THE EFFECT OF FERTILITY ON WOMEN'S SOCIAL NETWORK ACTIVITY

by

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ABSTRACT

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The purpose of this study was to analyze the changes (or lack of) in how women communicate on social media throughout the testing period, which includes at least one ovulation cycle. Data are collected through the participants' Facebook pages, focusing on actions that they themselves initiate. We also looked at the stages of their monthly cycle and attempted to find a manifestation of natural changes in communication on social media. Looking at Facebook, we hoped to find a correlation between increased fertility and increased activity on social media, particularly towards women. For example, were participants posting more pictures of themselves at certain times of the month? Were these pictures more revealing or "sexy" at certain times than at others? Did these posts correlate with standard behaviors associated with different points in the ovulatory cycle? We also looked at their general activity, whether they tend to be more active during some days than during others. In both studies, we found strong positive correlations between fertility levels and increased communication directed at other women. In conducting this study and analysis, we hoped to gain a deeper understanding as to how women's communication and their targets change on social media due to natural hormonal changes.

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CHAPTER 1: INTRODUCTION

Women use social media more than men and are more likely to use social media websites that offer status and photo updating services such as *Facebook, Pinterest,* and *Instagram* (Duggan & Brenner, 2013; Lenhart, Purcell, Smith, & Zickuhr, 2010), making an understanding of why and with whom women share information particularly important. For example, compared to men, women not only share more with peers but also, look to peers for information and are more likely to be influenced by them on social media (Lin & Lu, 2011). What might be a reason for this gender difference in social media activity?

We consider whether part of the difference may be related to women's motivation to use social media in the service of mating goals. To test this possibility, we examine the role female fertility plays in women's desire to share word-of-mouth. Building on the idea that women may use information sharing as a form of indirect intra-sexual competition (Campbell, 2004; Fisher & Cox, 2011), we test whether hormonal fluctuations associated with fertility—a known predictor of women's motivation to compete with other women for status and access to mates (Durante, Li, & Haselton, 2008; Durante, Griskevicius, Hill, Perilloux, & Li, 2011; Durante, Griskevicius, Cantu, & Simpson, 2014; Fisher, 2004)—influence women's desire to share information in both hypothetical contexts and in measures of real online social network behavior. In this study, using multiple methods and diverse samples of women, we will test how fertility influences a woman's desire to communicate and whether this desire is directed toward sharing with other women versus men. In addition, we will test whether a fertility-regulated shift in desire for status underlies the shift in desire to share word-of-mouth at high fertility, and whether this shift in focus of communication is due to the increased feeling of competition.

CHAPTER 2: HYPOTHESES

THE OVULATORY COMPETITION HYPOTHESIS

The human ovulatory cycle spans on average 28 days, during which a woman can become pregnant on only a few days during her cycle – the days of peak fertility right around ovulation. Given that women can only reproduce at ovulation, research finds that the ovulatory cycle influences women's courtship motivations (Thornhill & Gangestad, 2008). For instance, at high fertility women are more sexually attracted to men who display purported markers of genetic fitness such as social dominance and symmetrical, attractive faces (Durante et al., 2012; Gangestad et al., 2004; Gangestad, Thornhill, & Garver-Apgar, 2010; for a meta-analytic review, see Gildersleeve, Haselton, & Fales, 2014).

More recently research has found that fertility also enhances women's intrasexual competitive motivations (Durante et al., 2014). For example, fertility enhances women's motivation to appear more attractive and dress sexier (Durante, Li, & Haselton, 2008; Haselton et al., 2007), especially when women learn that there are many other desirable women in the local area (Durante et al., 2011). In addition, women have an increased desire for status near ovulation and become particularly sensitive to their *relative* status compared to other women (Durante et al., 2014). An increased motivation to enhance status at ovulation can help ensure greater access to high quality mates. This is consistent with the effects of fertility in non-human female primates, who become more aggressive toward same-sex rivals during ovulation in an attempt to gain status or rank and, thus, access to high-ranking males (Walker, Wilson, & Gordon, 1983). One way for women to increase their status relative to other women is to

demonstrate social value through word-of-mouth. By sharing certain aspects of their lives that they find to be advantages over others, women try to establish themselves as socially superior.

