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Women's acceptance of cosmetic surgery across the menstrual cycle

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ABSTRACT

Women compete to attract mates through self-promotion of their physical characteristics, and this is most pronounced in the fertile late-follicular phase of their menstrual cycles. Thus, we hypothesized that women in the late-follicular phase would report greater acceptance of cosmetic surgery than women in the non-fertile mid-luteal phase. Contrary to our hypothesis, we found a marginally significant effect whereby acceptance of cosmetic surgery was higher in the luteal phase compared to the late-follicular phase when controlling for self-esteem. Lower acceptance of cosmetic surgery at peak fertility may reflect women's intolerance of artificial (i.e., dishonest) attractiveness-enhancing procedures when mating opportunities are most critical, but further research is needed. Additionally, women's general approval of cosmetic surgery was positively predicted by their reported appearance-contingent self-worth and negatively predicted by self-worth contingent on being a virtuous person. This suggests that the greater the virtue individuals believe themselves to possess, the more readily they ascribe judgment to others.

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1. Introduction

In women, several traits are apparent indicators of health and reproductive value and are considered attractive by men (e.g., clear complexion, Fink & Neave, 2005; femininity, Law Smith et al., 2006). Women draw comparisons between themselves and other women on the basis of these traits (Buss, Shackelford, Choe, Buunk, & Dijkstra, 2000). This phenomenon is referred to as female *intrasexual competition*, which encompasses two primary competitive strategies: self-promotion and derogation (Vaillancourt & Sharma, 2011). Derogation of female rivals is a covert strategy used to decrease a competitor's apparent mate value through disparaging their appearance (e.g., Fisher, 2004), excluding them from a social group, or circulating rumors regarding their promiscuity (Vaillancourt & Sharma, 2011). Women report feeling jealous and competitive when exposed to attractive women (e.g., Fink, Klappauf, Brewer, & Shackelford, 2014) and jealousy over physical attractiveness is a recurrent explanation for female-directed social aggression (Owens, Shute, & Slee, 2000). Relatedly, self-promotion involves augmenting physical characteristics to garner the attention of potential partners and is a commonly used intrasexual competitive tactic (e.g., Haselton, Mortezaie, Pillsworth, Bleske, & Frederick, 2007).

Female intrasexual competition is most pronounced in the fertile late-follicular phase of the menstrual cycle (but see Cobey, Klipping, & Buunk, 2013). For example, women are more competitive and selfish during bargaining games when playing against other women (Lucas, Koff, & Skeath, 2007) and may downgrade the attractiveness of female

rivals more (Fisher, 2004) near ovulation. Fisher (2004) found that women tested on cycle days characterized by high estradiol (which peaks near ovulation, see Stanislaw & Rice, 1988) rated other women's facial attractiveness more negatively than those tested on low estradiol days, although this may not be about fertility per se because some of the high estradiol days fell within the non-fertile mid-luteal phase. Similarly, Hahn, Fisher, Cobey, DeBruine, and Jones (2016) documented a positive, within-subjects effect of women's testosterone (which also peaks near ovulation, Bloch, Schmidt, Su, Tobin, & Rubinow, 1998; Dabbs, 1990) on their intrasexual competition, but not of estradiol or progesterone. However, Cobey et al. (2013) used a within-subject design and transvaginal ultrasonography to assess fertility status and did not find that women's intrasexual competition increased when fertile, although this study used a very small sample. Moreover, women have been found to experience other behavioral and psychological changes around ovulation related to intrasexual competition, such as preferring sexier clothing more (Durante, Li, & Haselton, 2008), applying more cosmetics (Guéguen, 2012), and increasing self-grooming and ornamentation (Haselton et al., 2007) during peak fertility versus other times. Women's self-esteem may also decrease during the fertile phase of the menstrual cycle (Hill & Durante, 2009), which may increase the likelihood of spending money on attractiveness-enhancing products like cosmetics (Durante, Griskevicius, Hill, Perilloux, & Li, 2011).

