

# Sex Differences in the Perceived Dominance and Prestige of Women With and Without Cosmetics

*Perception*

2016, Vol. 45(10) 1166–1183

© The Author(s) 2016

Reprints and permissions:

[sagepub.co.uk/journalsPermissions.nav](http://sagepub.co.uk/journalsPermissions.nav)

DOI: 10.1177/0301006616652053

[pec.sagepub.com](http://pec.sagepub.com)



**Viktorija R. Mileva**

University of Stirling, Scotland, UK

**Alex L. Jones**

Swansea University, Wales, UK

**Richard Russell**

Gettysburg College, PA, USA

**Anthony C. Little**

University of Stirling, Scotland, UK

## Abstract

Women wearing cosmetics have been associated with a higher earning potential and higher status jobs. However, recent literature suggests that status can be accrued through two distinct routes: dominance and prestige. In two experiments, we applied a standardized amount of cosmetics to female faces using computer software. We then asked participants to rate faces with and without cosmetics for various traits including attractiveness, dominance, and prestige. Men and women both rated the faces with cosmetics added as higher in attractiveness. However, only women rated faces with cosmetics as higher in dominance, while only men rated them as higher in prestige. In a follow-up study, we investigated whether these enhanced perceptions of dominance from women were caused by jealousy. We found that women experience more jealousy toward women with cosmetics, and view these women as more attractive to men and more promiscuous. Our findings suggest that cosmetics may function as an extended phenotype and can alter other's perceptions differently depending on the perceiver's sex.

## Keywords

cosmetics, sex differences, attractiveness, social status, jealousy

---

## Corresponding author:

Viktorija R. Mileva, University of Stirling, Scotland, UK.

Email: [v.r.mileva@stir.ac.uk](mailto:v.r.mileva@stir.ac.uk)

## Introduction

The use of cosmetics to manipulate facial appearance has a long history, with historical examples showing the use of kohl around the eyes in Ancient Egypt (Lucas, 1930). In this study, we examined the impact of cosmetics use on perceptions of women's social status and attractiveness. Skin and lip coloration have been associated with attractiveness and health (Fink, Grammer, & Matts, 2006; Jones, Porcheron, Sweda, Morizot, & Russell, 2016.; Matts, Fink, Grammer, & Burquest, 2007; Russell et al., 2016.; Stephen, Coetzee, Law Smith, & Perrett, 2009; Stephen & McKeegan, 2010), and a high contrast between the eyes and lips with the rest of the face is associated with youth, femininity, and attractiveness (Porcheron, Mauger, & Russell, 2013; Russell, 2003, 2009). Cosmetics, including concealers, eye-liner, and lipstick, can all act to make the skin appear homogenous and increase contrast between features (for an example of this effect see stimuli used in Jones, Russell, & Ward, 2015). Indeed, numerous studies have found that using cosmetics makes women appear healthier, more attractive, and more feminine (Cash, Dawson, Davis, Bowen, & Galumbeck, 1989; Cox & Glick, 1986; Etoff, Stock, Haley, Vickery, & House, 2011; Mulhern, Fieldman, Hussey, Lévêque, & Pineau, 2003; Nash, Fieldman, Hussey, Lévêque, & Pineau, 2006; Richetin, Croizet, & Huguët, 2004; Russell, 2003, 2009). Cosmetic use may also be linked to success in the work place. Beautiful people of both sexes tend to have a higher earning potential than those who are below-average or average looking (Hamermesh & Biddle, 1993) and female waitresses wearing cosmetics have been shown to earn more tips than those without (Jacob, Guéguen, Boulbry, & Ardiccioni, 2009). Cosmetics have also been associated with perceived higher status, with women wearing cosmetics being judged to have higher status jobs including "company director" and "architect" versus low-status jobs such as "child-minder" and "cleaner" (Nash et al., 2006). Using an implicit association task, another study found that pictures of women's faces with cosmetics were also associated with higher status jobs more than lower status jobs (Richetin et al., 2004).

In humans, high social status can confer benefits including greater authority, wealth, and physical and mental wellbeing (Adler, Epel, Castellazzo, & Ickovics, 2000; Ball, Eckel, Grossman, & Zame, 2001; Ridgeway, 1987). Recent theoretical advances suggest that there are two largely different routes to gaining high status. The first, *dominance*, shares many similarities to the dominance defined in the non-human animal literature and is described as using force, coercion, or intimidation to achieve ones' goals (Cheng, Tracy, & Henrich, 2010; Henrich & Gil-White, 2001). This contrasts with *prestige*, in which people will freely bestow high status to an individual due to their exceptional abilities and qualities (Cheng et al., 2010; Henrich & Gil-White, 2001). As Henrich and Gil-White (2001) point out, prestigious individuals are looked up to by members of their group, while dominant individuals are generally feared.

There has been some experimental support for the distinction between dominance and prestige. Cheng, Tracy, Foulsham, Kingstone, and Henrich (2013) found that in the same-sex groups of students, those using a dominant strategy were less well liked than those using a prestigious strategy; however, as theory predicts, both strategies were rated as being highly influential. Cheng et al. (2010) also found that, for both male and female university students, self-ratings of hubristic pride, which is associated with arrogance, were greater in individuals who perceived themselves as more dominant. Self-ratings of authentic pride, the pride associated with confidence, were greater in individuals who perceived themselves as more prestigious. Moreover, Cheng et al. (2010) also found that self-perceived dominance was positively correlated with personality traits including narcissism and aggression, while self-perceived prestige was associated with prosociality and genuine self-esteem. At the proximate level, Men who rated themselves as prestigious had lower circulating levels of testosterone than men who rated themselves as more dominant; using regression modeling,

prestige was even found to be a predictor of lower testosterone, and the authors reason that this might serve as a regulatory mechanism to lower aggression (Johnson, Burk, & Kirkpatrick, 2007). This research presents compelling evidence that there are two viable and distinct routes to achieving high status.

Until now, much research has focused on characteristics of high status in men: both behavioral and physical. For example, men with higher facial width-to-height ratios (fWHR; which is thought to be a marker of physical dominance) have been associated with increased aggression (Carré & McCormick, 2008; Carré, McCormick, & Mondloch, 2009) and deception (Stirrat & Perrett, 2010), while also possessing a higher achievement drive (Lewis, Lefevre, & Bates, 2012). Cheng et al. (2010) also studied other-perceived dominance versus prestige in male athletes and found prestigious men to be associated with prosocial and intelligent attributes, while dominant men were thought to be more aggressive and less cooperative.

While some of the above-mentioned studies do concern women's prestige and dominance (see Cheng et al., 2013, 2010; Johnson et al., 2007), these studies are based on self-report data which may differ from other's opinions of an individual's dominance and prestige. How cosmetics use fits into the bigger picture of women's social status, with specific focus on prestige and dominance has, to our knowledge, never been tested. In Western society, the almost exclusively female behavior of cosmetics use has been shown to make women appear of higher status (Nash et al., 2006); however, whether the mechanism is through increased prestige or dominance has yet to be determined.

