



Evidence that makeup is a false signal of sociosexuality

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ABSTRACT

While the positive effect of makeup on attractiveness is well established, there has been less exploration into other possible functions of makeup use. Here we investigated whether one function of makeup is to signal sociosexuality. Using a large, well-controlled set of photographs, we found that faces with makeup were perceived to have more unrestricted sociosexuality than the same faces without makeup. Similarly, women wearing more makeup were perceived to have more unrestricted sociosexuality. The target women who were photographed also completed questionnaires about their makeup habits and the Sociosexual Orientation Inventory. Targets' self-reported sociosexuality was not associated with their makeup habits, with observer ratings of the amount of makeup they wore, or with observer ratings of their sociosexuality when attractiveness was controlled. Thus our study shows that people use makeup as a cue for perceiving sociosexuality but that it is an invalid cue.

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Makeup is one of the most ubiquitous forms of personal decoration, widely used by women throughout the world. Makeup use dates back several thousand years with origins in multiple locations (Russell, 2011). Given that it requires time and resources, the ubiquity and longevity of makeup use is particularly striking. This suggests that it is not an accidental behavior, but rather one that most likely serves some function. It is unclear, however, what this function is, or whether makeup use serves multiple functions.

The strongest evidence for a particular function for makeup is making the face more beautiful. Many studies using carefully controlled before-and-after photographs have found that makeup increases physical attractiveness (Cash, Dawson, Davis, Bowen, & Galumbeck, 1989; Cox & Glick, 1986; Etoff, Stock, Haley, Vickery, & House, 2011; Graham & Jouhar, 1981; Hamid, 1972; Hugué, Croizet, & Richetin, 2004; Jones, Russell, & Ward, 2015; Mulhern, Fieldman, Hussey, Leveque, & Pineau, 2003; Osborn, 1996). For example, Graham and Jouhar (1981) found that women's faces presented with cosmetics were given significantly higher attractiveness ratings than when presented without cosmetics. Similarly, Etoff et al. (2011) found that several styles of makeup (e.g., natural, glamorous) increased the attractiveness of women's faces. Whether professionally-applied (e.g., Mulhern et al., 2003) or self-applied (e.g., Cash et al., 1989), makeup has been consistently found to increase the attractiveness of women in photographs as perceived by both male and female raters. This increase in attractiveness may partly be

the result of makeup manipulating biologically-based factors of beauty, such as sexual dimorphism (Russell, 2009) and age appearance (Porcheron, Mauger, & Russell, 2013).

Makeup has also been linked with attractiveness in more ecologically-valid settings. For instance, Jacob, Guéguen, Boulbry, and Ardiccioni (2009) conducted a field study where two waitresses were either made up or not and their tips were recorded. Results showed that the waitresses received significantly higher tips on days when they wore makeup. However, it was only the male patrons whose tipping was affected by makeup use. In a subsequent study, Guéguen and Jacob (2011) found that the effect of makeup on tipping behavior was mediated by the perceived attractiveness of the waitress. In other words, waitresses received higher tips in the cosmetics condition because they looked more attractive.

In another field study investigating courtship behaviors, Guéguen (2008) recorded the number of male solicitations, and the latency of the first solicitation, toward female confederates at a bar who were either wearing cosmetics or not wearing cosmetics. In the cosmetics condition, the number of solicitations was higher and the latency between the arrival of the confederate at the bar and the first solicitation was shorter. These studies (Guéguen, 2008; Guéguen & Jacob, 2011; Jacob et al., 2009) suggest that the link between cosmetics and attractiveness found in laboratory studies (Cash et al., 1989; Cox & Glick, 1986; Graham & Jouhar, 1981; Hamid, 1972; Hugué et al., 2004; Jones et al., 2015; Mulhern et al., 2003; Osborn, 1996) translates to overt behaviors. Furthermore, Guéguen (2008) proposed that cosmetics may be associated with courtship behaviors not only because they increase attractiveness, but also because they may serve as a cue

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to availability. This suggests the possibility that one function of makeup is to signal sexual availability.