Some research hints at the possibility that women become more social at high fertility. For example, it has been found that women are more likely to volunteer and have an increased desire to attend social events near ovulation compared to other points in the cycle (Fessler, 2003; Haselton & Gangestad, 2006). But it is currently unknown whether fertility influences interpersonal communication. Here, we test how fertility influences women's social media activity and desire to share word-of-mouth and whether this desire is directed toward sharing with other women versus men. It is possible that ovulating women will direct their social sharing toward men in hopes of attracting a member of the opposite sex. However, we predict that ovulating women's online (Study 1) and offline (Study 2) social behavior will be directed toward women (not men) because social sharing is a tool women can use to secure alliances and gain status over rivals, effectively mitigating mate competition.

H1: Through the first study, we hypothesized that women in social settings will show increased desire to communicate with other women.

H2: In the second study, we hoped to see the same result as in Study 1, that women will communicate more with other women than with men, but now in an online setting.

CHAPTER 3: METHODOLOGY

Two studies estimated fertility status and measured women's online and offline social behavior.

Study 1

In this first study, we hoped to see whether fertility had any effect on who the intended target of a woman's communication is, whether man or woman. In accordance with the competition theory, we hoped to see that an increase in fertility would lead to an increase in desire to communicate with other women on certain subjects as a way to gain status among peers.

Participants were asked to consider certain consumer products: we predicted that with some of these products, women would converse with other women as a means to compete, while with other products, women would want to converse with men as a means of attraction.

Participants.

Roughly four hundred women participated for payment via Amazon's Mechanical Turk. All participants had to have regular monthly menstrual cycles and could not be pregnant, breastfeeding, or on hormonal contraception.

Procedure and Materials

Assessing fertility. Because we were collecting data from women across the entire cycle, we used the established reverse cycle day (RCD) method to predict day-of-ovulation for each participant (see Durante et al., 2011, 2012; Haselton & Gangestad, 2006; Miller et al., 2007). Specifically, we asked participants: (1) the start date of their last menstrual period and the previous menstrual period, (2) the expected start date of their next menstrual period, and (3) the typical length of their menstrual cycle. We used these dates to calculate conception probability in two ways. First, women were divided into a *High Fertility* group (near ovulation; cycle days 7 –

14) or a *Low Fertility* group (not near ovulation; cycle days 1 – 6 and 15 – 28). Day 14 is the estimated day of ovulation (see Haselton and Gangestad, 2006). Second, we calculated a continuous measure of conception probability as in Study 1. Conception probability was mean-centered prior to analysis. The experiment had a 2 (fertility: high vs. low) X 2 (target gender: men vs. women) between-subjects design. The study involved several tasks, the first of which involved an imagination and visualization task. The second task involved answering questions about consumer products.

Women in the male [female] target condition were asked to imagine that they were taking a class at a local community center by themselves. Participants read, "As you look around, you notice some of the other students in the class. Below are four of the men [women] who are also taking the class." Participants then saw four photographs of attractive men [women] from their class.

WOM. After viewing the photographs, participants in both conditions were asked to "Imagine that your class breaks for 10 minutes. During this break, people in the class chat with each other casually. Take a moment to consider the following situations and indicate how you would likely respond." Participants were asked to think about a variety of consumer purchases, both products and services and note the likelihood of mentioning the purchase(s) to the other men [women] in the class (1 = Not At All Likely, 9 = Extremely Likely). The following were the consumer items to be considered: bikini wax, Gap push-up bra, Forever 21 skinny jeans, Express pencil skirt, Manolo Blahnik high heels, Yves Saint Laurent lipstick, Gucci pencil skirt, Dior mascara, Valentino black dress, a piece of art, Tag Heuer watch, smartphone, Target linens, Energy drink, Hoover vacuum cleaner, and Sealy mattress.

What we hoped to find with Study 2 was that women were more willing to share and converse with other women about certain subjects at higher points of fertility rather than at lower levels in an effort to gain status.

Study 2

In this second study, we hoped to see the same results as in the first, now observing activity in online social settings.

Participants

Participants were female university students from a separate ovulatory study that were offered an additional $20 payment during the debriefing session of that study in return for a screenshot of their *Facebook* activity log for an approximate 30 days prior to the date of debriefing. Because the participants were drawn from a pool of women currently participating in an ovulatory cycle study, they were women with regular monthly menstrual cycles, i.e. not on hormonal contraception, and for whom we had obtained confirmation of ovulation (via LH hormone tests) during the previous menstrual cycle and, thus, could use this benchmark to calculate conception probability over the previous 30 days.

Procedure and Materials

Participants provided a screenshot of their *Facebook* activity log for the month preceding this study. The *Facebook* activity log is a list of each individual user's postings (status updates, check-ins, photos) and activity (likes, comments, shared content, friend requests) that occur each day. The activity log allowed us to code the type of activity (individual postings versus activity targeted toward other users) and determine the gender of the target of the participant's activity.