### Experiment 1

In order to address relationships between dominance, prestige, and status generally, in this experiment, we artificially applied a standardized amount of cosmetics to female faces and, using a within-subjects design, asked male and female participants to rate the faces for attractiveness, dominance, and prestige. Studies report that women wearing cosmetics appear both more attractive and more competent (Etcoff et al., 2011). If competence is a measure of ability, then we would predict that women with cosmetics ought to be rated as prestigious rather than dominant. However, as femininity (a strong correlate of attractiveness) has previously been associated with *social dominance*, a probable facet of 'dominance' (Watkins, Quist, Smith, Debruine, & Jones, 2012), it might be that women with cosmetics are considered dominant by others.

Moreover, women's and men's strategies for gaining high status differ, as women are generally not as physically strong as men (Lassek & Gaulin, 2009), and are less likely to aggress physically in order to solve a conflict (Björkqvist, 1994; Björkqvist, Lagerspetz, & Kaukiainen, 1992; Campbell, 1999). This suggests that as dominance and social status acquisition behaviors between the sexes differ, it is plausible that perceptions of cosmetics use in women will also differ. That is, men and women may view women's cosmetics practices differently as a function of their own status acquisition mechanisms. Hence, while women with cosmetics are associated with higher status professions (Nash et al., 2006; Richetin et al., 2004), whether they are perceived as being high status through the perception of higher dominance or prestige is unknown, and whether this differs based on the perceivers' sex has yet to be explored.

## Materials and Methods

### Stimuli Creation

Forty-five female undergraduate students (age  $M=21.18$  years,  $SD=1.92$ , range 18–27 years) from Bangor University were recruited for this part of the experiment. Models were

asked to remove all traces of facial cosmetics and jewelry, and to tie their hair back from their face as much as possible. Models were then photographed using a Nikon D3000 SLR camera against a white background, at a distance of approximately one meter, with a Nikon SS-400 flash angled 45° towards the ceiling. Camera settings were kept constant between shots, with an ISO speed rating of 200, a 1/60 s exposure time, and a lens aperture of F5.3. After the initial photograph, models were provided with a range of cosmetics items including eye-liner, mascara, blush, foundation, etc., and instructed to apply cosmetics as she would on a typical “night out”. Subsequently, a second photograph was taken. All camera settings were identical between the first and second photographs. All models provided informed consent to have their pictures used for future experiments (see Jones & Kramer, 2015; Jones, Kramer, & Ward, 2014).

Using Psychomorph software (Tiddeman, Burt, & Perrett, 2001; <http://users.aber.ac.uk/bpt/jpsychomorph>) each of the 90 facial images (those with and without cosmetics) were delineated using a custom template consisting of 160 landmark points. The landmark points were placed to follow the outline of the face and the eyes, mouth, and eyebrows. Points also carefully delineated the bridge of the nose and the nostrils, the lines under the eyes, the philtrum, and the fold above the eyelid. The 45 faces with no cosmetics were then averaged to create a *without cosmetics composite*, while the 45 faces with cosmetics were averaged to create a *with cosmetics composite*. These were aligned on interpupillary distance and symmetrized (Figure 1). Composite images are created to allow us to apply a standardized level of cosmetics to female faces, where there is no variation in the amount of make-up applied to each face.

As such, we used the composite images to apply cosmetics to the original 45 female faces without cosmetics. With Psychomorph, a 100% manipulation was used to evenly simulate the appearance of cosmetics on each face, by changing the coloration of the face in the same way that the *without cosmetics composite* can be changed to become the *with cosmetics composite*. In this way, we were able to manipulate each face in precisely the same way, simulating the visual effects of cosmetics. Only texture and color were manipulated, with no changes applied



**Figure 1.** Composite images of 45 women’s faces with no cosmetics (left) and with cosmetics (right). A depiction of the template, the landmark points, which was used to delineate faces is also shown (middle).

to face shape. The composite images both have even, homogeneously pigmented skin tone due to the morphing procedure which averages out the small-scale pigmentation irregularities that are present in normal skin. Thus the two composites differed only in terms of the coloration of different parts of the face (e.g., redder lips), but not in terms of the evenness of the skin tone. Because of this, the effect of our manipulation included all the major aspects of cosmetics as applied by the 45 women, with one exception—it did not increase the evenness of the skin tone, which is the effect of applying foundation and concealer.

The resulting 90 face images (45 with cosmetics and 45 without) were then aligned on interpupillary distance and cropped such that the left and right zygion were visible, and the hairline and the chin provided the upper and lower constraints. Additionally, images were each resized to  $296 \times 448$  pixels for online presentation. We excluded five faces from our stimuli set, as four of the original faces with no cosmetics had remnants of cosmetics around the eyes, while one woman had no discernible eyebrows. Thus, 80 stimuli (40 with cosmetics and 40 without) were included in our experiment (Figure 2).

### Participants

A total of 128 University of Stirling students (59 female; age  $M = 19.30$  years,  $SD = 2.10$ ; age range: 17–29 years) were recruited to take part in the online portion of this experiment, for course credit.

### Design

Examination of the data revealed that out of our initial sample of participants, 112 failed to assign a rating on every trial. As such, we instead averaged ratings across all participants to



**Figure 2.** Example stimulus with no make-up (left) and with manipulation of added (100%) make-up (right). This figure was made by combining facial images of 3 women in the dataset so as to protect each woman's anonymity. However, for the actual experiment, single pictures of each of the women's faces were presented to participants.

provide a score for each face under both cosmetics conditions, for each trait. That is, we chose to take all available ratings and average them to provide a rating for each stimulus. Each image was rated by an average of 49.17 females ( $SD=2.18$ ) and 53.81 males ( $SD=2.33$ ). This approach has been used to illustrate the effect size of various factors of attractiveness in previous literature (Jones & Kramer, 2015; Morrison, Morris, & Bard, 2013). As such, we employed a 2 (Rater Sex: Female, Male)  $\times$  2 (Manipulation: No Cosmetics, With Cosmetics) repeated measures design by using the stimuli as the unit of analysis. This allowed both manipulation type and sex of rater to be within-stimuli factors. Each stimulus was rated with and without cosmetics and mean scores were calculated separately for each sex of rater. This meant for each stimulus we had four ratings: female ratings of stimuli with and without cosmetics and male ratings of stimuli with and without cosmetics. For each stimulus, we also had three types of ratings as dependent variables: attractiveness, dominance, and prestige.