Consistent with this view, one study found that women are evaluated as having more “overt interest in the opposite sex” when wearing lipstick (McKeachie, 1952). Similarly, Osborn (1996) found that when wearing makeup, women are regarded as less modest and more likely to have an extramarital affair than when without makeup. A more recent study found that female faces with makeup are rated as more promiscuous than the same faces without makeup (Mileva, Jones, Russell, & Little, 2016). These findings suggest that makeup may be associated with unrestricted sociosexuality (i.e., a willingness to engage in uncommitted sexual relationships; Penke & Asendorpf, 2008; Simpson & Gangestad, 1991). However, all of these studies were designed to test other hypotheses, and they used samples of only one to six target women. Thus, there remains a need to more firmly establish whether faces with makeup are perceived as signaling more unrestricted sociosexuality, which we sought to accomplish in this research.

Regardless of whether people *perceive* makeup to be a signal of more unrestricted sociosexuality, it remains unknown whether makeup is, in fact, a *valid* cue of unrestricted sociosexuality. No studies to date have investigated whether makeup use predicts the *actual* sociosexuality reported by women who wear makeup. Indeed, investigations of whether actual sociosexuality can be perceived from the face have revealed mixed results. Boothroyd, Jones, Burt, DeBruine, and Perrett (2008), for example, found that when viewing composites of women with unrestricted sociosexuality and those with restricted sociosexuality, male participants could not successfully distinguish between the two in terms of which woman would be “more open to short-term relationships, one-night stands, and the idea of sex without love”. When using individual faces, however, Boothroyd et al. (2008) found a positive correlation between actual (self-reported) sociosexuality and perceived sociosexuality, even after controlling for each woman's facial attractiveness. Gangestad, DiGeronimo, Simpson, and Biek (1992), however, found that when controlling for attractiveness, the relation between actual sociosexuality and perceived sociosexuality was not significant for female targets. Moreover, there are research discrepancies regarding whether restricted or unrestricted sociosexuality is preferred. For instance, Campbell et al. (2009) found that men rate women who appear to be more unrestricted as less desirable long-term mates, whereas Boothroyd et al. (2008) found that men rate such women as more desirable long-term and short-term mates. These inconsistencies suggest that further research examining perceptions of sociosexuality is still needed.

In the present work, we examined whether makeup use functions in part to signal sociosexuality. To do so, we explored the relation between makeup use and sociosexuality. Specifically, we investigated three hypotheses: 1) that makeup use predicts perceived sociosexuality (rated by observers), 2) that makeup use predicts actual sociosexuality (reported by women), and 3) that perceived sociosexuality predicts actual sociosexuality. In Study 1, we tested whether makeup use predicts perceived sociosexuality. We did this in two ways. First, we had raters assess the perceived sociosexuality of women who had been photographed with and without makeup. Second, we had another set of raters assess the perceived amount of makeup worn by each woman and then examined the association between this measure and ratings of perceived sociosexuality. In Study 2, we tested whether makeup use predicts actual sociosexuality (reported by women) by examining associations between self-reported sociosexuality and different measures of makeup use. In Study 3, we tested whether perceived sociosexuality is a valid predictor of actual sociosexuality by

examining the association between the perceived sociosexuality ratings made on the photographs in Study 1 and the self-reported sociosexuality of the photographed target women used in Study 2.

1. Study 1

1.1. Methods

1.1.1. Target stimuli

Photographs were taken of 69 women of European descent (M age = 20.01 years, $SD = 1.39$) who were facing forward under constant camera and lighting conditions, with neutral expressions, no adornments, hair pulled back or pinned down, and closed mouths using a Nikon digital camera (Model E950) mounted on a tripod against a background of professional grade photography paper. Target women were recruited from the student body of a large public university in the northeastern United States by an advertisement in the student newspaper and posters on campus. Each target was photographed three times: once while holding a card with an identification number, once with no makeup on, and a second time after they had applied their ‘everyday’ makeup. The photographs with the ID numbers allowed us to associate each target woman's photograph with her other data without having to use her name or another identifier, thus ensuring the target women's anonymity. The target women were instructed to arrive wearing no makeup. We also provided cotton balls and makeup removing wipes for women who did arrive wearing makeup. Each target woman provided her own cosmetics. To make it easier for the women to apply their makeup, we provided two three-paneled vanity mirrors. Only women who stated that they routinely used makeup were eligible to participate. All women provided consent for their photos to be taken and used in subsequent research following a protocol approved by the local Institutional Review Board. This process resulted in 138 images, where each of the 69 target faces had a no makeup image and a makeup image. The no makeup photographs, together with others of women of non-European descent, were also used to test a different set of hypotheses in a study by Campbell et al. (2009).