Assessing fertility. To determine fertility, we used the day of a positive LH test as day 13 of a normalized 28-day menstrual cycle. We used this marker to calculate conception probability. To do this, we calculated a continuous measure of the probability the participant would conceive if she engaged in a single act of intercourse for each day of recorded *Facebook* activity. We first calculated each woman's probability of conception corresponding to the woman's current estimated day of the cycle (Wilcox, Dunson, Weinberg, Trussell & Baird, 2001). Based on established actuarial tables that estimate the probability of conception from one act of intercourse for each day of the cycle, participants were assigned a value from 0 to .09, with higher values indicating higher fertility (higher conception probability). Conception probability was mean-centered prior to analysis.

Activity coding. To test our hypothesis, we coded each instance of the following seven activities: status update, check-in, photo posting, likes, comments, shared content, and friend requests, over the course of approximately one month for each participant, as well as the target gender of the activity. For the activity targeted toward another user (likes, comments, shared content, and friend requests), the gender of the target person was coded, in the following manner. The activity log notes the name of the person the participant is directing the activity toward. We then used the first name of the target to determine gender. Activity was not coded by gender of target if the first name was gender neutral (e.g., Chris) and, thus, gender could not be determined with confidence. Data pulled on birthdays or holidays were not coded because these are instances in which there is a normal increase in activity on social media. Prior to analysis we lined up the data for all participants onto a normalized 28-day cycle such that each day of the cycle corresponded with the associated probability of conception and contained the number of observations documented for that day across all participants.

CHAPTER 4: RESULTS

Study 1

An ANOVA revealed a significant main effect of target gender on word-of-mouth, $F(1, 412) = 192.65$, $p < .0001$. Women reported a greater desire to share word-of-mouth when the target was other women ($M_{\text{women}} = 5.19$ vs. $M_{men} = 2.95$). However, our central prediction concerned the effect of fertility by target gender on WOM. As predicted, there was a significant fertility x target gender interaction, $F(1, 412) = 4.34$, $p = .037$. Compared to low fertility, women in the female target condition reported greater likelihood of engaging in word of mouth at high fertility ($M_{high\ fertility} = 5.64$ vs. $M_{low\ fertility} = 5.01$), $F(1, 412) = 6.14$, $p = .014$. This effect disappeared, however, among women who imagined they would be talking to men ($M_{high\ fertility} = 2.90$ vs. $M_{low\ fertility} = 2.98$), $p = .71$. See Figure 2.

For the conception probability measure, there again emerged a significant main effect of condition, $\beta = -.57$, $t(412) = -13.99$, $p < .0001$. Women reported greater likelihood of sharing WOM when the target was other women. However, as predicted, results revealed a marginally significant conception probability x target gender interaction, $\beta = -.08$, $t(412) = -1.95$, $p = .052$. When women imagined they would be talking to other women, WOM propensity was positively correlated with conception probability, $r(198) = .14$, $p = .047$. As likelihood of conception increased, women were more likely to share word-of-mouth with other women. There was no such effect when women imagined they would be talking to men, $r(218) = -.032$, $p = .64$.

Looked at another way, at +/- 1 SD above and below the mean on conception probability there was a significant difference in likelihood of sharing WOM in the female target condition ($M_{high\ fertility} = 5.46$ vs. $M_{low\ fertility} = 4.93$), $t(412) = 2.28$, $p = .02$. At +/- 1 SD above and below the

mean on conception probability there was no difference in likelihood of sharing WOM in the male target condition, $p = .68$.

Study 2

There was a positive association between conception probability and overall social media activity, $\beta = .62$, $t(27) = 4.04$, $p < .001$. As fertility within the cycle increased, so too did women's activity on *Facebook*. Over 23.9% of postings occurred only for 4 days (11-14 days which shows the highest conception probability, .09). Further analysis using the activity directed toward other users (likes, comments, shared content, and friend requests) revealed a significant conception probability by target gender interaction, $\beta = 111.21$, $t(52)=3.45$, $p =.001$. Specifically, there was a significant effect of conception probability on *Facebook* activity directed toward other women ($\beta = 244.81$, $t(52)= 5.37$, $p < .001$; $M_{(-1SD)} = 10.68$ vs. $M_{(+1SD)} = 26.10$), but no effect for activity directed toward men ($p > .63$; $M_{(-1SD)} = 2.62$ vs. $M_{(+1SD)} = 4.03$). See Figure 1.