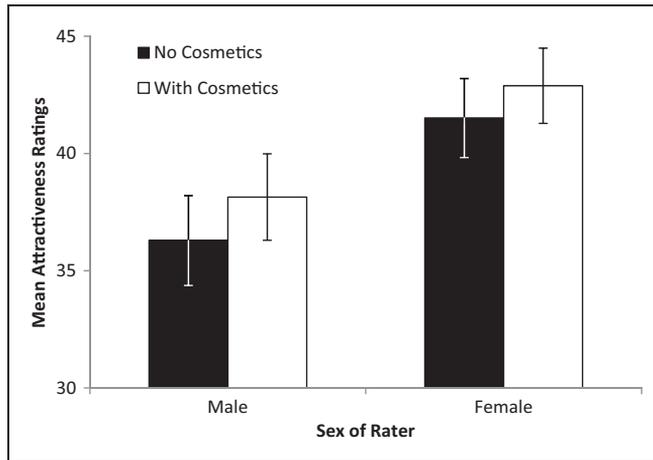
### Procedure

Participants were provided with a link to the survey, which was created using Qualtrics ([www.qualtrics.com](http://www.qualtrics.com); Qualtrics Labs Inc., Provo, UT). Participants were first asked their age, sex, nationality, and other standard demographic information. Following this, each student was instructed that they would be seeing faces of women and was asked to rate them on certain attributes in comparison to the average woman. They were not told that cosmetics use was being manipulated. Each participant was then randomly assigned to one of the two blocks: all faces with no cosmetics, or all faces with cosmetics. Subsequently, they were randomly assigned to a specific attribute which they were to rate the faces for first. They then had to rate all 40 faces (which were fully randomized) for that attribute before continuing on to the next attribute within that block. There was an opportunity to rate faces for three different attributes (attractiveness, dominance, or prestige) and each participant was directed to use a 101 point scale (0 being “much less than average” and 100 being “much more than average”) to make their judgment. Once they had completed rating the 40 faces for all three attributes, they moved on to the other block. For example, if they had seen all faces with cosmetics first then they would subsequently see all faces without cosmetics, or vice versa. The attributes and faces to be rated within this second block were randomized as described above. Consequently, every participant provided a total of 240 ratings (3 Attributes  $\times$  2 Cosmetics Conditions  $\times$  40 Faces). We allowed participants to use their gut feeling when rating for each attribute; this procedure has been used in previous studies (e.g., Oosterhof & Todorov, 2008).

## Results

### Attractiveness

To investigate the difference in perceptions of attractiveness for stimuli with or without cosmetics, we conducted a repeated-measures ANOVA with *manipulation* (no cosmetics or with cosmetics) and *sex of rater* (male or female) as factors. There was a significant main effect of *manipulation*  $F(1, 39) = 30.31, p < .001, \eta_p^2 = 0.44$ , and a significant main effect of *sex of rater*  $F(1, 39) = 141.21, p < .001, \eta_p^2 = 0.78$ . However, there was no significant interaction between *manipulation* and *sex of rater*  $F(1, 39) = 1.88, p = 0.18, \eta_p^2 = 0.05$  (Figure 3). These results suggest that attractiveness ratings are higher for women wearing cosmetics than those without cosmetics, regardless of whether the face is rated by a man or woman. However, women appear to rate all faces as higher in attractiveness than men, irrespective of their cosmetics use.



**Figure 3.** Attractiveness ratings for faces with and without cosmetics, as judged by male and female raters. Error bars denote  $\pm 1$  SEM and asterisks denote significance at  $p < .05$ .

### Dominance

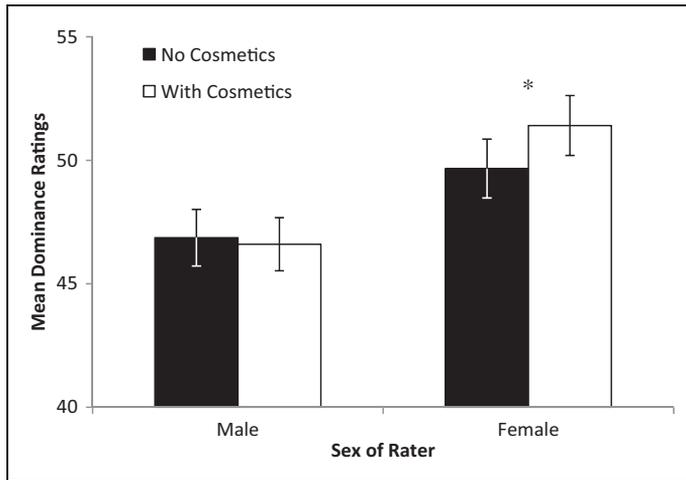
A second repeated-measures ANOVA was performed to investigate perceptions of dominance for stimuli with or without cosmetics, again with *manipulation* (no cosmetics or with cosmetics) and *sex of rater* (male or female) as factors. There was a significant main effect of *manipulation*  $F(1, 39) = 6.03, p = .02, \eta_p^2 = 0.13$ , and a significant main effect of *sex of rater*  $F(1, 39) = 76.95, p < .001, \eta_p^2 = 0.66$ . However, these were qualified by a significant interaction between *manipulation* and *sex of rater*  $F(1, 39) = 9.54, p = .004, \eta_p^2 = 0.20$  (Figure 4). A simple effects analysis examining the presence or absence of cosmetics for males revealed no difference,  $F(1, 39) = 0.34, p = 0.57, \eta_p^2 = .01$ . However, faces with cosmetics showed a significant increase in perceived dominance when judged by female participants,  $F(1, 39) = 16.96, p < .001, \eta_p^2 = 0.30$ .

### Prestige

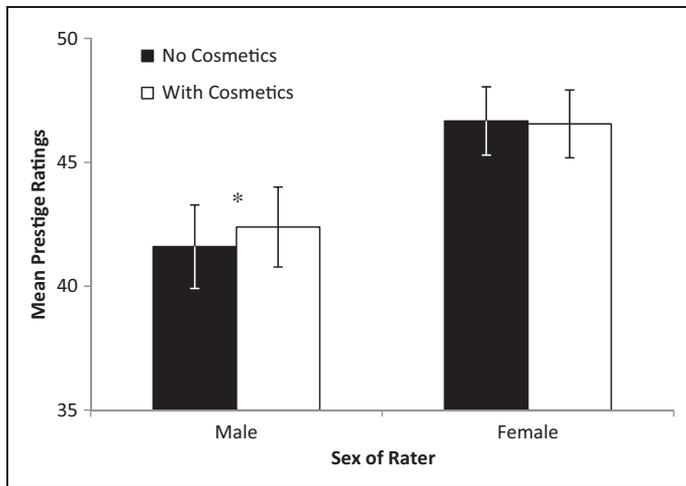
To test whether cosmetics use had any effect on ratings of prestige, a third repeated-measures ANOVA was performed with *manipulation* (no cosmetics or with cosmetics) and *sex of rater* (male or female) as factors. There was no main effect of *manipulation*  $F(1, 39) = 1.29, p = 0.26, \eta_p^2 = .03$ , but there was as a main effect of *sex of rater*  $F(1, 39) = 88.45, p < .001, \eta_p^2 = 0.69$ . There was also a near significant interaction between *manipulation* and *sex of rater*  $F(1, 39) = 3.64, p = .06, \eta_p^2 = .09$  (Figure 5). Although only trending towards significance, inspection of the means revealed that this interaction appeared to be the reverse pattern of the interaction occurring with dominance ratings. As such, we carried out an exploratory simple effects analysis. For female raters, there was no significant difference between cosmetics conditions,  $F(1, 39) = 0.84, p = 0.77, \eta_p^2 = 0.00$ . However, faces with cosmetics received higher ratings of prestige from male raters,  $F(1, 39) = 5.61, p = .02, \eta_p^2 = 0.13$ .

### Discussion

Both sexes rated women as more attractive with cosmetics than without, and perceived women with cosmetics as being of higher status. However, in male raters, we found that



**Figure 4.** Dominance ratings for faces with and without cosmetics, as judged by male and female raters. Error bars denote  $\pm 1$  SEM and asterisks denote significance at  $p < .05$ .