Cosmetics have been used for centuries to enhance attractiveness (e.g., Marwick, 1988) and represent a method of artificially increasing one's perceived genetic quality (see Etcoff, Stock, Haley, Vickery, & House, 2011). Accordingly, women wearing facial cosmetics are consistently rated as being more attractive by men (e.g., Mulhern, Fieldman, Hussey, Lévêque, & Pineau, 2003). Medical advances have provided

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novel methods for improving appearance through cosmetic surgery procedures (e.g., Singh & Randall, 2007). Several popular procedures (e.g., breast augmentation; American Society of Plastic Surgeons, 2011) cater to men's preferences for physical attributes, such as relatively large breast size (Jasieńska, Ziomkiewicz, Ellison, Lipson, & Thune, 2004) and feminine faces (Law Smith et al., 2006). Similar to makeup, cosmetic surgery represents dishonest signaling whereby one advertises artificially-enhanced indicators of genetic quality. However, unlike cosmetics, cosmetic surgery carries significant health risks. Priming women with intersexual courtship and intrasexual competition increases their reported willingness to engage in high-risk appearance-enhancing activities (Hill & Durante, 2011), and women report that enhancement of their physical features is a competitive tactic (Walters & Crawford, 1994), suggesting that cosmetic surgery is an example of self-promotion as an intrasexual strategy. Indeed, Arnocky and Piché (2014) found that men and women who report being more intrasexually competitive have more positive attitudes about cosmetic surgery. Here we investigated the relationship between menstrual cycle phase and women's acceptance of cosmetic surgery using a between-subjects design. We compared women estimated to be in the fertile late-follicular phase to women estimated to be in the mid-luteal (non-fertile) phase of their menstrual cycles. We hypothesized that women in the late-follicular phase would report greater acceptance of cosmetic surgery.

2. Materials and methods

2.1. Participants

Participants were recruited from the psychology subject pool at a Midwestern university and from the online community via social media websites (e.g., Facebook). Subject pool participants were compensated with course credit and other participants were not compensated. Participation was restricted to naturally-cycling women between 18 and 40 years of age who were not using exogenous hormones (and had not in the previous 3 months), were not pregnant or breastfeeding, and who reported regular menstrual cycles between 24 and 35 days in length. To maximize differences based on fertility status, we included participants who reported being at one of two points in the cycle (late-follicular or mid-luteal) that show fairly predictable hormonal patterns (e.g., Bakos, Lundkvist, Wide, & Bergh, 1994). We deemed the high fertility (late-follicular) phase to include participants' predicted day of ovulation and the preceding 6 days (see Jochle, 1973; Wilcox, Weinberg, & Baird, 1995) and the mid-luteal phase as 6–10 days before the estimated next menstrual onset. Data from participants who did not meet these inclusion criteria were not saved.

Participants ($N = 121$, 66 predicted to be in the late-follicular/high fertility phase; age: $M = 23.92$ years, $SD = 5.26$) primarily Caucasian (79.3%; 7.4% African American, 4.1% Asian, 6.6% Hispanic, and 2.5% "other") and heterosexual (90.0%, 7.5% bisexual, and 2.5% homosexual). Roughly half (48.7%) reported being in a committed relationship. Procedures were in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for experiments involving humans, was approved by the university ethics committee, and all persons gave their informed consent prior to participation. Participation occurred online.

2.2. Procedure

Participants completed a demographic questionnaire that included questions assessing eligibility (e.g., cycle regularity). They reported the date of their previous two menstrual onsets, their typical menstrual cycle length, their next estimated menstrual onset, and how accurate they deemed each estimate on a five-point scale (anchors: 1 = not at all accurate, 5 = completely accurate; for similar methods, see

Gangestad, Thornhill, & Garver, 2002; Gangestad, Thornhill, & Garver-Apgar, 2005). Using this information, we took an average (weighted by participants' reported certainty) of three cycle lengths: the length of their last cycle (calculated from their reported last two onset dates), the length of their current cycle (calculated from their last menstrual onset and predicted next onset), and their estimated average cycle length. Each participant's point in their menstrual cycle relative to the date of ovulation was calculated using the backward-counting method (e.g., Gangestad, Simpson, Cousins, Garver-Apgar, & Christensen, 2004), whereby we counted forward one cycle length from reported last menstruation and then counted backward 15 days (see Dixon, Schlesselman, Ory, & Blye, 1980) to estimate the day of ovulation.

