1.14)	2.91 (1.20)	F(1,672) = 0.24 *ns*

***p < .001

[a]One low fertility, paired participant did not complete the fiscal attitudes measure.

[b]For each interaction term, partial eta square was less than 0.001 (see supplemental for comparison to Durante et al.)