**Figure 5.** Prestige ratings for faces with and without cosmetics, as judged by male and female raters. Error bars denote  $\pm 1$  SEM and asterisks denote significance at  $p < .05$ .

women wearing cosmetics were perceived as being higher in prestige, but no different in dominance than those without cosmetics. There may be several explanations for this finding. First, men do not tend to compete directly with women, and competition with other males takes a different form than that in women. That is, male dominance can be decided more easily through physical aggression (Björkqvist, 1994; Campbell, 1999; Wilson & Daly, 1985) which is not a route used commonly by women to assert their dominance. It is unlikely then, that men would need to physically aggress against a woman in competition for something, and men are also stronger on average and, therefore, more likely to win in this type of context (Lassek & Gaulin, 2009). Thus, for men, a woman’s dominance would not be expected to differ depending on her cosmetics use. Second, attractive individuals tend to

be associated with other positive qualities. For example, highly attractive individuals are perceived to have a better sense of humor, be higher in extraversion, and even be more likely to have a happier marriage than unattractive individuals (Albright, Kenny, & Malloy, 1988; Cowan & Little, 2013; Dion, Berscheid, & Walster, 1972). This attractiveness “halo” effect may be the reason why men think women with cosmetics are also more prestigious, as prestigiousness itself is associated with the positive characteristics such as prosociality and genuine self-esteem (Cheng et al., 2010). Finally, cosmetics have been shown to make women appear more competent (Etcoff et al., 2011), and prestige has been associated with possessing skills and knowledge (Henrich & Gil-White, 2001). Thus, the competence attributed to cosmetics use might directly impact men’s perceptions of women’s prestige. However, competence may also be attributable to the aforementioned “halo” effect, whereby attractive women have the added positive quality of competence. Whatever the reasons, men appear to view women with cosmetics as both more attractive and higher in prestige.

In contrast to men, women rated women with cosmetics to be more dominant than those without, while there was no difference in their ratings of prestige between women with and without cosmetics. This might be due to raters finding other attractive women more threatening. Men have been shown to prefer women who are younger and more attractive, as these can be indicators of fertility and potential reproductive success (Buss, 1989; Kenrick & Keefe, 1992). As cosmetics can help a woman look both younger and more attractive, this could make other women feel threatened, and in turn jealous. Indeed, in several studies, women report that they would feel more jealousy towards physically attractive rivals than less physically attractive rivals (Buss, Shackelford, Choe, Buunk, & Dijkstra, 2000; Dijkstra & Buunk, 1998), as well as feeling threatened by more feminine rivals (Fink, Klappauf, Brewer, & Shackelford, 2014). Highly attractive women are also perceived as having a greater number of sexual partners and as less restricted in their sexual encounters (Boothroyd, Jones, & Burt, 2008; Stillman & Maner, 2009). Thus it may be that women feel more threatened by attractive women and conversely may judge them as more likely to attract, or even to poach, mates.

Since dominance has been defined in the literature as attaining social status through manipulation or coercion (e.g., Cheng et al., 2010; Henrich & Gil-White, 2001), female raters may associate these negative characteristics with attractive women in part due to the jealousy they experience. This may explain why there were no differences for prestige ratings, as characteristics of prestigious individuals are generally positive. A recent study found that feminine women were rated as more *socially dominant* (Watkins et al., 2012), and femininity correlates strongly and positively with attractiveness in female faces (see review by Rhodes, 2006). As women are thought to use direct and indirect psychological aggression as opposed to physical aggression (Björkqvist, 1994; Björkqvist et al., 1992; Conway, Irannejad, & Giannopoulos, 2005) and form hierarchies through social behaviors including creation of, and exclusion from, cliques (Campbell, 1999; Eder, 1985) it may be that “manipulative” and “coercive” could fit within *social dominance*. Thus women’s perceptions of women with cosmetics may align with the dominant aspect of social status rather than that of prestige.

## Experiment 2

As women wearing cosmetics have been associated with higher status careers, in Experiment 1, we investigated perceptions of women with cosmetics regarding two main routes to high status: dominance and prestige. We observed that women wearing cosmetics were perceived as higher in dominance by other women (but not men). To further understand why women

might see women using cosmetics as dominant, in Experiment 2 we investigated whether jealousy may have played a role. Women have been shown to feel a greater sense of jealousy towards attractive than unattractive women (Buss et al., 2000; Dijkstra & Buunk, 1998), and as our findings suggest that women with make-up appear more attractive, it may be jealousy driving our findings for dominance. First, we asked women how jealous they would feel if a woman with or without cosmetics were to interact with her partner. Additionally, we also conducted two forced-choice studies to investigate other perceptions of women with and without cosmetics including their promiscuity and their attractiveness to men. We did this in order to examine the further nuances of whether attractiveness differences in women with and without cosmetics may affect jealousy, and this in turn may be the reason why women with cosmetics are perceived as more dominant. If women find women with cosmetics more attractive, they may feel that men would make similar observations, and this could lead to their being more jealous of them.

For promiscuity, just as men's social rank can be decided through physical aggression (see above Discussion section), studies show that women are more likely to assert their rank/superiority through indirect aggression including exclusion, gossiping, and spreading rumours (see Björkqvist, 1994; Björkqvist, Osterman, & Lagerspetz, 1994; Björkqvist et al., 1992). As being promiscuous is generally considered a negative characteristic to possess and the term itself is negatively valenced, it is possible that women who are jealous of others would also be more likely to consider them in negative terms, including ascribing promiscuity to them regardless of their knowledge of the individual. As such, we included promiscuity as another measure through which to gauge the potential effect of jealousy.

## **Methods**

### *Participants*

A total of 48 undergraduate women studying Psychology at the University of Stirling (age  $M=21.20$  years,  $SD=4.87$ ; age range: 17–45 years) were recruited to take part in this experiment for course credit.

### *Stimuli*

Stimuli used in this experiment were identical to those used in Experiment 1 described above; all 40 female faces with and without standardized cosmetics were used.

### *Design*

As in Experiment 1, we used a repeated-measures design with stimuli as our unit of analysis. Each stimulus was rated with and without cosmetics by female participants. This time our dependent variables of interest were jealousy, attractiveness to other women, and promiscuity.

### *Procedure*

Participants were first asked to fill out a standard demographic questionnaire as described above. Subsequently, each participant was instructed that they would be seeing faces of women and asked to rate them on a 1–7 point Likert scale (1: “low”; 7: “high”) on the question, “how jealous would you feel if this woman were to interact with your partner?” As in Experiment 1, faces were presented sequentially one after the other in

blocks, where women saw all faces with or without cosmetics separately and this was randomized between participants. Additionally, all participants saw all faces with and without cosmetics.

Two additional short forced-choice studies were conducted. In these, participants saw each woman's face both with and without cosmetics on the screen (side-by-side). They were then asked to choose which of the two faces presented "men would find more attractive" and which of the two faces "appears more promiscuous". Participants saw all face-pairs in blocks, first rating for one of the questions (attractiveness to men or promiscuity) and then the other. The side of the screen which faces with cosmetics and those without were presented was randomized. There were eight gradated response options, with participants able to choose "definitely this one", "mostly this one", "probably this one" and "guess this one" for each of the two faces. These were scored as  $-4$  to  $+4$  with negative numbers indicating a decision towards the face with no cosmetics while positive numbers indicated a decision towards the face with cosmetics. At no time during any of the experiments were participants told that cosmetics were being manipulated.