We assessed women's attitudes about cosmetic surgery using the Acceptance of Cosmetic Surgery Scale (ACSS; Henderson-King & Henderson-King, 2005). Because women's self-esteem may decrease at ovulation (Hill & Durante, 2009), we included the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965). Finally, participants completed the Contingencies of Self-Worth Scale (CSWS; Crocker, Luhtanen, Cooper, & Bouvrette, 2003), which includes seven subscales measuring where individuals derive their feelings of self-worth. We presented the entire CSWS to participants, but were specifically interested in the appearance subscale because high appearance-contingent self-worth (ACSW) is associated with positive attitudes about cosmetic surgery (e.g., Delinsky, 2005).

3. Results

ACSS data were log transformed to correct skew (Kolmogorov-Smirnov = .094, $p = .054$; $M = 3.59$; $SD = .39$, Range = 2.84–4.26). First, we tested for differences in self-esteem and ACSW between our high- and low-fertility participants, but found no significant differences (RSES: $t(112) = .243$, $p > .80$; ACSW: $t(100) = .934$, $p > .35$). RSES scores were not correlated with total ACSS scores ($r = -.142$, $p > .14$), but were negatively correlated with ACSW scores ($r = -.411$, $p < .001$).

A one-way ANOVA with ACSS as the dependent variable and cycle phase as the fixed factor revealed no effect of menstrual cycle phase on ACSS scores, $F(1, 111) < 2.18$, $p > .14$. Including ACSW as a covariate revealed a significant main effect of ACSW, $F(2,99) = 16.109$, $p < .001$, $\eta^2 = .144$, whereby women high in ACSW reported higher ACSS scores ($M = 43.3$, $SD = 13.6$) than other women ($M = 34.2$, $SD = 13.4$). Repeating the above analyses with RSES scores as a covariate revealed a marginally significant main effect of cycle phase ($F(2105) = 3.199$, $p = .077$, $\eta^2 = .03$), whereby participants had higher ACSS scores during the luteal phase ($M = 3.55$, $SE = .054$) than during the follicular phase ($M = 3.43$, $SE = .051$) when controlling for differences in self-esteem. There were no other significant effects (all $F < .943$, all $p > .33$).

3.1. Additional analyses

A linear regression revealed that ACSS scores were positively predicted by women's ACSW (late-follicular phase: $\beta = .334$, $t = 2.55$, $p = .014$; mid-luteal phase: $\beta = .408$, $t = 2.93$, $p = .005$), which accounted for 11–17% of the variance in ACSS scores (late-follicular phase: $R^2 = .11$, $F(1, 53) = 6.52$, $p < .014$; luteal phase: $R^2 = .17$, $F(1, 44) = 8.59$, $p < .005$). Multiple regression using Akaike Information Criterion for model selection and entering all CSWS subscales revealed that the appearance and virtue subscales offered the best model for predicting scores on the ACSS, accounting for 14.9% of the variance, $F(2, 272) = 23.69$, $R^2 = .149$, $p < .001$. A higher acceptance of cosmetic surgery is positively related to self-worth contingent on one's appearance, $\beta = .367$, $t = 6.54$, $p < .001$, and is negatively related to self-worth contingent on being a virtuous or moral person, $\beta = -.130$, $t = -2.31$, $p = .022$.