CHAPTER 5: CONCLUSIONS

It was hypothesized that women will want to interact with other women in social settings in order to gain status and rank. Across both of the studies conducted, results showed that women at peak fertility levels consistently increased their online social media and word-of mouth activities when interacting with other women, not men. In other words, it was found that fertility had a positive effect on the willingness of women to socially interact with other women.

CHAPTER 6: APPLICATIONS OF RESEARCH

From a marketing standpoint, social psychology holds much context in that it plays a great part in how products and services are displayed and presented to the public. Consumer behavior is something that is heavily studied in marketing because it allows marketers to get into the mind of the consumer and attempt to predict how the consumer will react to different scenarios, products, or services. While this study may not necessarily directly impact consumer studies, it may support existing theories about female and male consumers and how they make purchasing decisions based on certain behaviors. In women especially, where behaviors are most notably different throughout the month, marketers and consumer analysts would do well to understand as much about how women communicate and why they communicate as they can in order to more effectively understand that segment.

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APPENDIX

Figure 1. Conception probability correlates positively with *Facebook* activity targeted toward other women.

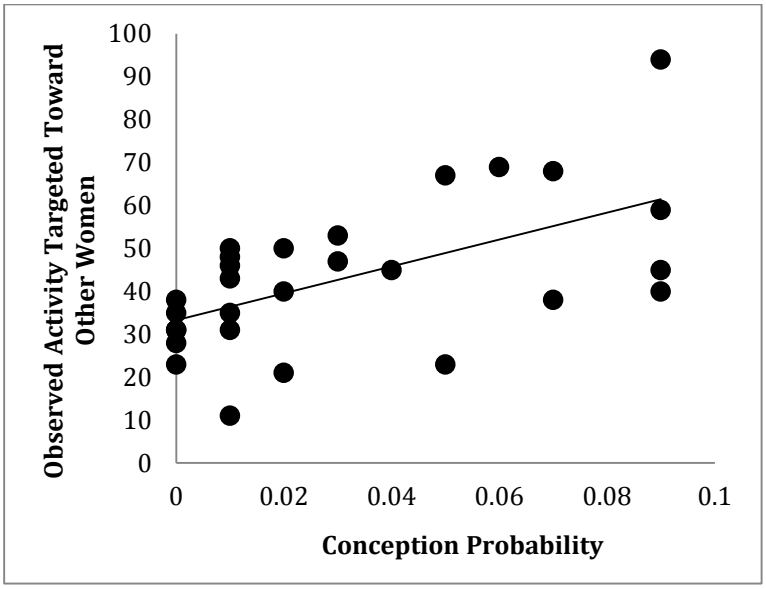
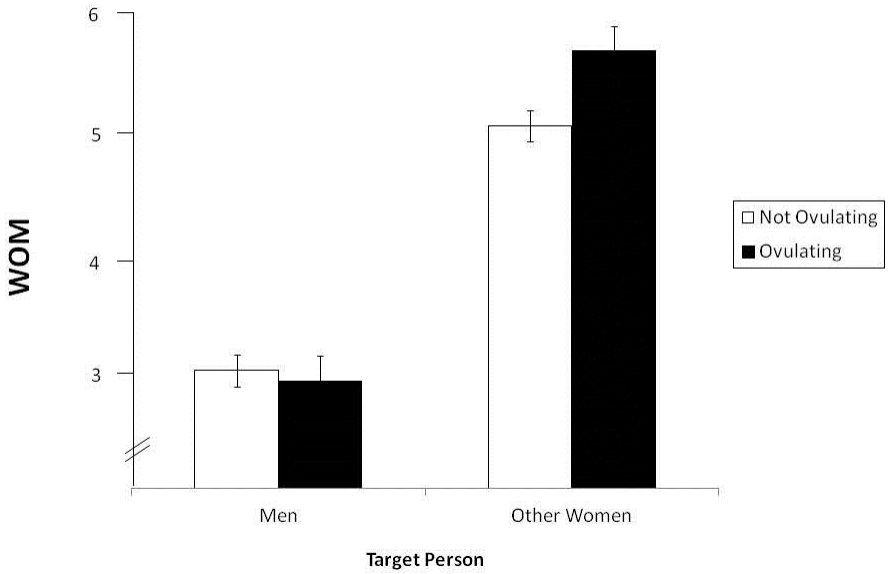


Figure 2. WOM as a function of fertility and target person (Study 2).



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