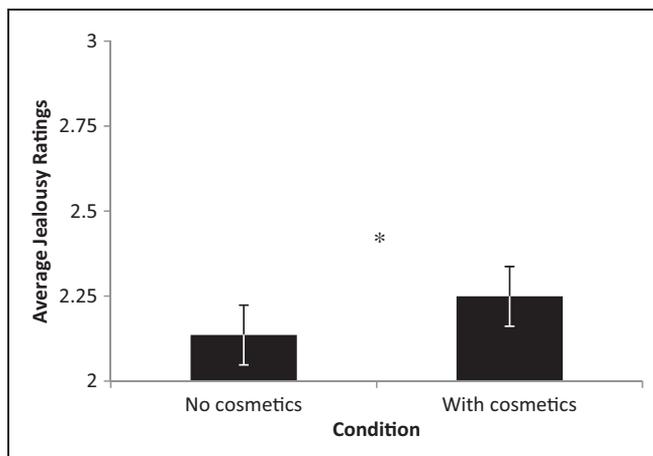
## Results

### *Jealousy*

To examine how jealous the faces presented made female raters feel, all ratings were averaged to produce a single score for each stimulus face with and without cosmetics. A paired-samples  $t$  test revealed that participants felt they would be more jealous of women with cosmetics than those without,  $t(39) = 5.20$ ,  $p < .001$ ,  $d = 0.82$  (Figure 6).

### *Promiscuity and Attractiveness to Men*

For each participant, their forced-choice ratings (from  $-4$  to  $+4$ ) were averaged for all 40 stimulus face-pairs. We then performed a one-sample  $t$  test using the participant's average scores against a mean of 0. This allowed us to test whether there was a propensity for faces without cosmetics or faces with cosmetics to be associated with either promiscuity or higher attractiveness to men. For promiscuity, faces with cosmetics were judged to be



**Figure 6.** Jealousy ratings for faces with and without cosmetics, as judged by female raters. Error bars denote  $\pm 1$  SEM and asterisks denote significance at  $p < .05$ .

significantly more promiscuous than those without,  $M = 1.89$ ,  $SD = 0.99$ ,  $t(36) = 11.58$ ,  $p < .001$ ,  $d = 1.90$ . The same was true for attractiveness, whereby women judged faces with cosmetics to be more attractive to men than faces without cosmetics,  $M = 1.76$ ,  $SD = 0.72$ ,  $t(36) = 14.90$ ,  $p < .001$ ,  $d = 2.45$ .

## Discussion

In Experiment 2, we examined whether women rate faces of other women with cosmetics as more dominant than those not wearing cosmetics, as shown in Experiment 1, due in part to jealousy. We found support for this hypothesis in that women reported that they would be more jealous of women with cosmetics than those without.

Additionally, when presented with a forced-choice paradigm, women perceived faces of women with cosmetics as both more attractive to men and more promiscuous than their counterparts not wearing cosmetics. These findings indicate that women may be particularly jealous of other women which men find attractive, as attractive women may signal the highest threat to a relationship. Also, women with cosmetics may be considered a threat due to their being perceived as more promiscuous; however, it is important to note that women may also be aware that they appear more promiscuous to others when wearing cosmetics.

## General Discussion

In two experiments, we examined the effect of facial cosmetics use on perceived social status in women and the potential mechanisms underlying these perceptions. Using a within-subjects design for cosmetics use, and a novel technique of applying standardized cosmetics, we found that both men and women perceived women with cosmetics applied to their faces as more attractive. Both sexes thought that women with cosmetics looked higher in social status; however, male raters thought they looked more prestigious, while female raters thought they looked more dominant. Men, however, did not find women with cosmetics more dominant, and women did not find them more prestigious. Thus, our findings provide support for the notion that dominance and prestige are two separate aspects of social status because here we found them to vary independently with cosmetics use. Our data also suggest that there are certain attributes that both male and female raters agree on (i.e., attractiveness) as well as disagree on (i.e., dominance and prestige) when viewing women wearing cosmetics.

One similarity between the sexes was that both men and women thought women wearing cosmetics were more attractive. Skin quality and appearance have previously been shown to alter perceptions of attractiveness (Fink et al., 2006; Matts et al., 2007), and if cosmetics, including concealer and foundation, act to make the skin appear more homogeneous, it follows that these faces are also rated higher in attractiveness. Higher contrast between facial features and the surrounding skin have also been linked to attractiveness, femininity, and healthiness (Porcheron et al., 2013; Russell, 2003, 2009; Russell et al., 2016). As cosmetics are commonly applied to accentuate facial contrast (e.g., through the use of eye-liner, lipstick; Jones et al., 2015), it is likely that this is also potentially responsible for our attractiveness findings. Thus, both smoother-looking skin and heightened facial contrast can make women appear more attractive, and previous studies have shown that cosmetics do indeed make women look more attractive (Cash et al., 1989; Etoff et al., 2011; Mulhern et al., 2003; Nash et al., 2006; Richetin et al., 2004). Here we manipulated facial contrast but not skin homogeneity and found that faces were rated as more attractive. Future research could manipulate skin homogeneity alone to compare with the current findings.

Additionally, we found that women rated faces with cosmetics as more dominant, and, in a follow-up study, found evidence that this may in part be explained by jealousy. Women's faces with cosmetics were judged to appear more promiscuous, to be more attractive to men, and instilled a higher sense of jealousy than those faces without cosmetics. As more attractive women have previously been shown to be perceived as more promiscuous (Boothroyd et al., 2008) and to induce a greater sense of jealousy (Buss et al., 2000; Dijkstra & Buunk, 1998), it seems plausible that the attractiveness benefits garnered from cosmetics may be responsible for this finding. In fact, cosmetics may serve to directly increase the perceived competitive value of women. Women with more feminine faces are ranked as being more of a threat to individuals' mating success, and this perceived threat seems to increase linearly with increasing femininity (Fink et al., 2014). Since cosmetics exaggerate cues to femininity (Jones et al., 2015; Russell, 2009), this is a very likely explanation for why women view faces with cosmetics as more socially dominant and attractive to men. Additionally, as more feminine women are perceived as more attractive (Fink et al., 2014), it is likely men will hold facial femininity in high regard (i.e., conferring it higher prestige), which may be a possible reason for men rating faces with cosmetics as having higher prestige.

Conversely, men thought women with cosmetics were no more dominant than those without cosmetics, but were instead more prestigious. The association of positive qualities (such as prestige) with attractiveness (Dion et al., 1972) may be one reason for our findings, as we saw that men find women with cosmetics more attractive, which has also been shown in previous studies (e.g., Etcoff et al., 2011; Mulhern et al., 2003). In relation to the lack of perceived dominance, as men do not compete and aggress in the same manner as women (Björkqvist, 1994) men may have less likelihood of associating women with dominance generally. Alternatively, some work has indicated that men feel negatively affected by dominant women, so detecting signals or cues to women's dominance may be important to detect quickly (Williams & Tiedens, 2016). The lack of evidence for these perceptions in our findings seem to indicate a sex-specific effect of cosmetics on perceptions, in that cosmetics, at least in the way we have applied them to our stimuli, seem not to affect how men view women's dominance. Thus social norms may be influencing judgments—men may simply not view women with cosmetics as attempting to increase their dominance.