4. Discussion

We found a marginally significant main effect of cycle phase on acceptance of cosmetic surgery when we controlled for individual differences in self-esteem. Contrary to our hypothesis, acceptance of cosmetic surgery was higher during the mid-luteal phase of the menstrual cycle than the late-follicular phase. These findings may nonetheless reflect heightened intrasexual competition and derogation of rivals (e.g., Fisher, 2004) at peak fertility. Women's tolerance for other women engaging in dishonest signals of mate quality may decrease at peak fertility, thus decreasing their acceptance of cosmetic surgery in general. Alternatively, because women are more attractive during the fertile phase of the menstrual cycle (e.g., Roberts et al., 2004), they may be less self-conscious about their appearance. Indeed, women report feeling sexier and more attractive around ovulation compared to other times (e.g., Haselton & Gangestad, 2006). Thus, reduced acceptance of extreme appearance-enhancing techniques at high fertility may be a by-product of women feeling more attractive. Although other research has found that women's self-esteem is lowest during the fertile phase of the menstrual cycle (Hill & Durante, 2009), we did not replicate this finding. To be clear, we do not believe our findings suggest that women impulsively decide to undergo cosmetic surgery at a specific point in their cycles. Rather, we suggest that women's attitudes toward cosmetic procedures may fluctuate as a function of their menstrual cycle phase. This possibility should be examined using a within-subject design in future work.

The average ACSW score was fairly low in the current sample, which aligns with previous work (e.g., Delinsky, 2005). Similarly, although women's use of makeup positively increases social perceptions (e.g., Richetin, Huguet, & Croizet, 2007), women who wear heavier makeup are perceived negatively (e.g., Huguet, Croizet, & Richetin, 2004). This suggests that deceptive mate-attraction tactics are considered socially acceptable to an extent, so long as they do not exceed group norms. Our finding that ACSW is related to cosmetic surgery acceptance suggests that women who place a greater importance on appearance as a defining factor of their self-worth are more prone to seek cosmetic procedures. Additionally, women who place less importance on perceiving themselves as moral are more accepting of cosmetic surgery, which supports Delinsky's (2005) argument that cosmetic surgery may be considered irrelevant to moral values or even immoral for those individuals who place a greater deal of importance on virtue.

This study had some limitations to consider. First, self-reported menstrual cycle data is prone to error, particularly when the estimates are made toward the end of a woman's cycle (e.g., Jukic, Weinberg, Wilcox, & McConaughy, 2008) and a recent methodological review that tested the validity of counting methods found that unless one uses a confirmed onset of menses, validities are frequently modest (Gangestad et al., 2016). Additionally, we assumed ovulation occurs 15 days prior to next menstrual onset (as per Dixon et al., 1980), but Trussell et al. (1998) argues that 14 days prior to next menses provides a less biased estimate, suggesting our estimates may be off by about a day. However, by averaging three menstrual cycle length estimates (weighted by reported certainty) and excluding participants with irregular cycles, we hope to have minimized error. Moreover, this study designated the fertile phase to comprise 7 high-fertility days, which is more valid than shorter windows of discrete fertility used in some studies (see Gangestad et al., 2016). Second, we used a between-subjects design, so it is possible that unknown individual differences between our groups are influencing the results. Indeed, our effect was only marginally significant, possibly as a result of unmeasured participant characteristics between our groups increasing variance, so our results should be interpreted with due caution. Finally, we did not measure hormone levels. We therefore suggest that future studies in this area make use of more objective measures to determine participant fertility, employ a within-subject design, and use measured hormone levels.

4.1. Conclusions

Acceptance of cosmetic surgery was higher in the luteal phase versus the late-follicular phase, but only when controlling for self-esteem. Although this finding was not quite significant, it suggests that women may be less tolerant of extreme attractiveness-enhancing procedures when mating opportunities are most critical, perhaps because these strategies are viewed as giving competitors an unfair advantage. Additionally, we replicated Delinsky's (2005) finding that acceptance of cosmetic surgery is negatively associated with one's perception of being a moral person. A higher investment in the idea that one is a moral person may allow one to more readily cast judgment on others, especially potential competitors.

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