Our data present important implications for sex differences in the perception of women wearing cosmetics. For example, in the mating market, it may be important to note that cosmetics use accentuates ones' attractiveness. Evolutionary psychology literature suggests that men are interested in women who outwardly exhibit youth and beauty as reproductive partners, as these qualities can be indicators of fertility (Buss, 1989). Thus, women wearing cosmetics may gain certain advantages including access to high value men; if these women are considered attractive then they can perhaps be choosier when selecting a male partner. Additionally, interactions with men may be more rewarding due to the benefits of being perceived as both more attractive and prestigious. That is, women may be conferred certain benefits from men including greater attention, respect, and influence.

In contrast to a positive effect of cosmetic use on interactions with men, cosmetic use may have a different effect on interactions with other women. The benefits in attractiveness (and social status) gained by application of cosmetics may lead to less desirable reactions and even higher levels of competitive behavior from other women. While there are benefits to being perceived as higher in dominance, namely the ability to get ones' way, interactions with other women may be more unpleasant. For example, in one study of adolescents, higher status girls (those who were perceived as more popular) were rarely the most well liked, and in fact many of their female peers actively disliked them (Eder, 1985). However, the fact that these girls were still highly popular even without being liked supports a case for women of perceived

high status being formidable, and influential, even without the support of other women. Thus, there is the potential to experience certain costs (mostly from women) and benefits (mostly from men) when using cosmetics, which may influence the outcomes of interpersonal interactions.

It is important to note that we focused solely on perceptions of dominance and prestige from faces represented by a simple passport-style photograph. Everyday behavior is naturally much more complex, with dominant and prestigious behaviors expressed explicitly through direct demands and behaviors, or implicitly through behavioral cues like eye contact and gaze (Williams & Tiedens, 2016). Importantly, explicit behaviors such as direct demands have been shown to negatively impact women's likability, while implicit behaviors (like eye gaze) do not (Williams & Tiedens, 2016). It may be that the effects of cosmetics on perceived dominance and prestige are implicit cues that serve to alter perceptions of women, but that the effects may disappear if the women engage explicitly in direct demands with, for example, men. However, there is some evidence the two interact. Perceptions of likability decreased with the more cosmetics a woman wore (Etcoff et al., 2011), which suggests that cosmetics, as an implicit cue, could bias perceptions and outcomes of explicit, dominant behaviors. Future research incorporating videos of, or real face-to-face interactions with, women wearing varying amounts of cosmetics would help elucidate whether cosmetics can act as an implicit and/or explicit cue to a woman's dominance.

These results suggest that cosmetics may function as an extended phenotype (Etcoff et al., 2011) whereby certain features and characteristics can be exaggerated to appear more attractive. In a recent non-human animal example, greater flamingos were found to secrete carotenoid-rich oils into their oil glands, which they spread over their wings to enhance their red coloration, much like cosmetics (Amat et al., 2011). This in turn affects their attractiveness to females, with redder birds being perceived as more attractive. In our research we demonstrate that the increasing attractiveness that cosmetics confer to women serves to simultaneously signal dominance to potential rivals, while increasing their perceived mate value to potential partners. Furthermore, cosmetics may function as a supernormal stimulus by exaggerating sexually dimorphic traits like facial contrast (Jones et al., 2015) that serves as a powerful cue to perceived sex. These sorts of exaggerations confer greater mating success in non-human animals (Winquist & Lemon, 1994). This exaggeration of sexual dimorphism may be an indicator of mate value, which is perceived as threatening by women and desirable by men. If this is the case, then it would go some way to explain why cosmetics have been used throughout much of human history (Etcoff, 1999) and across the majority of human cultures (Jablonski, 2006), and why the cosmetics industry is worth millions of dollars today (Etcoff, 1999). While evolutionary explanations are powerful in the domain of attractiveness perceptions, there are also likely further cultural influences on these results. For example, Chao and Schor (1998) found that women with higher income and occupational status engage in purchasing of higher quality or luxury branded cosmetics. Social factors such as learned associations between cosmetics and socioeconomic class might drive the perceptions of, for example, prestige by men, though why women did not view other women wearing cosmetics as more prestigious is unclear. Evolutionary predictions of the perception of dominance and prestige as a function of attractiveness may be more relevant for women viewing other attractive women than men viewing attractive women (e.g., Fink et al., 2014).

In Experiment 1, we allowed female and male participants to use their inherent ideas of dominance and prestige in the ratings, rather than providing them with concrete definitions. This methodology has been used in many previous studies (e.g., Jones, DeBruine, Little, Watkins, & Feinberg, 2011; Oosterhof & Todorov, 2008; Sutherland et al., 2013; Watkins

et al., 2010); however, it is unclear whether both sexes were rating the faces using the same working definitions. Thus it is possible that the differences we found are attributable in part to the way in which the faces were rated, and those ratings may have differed if participants were provided with definitions. Revealing exactly what men and women think dominance and prestige mean would help in the interpretation of these data; however, it does not detract from the differences we observed in our study, and instead are useful directions for future research. Further, we did not collect data about whether participants noticed the manipulation, which would have proved useful in further understanding how these judgments were made. However, the same faces were used in a study that utilized a carefully controlled presentation style, where no participant viewed the same face in both conditions when rating attractiveness (Jones & Kramer, 2015). A significant effect of cosmetics on attractiveness was observed, which indicates these judgments are not likely due to participants noticing the manipulation and adjusting ratings accordingly. Finally, the scales used in Experiments 1 and 2 differed, as we changed from a 101 point scale in Experiment 1 to a 7-point Likert scale in Experiment 2. Originally, we predicted that having a large 101 point scale would help participants differentiate between faces in a way that, perhaps, they are more accustomed to seeing (e.g., online face rating databases such as 'hot or not', <https://hotornot.com/>, which have a 10-point rating scale). However, participants instead used quite narrow ranges within the possible 101 point scale and as such we opted to use a more traditional measure used in psychology research (7-point Likert scale) in Experiment 2, in order to encourage use of the entire scale range.

Through our research, we also aimed at standardizing the amount and quality of cosmetics applied to each of the faces; however, different women apply cosmetics in different ways. Future studies could explore how applying cosmetics in a particular fashion (e.g., very dark eye-shadow or eye-liner, or even varying colors) might affect perceptions by others.

## Conclusion

By applying a standardized amount of cosmetics, we found that men and women both viewed the faces of women wearing cosmetics as more attractive and as higher in status, in line with previous findings in the literature. However, women with cosmetics were viewed as more dominant by other women and as more prestigious by men. Further, Experiment 2 highlighted that women experience more jealousy toward women with cosmetics, and find these women to be more attractive to men and also more promiscuous. This difference in perception can have repercussions on these women's interactions with others. As many women wear cosmetics, either sporadically or on a regular basis, knowing the effect of cosmetics use on other's perceptions may be important in judging how to present oneself to others. Broadening our understanding of the ways in which cosmetics use may affect other's perceptions would be a valuable next step.

## Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

## References

- Adler, N. E., Epel, E. S., Castellazzo, G., & Ickovics, J. R. (2000). Relationship of subjective and objective social status with psychological and physiological functioning: Preliminary data in healthy white women. *Health Psychology, 19*, 586–592.
- Albright, L., Kenny, D. A., & Malloy, T. E. (1988). Consensus in personality judgments at zero acquaintance. *Journal of Personality and Social Psychology, 55*, 387–395.
- Amat, J. A., Rendón, M. A., Garrido-Fernández, J., Garrido, A., Rendón-Martos, M., & Pérez-Gálvez, A. (2011). Greater flamingos *Phoenicopterus roseus* use uropygial secretions as make-up. *Behavioral Ecology and Sociobiology, 65*, 665–673. <http://doi.org/10.1007/s00265-010-1068-z>
- Ball, S. B., Eckel, C., Grossman, P. J., & Zame, W. (2001). Status in markets. *The Quarterly Journal of Economics, 116*, 161–188.
- Björkqvist, K. (1994). Sex differences in physical, verbal, and indirect aggression: A review of recent research. *Sex Roles, 30*, 177–188. <http://doi.org/10.1007/BF01420988>
- Björkqvist, K., Lagerspetz, K. M. J., & Kaukiainen, A. (1992). Do girls manipulate and boys fight? Developmental trends in regard to direct and indirect aggression. *Aggressive Behaviour, 18*, 117–127.
- Björkqvist, K., Osterman, K., & Lagerspetz, K. M. J. (1994). Sex differences in covert aggression among adults. *Aggressive Behavior, 20*, 27–33.
- Boothroyd, L. G., Jones, B. C., & Burt, D. (2008). Facial correlates of sociosexuality. *Evolution and Human Behavior, 29*, 211–218.
- Buss, D. M. (1989). Sex differences in human mate preferences: Evolutionary hypotheses tested in 37 cultures. *Behavioral and Brain Sciences, 12*, 1–49. <http://doi.org/10.1017/S0140525X00023992>
- Buss, D. M., Shackelford, T. K., Choe, J., Buunk, A. P., & Dijkstra, P. (2000). Distress about mating rivals. *Personal Relationships, 7*, 235–243.
- Campbell, A. (1999). Staying alive: Evolution, culture, and women's intrasexual aggression. *Behavioral and Brain Sciences, 22*, 203–252. <http://doi.org/10.1017/S0140525X99001818>
- Carré, J. M., & McCormick, C. M. (2008). In your face: Facial metrics predict aggressive behaviour in the laboratory and in varsity and professional hockey players. *Proceedings of the Royal Society B: Biological Sciences, 275*, 2651–2656. <http://doi.org/10.1098/rspb.2008.0873>
- Carré, J. M., McCormick, C. M., & Mondloch, C. J. (2009). Facial structure is a reliable cue of aggressive behavior. *Psychological Science, 20*, 1194–1198. <http://doi.org/10.1111/j.1467-9280.2009.02423.x>
- Cash, T. F., Dawson, K., Davis, P., Bowen, M., & Galumbeck, C. (1989). Effects of cosmetics use on the physical attractiveness and body image of American college women. *The Journal of Social Psychology, 129*, 349–355.
- Chao, A., & Schor, J. B. (1998). Empirical tests of status consumption: Evidence from women's cosmetics. *Journal of Economic Psychology, 19*, 107–131. [http://doi.org/10.1016/S0167-4870\(97\)00038-X](http://doi.org/10.1016/S0167-4870(97)00038-X)
- Cheng, J. T., Tracy, J. L., Foulsham, T., Kingstone, A., & Henrich, J. (2013). Two ways to the top: Evidence that dominance and prestige are distinct yet viable avenues to social rank and influence. *Journal of Personality and Social Psychology, 104*, 103–125. <http://doi.org/10.1037/a0030398>
- Cheng, J. T., Tracy, J. L., & Henrich, J. (2010). Pride, personality, and the evolutionary foundations of human social status. *Evolution and Human Behavior, 31*, 334–347. <http://doi.org/10.1016/j.evolhumbehav.2010.02.004>
- Conway, M., Irannejad, S., & Giannopoulos, C. (2005). Status-based expectancies for aggression, with regard to gender differences in aggression in social psychological research. *Aggressive Behavior, 31*, 381–398. <http://doi.org/10.1002/ab.20058>
- Cowan, M. L., & Little, A. C. (2013). The effects of relationship context and modality on ratings of funniness. *Personality and Individual Differences, 54*, 496–500.
- Cox, C. L., & Glick, W. H. (1986). Resume evaluations and cosmetics use: When more is not better. *Sex Roles, 14*, 51–58.
- Dijkstra, P., & Buunk, A. P. (1998). Jealousy as a function of rival characteristics: An evolutionary perspective. *Personality and Social Psychology Bulletin, 11*, 1158–1166.

- Dion, K., Berscheid, E., & Walster, E. (1972). What is beautiful is good. *Journal of Personality and Social Psychology*, 24, 285–290.
- Eder, D. (1985). The cycle of popularity: Interpersonal relations among female adolescents. *Sociology of Education*, 58, 154–165.
- Etcoff, N. (1999). *Survival of the Prettiest*. London: Little, Brown and Company.
- Etcoff, N. L., Stock, S., Haley, L. E., Vickery, S. A., & House, D. M. (2011). Cosmetics as a feature of the extended human phenotype: Modulation of the perception of biologically important facial signals. *PLoS One*, 6, e25656. <http://doi.org/10.1371/journal.pone.0025656>
- Fink, B., Grammer, K., & Matts, P. (2006). Visible skin color distribution plays a role in the perception of age, attractiveness, and health in female faces. *Evolution and Human Behavior*, 27, 433–442. <http://doi.org/10.1016/j.evolhumbehav.2006.08.007>
- Fink, B., Klappauf, D., Brewer, G., & Shackelford, T. K. (2014). Female physical characteristics and intra-sexual competition in women. *Personality and Individual Differences*, 58, 138–141.
- Hamermesh, D. S., & Biddle, J. E. (1993). Beauty and the labor market. *The American Economic Review*, 84, 1174–1194.
- Henrich, J., & Gil-White, F. J. (2001). The evolution of prestige: Freely conferred deference as a mechanism for enhancing the benefits of cultural transmission. *Evolution and Human Behavior*, 22, 165–196. [http://doi.org/10.1016/S1090-5138\(00\)00071-4](http://doi.org/10.1016/S1090-5138(00)00071-4)
- Jablonski, N. G. (2006). *Skin: A natural history*. Berkeley: University of California Press.
- Jacob, C., Guéguen, N., Boulbry, G., & Ardiccioni, R. (2009). Waitresses' facial cosmetics and tipping: A field experiment. *International Journal of Hospitality Management*, 29, 188–190. <http://doi.org/10.1016/j.ijhm.2009.04.003>
- Johnson, R. T., Burk, J. A., & Kirkpatrick, L. A. (2007). Dominance and prestige as differential predictors of aggression and testosterone levels in men. *Evolution and Human Behavior*, 28, 345–351. <http://doi.org/10.1016/j.evolhumbehav.2007.04.003>
- Jones, A. L., & Kramer, R. (2015). Facial cosmetics have little effect on attractiveness judgements compared with identity. *Perception*, 44, 79–86.
- Jones, A. L., Kramer, R., & Ward, R. (2014). Miscalibrations in judgements of attractiveness with cosmetics. *Quarterly Journal of Experimental Psychology*, 67, 2060–2068.
- Jones, A. L., Russell, R., & Ward, R. (2015). Cosmetics alter biologically based factors of beauty: Evidence from facial contrast. *Evolutionary Psychology*, 13, 210–229.
- Jones, A. L., Sweda, J. R., Porcheron, A., & Russell, R. (2016). Coloration in different areas of facial skin is a cue to health: The role of cheek redness and periorbital luminance in health perception. *Body Image*. doi: 10.1016/j.bodyim.2016.02.001
- Jones, B. C., DeBruine, L. M., Little, A. C., Watkins, C. D., & Feinberg, D. R. (2011). “Eavesdropping” and perceived male dominance rank in humans. *Animal Behaviour*, 81, 1203–1208. <http://doi.org/10.1016/j.anbehav.2011.03.003>
- Kenrick, D. T., & Keefe, R. C. (1992). Age preferences in mates reflect sex differences in human reproductive strategies. *Behavioral and Brain Sciences*, 15, 75–133.
- Lassek, W. D., & Gaulin, S. J. C. (2009). Costs and benefits of fat-free muscle mass in men: Relationship to mating success, dietary requirements, and native immunity. *Evolution and Human Behavior*, 30, 322–328. <http://doi.org/10.1016/j.evolhumbehav.2009.04.002>
- Lewis, G. J., Lefevre, C. E., & Bates, T. C. (2012). Facial width-to-height ratio predicts achievement drive in US presidents. *Personality and Individual Differences*, 52, 855–857. <http://doi.org/10.1016/j.paid.2011.12.030>
- Lucas, A. (1930). Cosmetics, perfumes and incense in ancient Egypt. *The Journal of Egyptian Archaeology*, 16, 41–53.
- Matts, P. J., Fink, B., Grammer, K., & Burquest, M. (2007). Color homogeneity and visual perception of age, health, and attractiveness of female facial skin. *Journal of the American Academy of Dermatology*, 57, 977–984. <http://doi.org/10.1016/j.jaad.2007.07.040>
- Morrison, E. R., Morris, P. H., & Bard, K. a. (2013). The stability of facial attractiveness: Is it what you've got or what you do with it? *Journal of Nonverbal Behavior*, 37, 59–67. <http://doi.org/10.1007/s10919-013-0145-1>

- Mulhern, R., Fieldman, G., Hussey, T., Lévêque, J.-L., & Pineau, P. (2003). Do cosmetics enhance female Caucasian facial attractiveness? *International Journal of Cosmetic Science*, *25*, 199–205. <http://doi.org/10.1046/j.1467-2494.2003.00188.x>
- Nash, R., Fieldman, G., Hussey, T., Lévêque, J.-L., & Pineau, P. (2006). Cosmetics: They influence more than Caucasian female facial attractiveness. *Journal of Applied Social Psychology*, *36*, 493–504.
- Oosterhof, N. N., & Todorov, A. (2008). The functional basis of face evaluation. *Proceedings of the National Academy of Sciences of the United States of America*, *105*, 11087–11092. <http://doi.org/10.1073/pnas.0805664105>
- Porcheron, A., Mauger, E., & Russell, R. (2013). Aspects of facial contrast decrease with age and are cues for age perception. *PLoS One*, *8*, e57985. <http://doi.org/10.1371/journal.pone.0057985>
- Rhodes, G. (2006). The evolutionary psychology of facial beauty. *Annual Review of Psychology*, *57*, 199–226. <http://doi.org/10.1146/annurev.psych.57.102904.190208>
- Richetin, J., Croizet, J.-C., & Huguët, P. (2004). Facial Make-up elicits positive attitudes at the implicit level: Evidence from the implicit association test. *Current Research in Social Psychology*, *9*, 145–164.
- Ridgeway, C. L. (1987). Nonverbal behavior, dominance, and the basis of status in task groups. *American Social Review*, *52*, 683–694.
- Russell, R. (2003). Sex, beauty, and the relative luminance of facial features. *Perception*, *32*, 1093–1107. <http://doi.org/10.1068/p5101>
- Russell, R. (2009). A sex difference in facial contrast and its exaggeration by cosmetics. *Perception*, *38*, 1211–1219. <http://doi.org/10.1068/p6331>
- Russell, R., Porcheron, A., Sweda, J. R., Jones, A. L., Mauger, E., & Morizot, F. (2016). Facial contrast is a cue for perceiving health from the face. *Journal of Experimental Psychology: Human Perception and Performance*. doi: 10.1037/xhp0000219
- Stephen, I. D., Coetsee, V., Law Smith, M., & Perrett, D. I. (2009). Skin blood perfusion and oxygenation colour affect perceived human health. *PLoS One*, *4*, e5083. <http://doi.org/10.1371/journal.pone.0005083>
- Stephen, I. D., & McKeegan, A. (2010). Lip colour affects perceived sex typicality and attractiveness of human faces. *Perception*, *39*, 1104–1110. <http://doi.org/10.1068/p6730>
- Stillman, T. F., & Maner, J. K. (2009). A sharp eye for her SOI: Perception and misperception of female sociosexuality at zero acquaintance. *Evolution and Human Behavior*, *30*, 124–130. <http://doi.org/10.1016/j.evolhumbehav.2008.09.005>
- Stirrat, M., & Perrett, D. I. (2010). Valid facial cues to cooperation and trust: Male facial width and trustworthiness. *Psychological Science*, *21*, 349–354. <http://doi.org/10.1177/0956797610362647>
- Sutherland, C. a. M., Oldmeadow, J. a., Santos, I. M., Towler, J., Michael Burt, D., & Young, A. W. (2013). Social inferences from faces: Ambient images generate a three-dimensional model. *Cognition*, *127*, 105–118. <http://doi.org/10.1016/j.cognition.2012.12.001>
- Tiddeman, B., Burt, D. M., & Perrett, D. I. (2001). Prototyping and transforming facial textures for perception research. *Computer Graphics and Applications, IEEE*, *21*, 42–50. <http://doi.org/10.1109/38.946630>
- Watkins, C. D., Fraccaro, P. J., Smith, F. G., Vukovic, J., Feinberg, D. R., Debruine, L. M., . . . Jones, B. C. (2010). Taller men are less sensitive to cues of dominance in other men. *Behavioral Ecology*, *21*, 943–947. <http://doi.org/10.1093/beheco/arq091>
- Watkins, C. D., Quist, M. C., Smith, F. G., Debruine, L. M., & Jones, B. C. (2012). Individual differences in women's perceptions of other women's dominance. *European Journal of Personality*, *26*, 79–86. <http://doi.org/10.1002/per>
- Williams, M. J., & Tiedens, L. Z. (2016). The subtle suspension of backlash: A meta-analysis of penalties for women's implicit and explicit dominance behavior. *Psychological Bulletin*, *142*, 165–97. <http://doi.org/10.1037/bul0000039>
- Wilson, M., & Daly, M. (1985). Competitiveness, risk taking, and violence: The young male syndrome. *Ethology and Sociobiology*, *73*, 59–73.
- Winquist, T., & Lemon, R. E. (1994). Sexual selection and exaggerated male tail length in birds. *American Naturalist*, *143*, 95–116.