1.1.2. Procedures and raters

Ethical approval was received from the local Institutional Review Board. Study 1 raters were recruited at a small eastern college in the United States. Raters first completed a short questionnaire that asked about their sex and age. Raters were then told that they would view several faces on which they would make assessments. Raters were randomly assigned to one of three conditions. In one condition, raters were asked to assess each face according to how much makeup each woman appeared to be wearing (“How much makeup does this face have?”; 1 = no makeup; 7 = a lot of makeup). In a second condition, raters assessed each face in terms of its attractiveness (“How attractive is this face?”; 1 = less attractive; 7 = more attractive). In the third condition, raters assessed each face in terms of its perceived sociosexuality (“I can imagine this person being comfortable and enjoying ‘casual’ sex with different partners”; 1 = strongly disagree; 9 = strongly agree). This is one of the items from the Sociosexual Orientation Inventory (Simpson & Gangestad, 1991).

The raters evaluated all 138 target images (makeup categories were intermixed) and assessed the images individually in random order. One hundred and eighty two raters (85 male, 96 female, 1 other), aged 17–22 years old (M age = 18.66 years, $SD = 0.98$) completed this task.

1.2. Results

Male and female raters demonstrated high inter-rater reliability for the ratings on amount of makeup used (Cronbach's α males = 0.97; α females = 0.98), perceived sociosexuality (Cronbach's α males = 0.98; α females = 0.98), and ratings of attractiveness (Cronbach's α males = 0.99; α females = 0.99). Thus, their ratings were averaged to produce a mean rating for every face in each makeup category. Match-paired t -tests for each trait at both makeup levels (makeup versus no makeup) revealed significant rater sex differences for every comparison (all p s < 0.001) except for the sociosexuality ratings of the images with makeup ($p = 0.106$). For the significant comparisons, male raters assessed the faces as signaling more unrestricted sociosexuality, as wearing more makeup, and as being less attractive compared to female raters. In all subsequent analyses, therefore, male and female raters were analyzed separately.

We then compared the ratings of the images with and without makeup for both male and female raters. There were significant differences between the images with makeup and those without makeup on all three traits for both male and female raters (*male raters*: amount of perceived makeup: $t(68) = 13.62, p < 0.001$, Cohen's $d = 1.64$; perceived sociosexuality: $t(68) = 2.62, p = 0.011$, Cohen's $d = 0.32$; perceived attractiveness: $t(68) = 5.30, p < 0.001$, Cohen's $d = 0.64$; *female raters*: amount of perceived makeup: $t(68) = 14.23, p < 0.001$, Cohen's $d = 1.71$; perceived sociosexuality: $t(68) = 9.48, p < 0.001$, Cohen's $d = 1.14$; perceived attractiveness: $t(68) = 7.33, p < 0.001$, Cohen's $d = 0.88$). The images of women with makeup were rated as wearing more makeup, being more attractive, and having more unrestricted sociosexuality than the images of the same women without makeup by both male and female raters (see Fig. 1).

In addition to comparing the attractiveness and sociosexuality of faces with and without makeup, we also examined the associations between these ratings and ratings of the amount of makeup within the

makeup condition. There were significant, positive correlations between perceived amount of makeup and perceived attractiveness, *male raters*: $r(67) = 0.38, p = 0.001$; *female raters*: $r(67) = 0.39, p = 0.001$, as well as between perceived amount of makeup and perceived sociosexuality, *male raters*: $r(67) = 0.53, p < 0.001$; *female raters*: $r(67) = 0.66, p < 0.001$. That is, faces that appeared to have more makeup also appeared to be more attractive and signal more unrestricted sociosexuality.

Lastly, we found significant positive correlations between perceived sociosexuality and perceived attractiveness (*male raters day makeup*: $r(67) = 0.76, p < 0.001$; *female raters day makeup*: $r(67) = 0.77, p < 0.001$; *male raters no makeup*: $r(67) = 0.65, p < 0.001$; *female raters no makeup*: $r(67) = 0.81, p < 0.001$). In order to better understand the relations between makeup, sociosexuality, and attractiveness, we ran mediation analyses using the SPSS plugin MEMORE (Montoya & Hayes, 2017). Perceived attractiveness ratings were entered as the mediating variable and perceived sociosexuality ratings were entered as the dependent variable (see Fig. 2). Percentile bootstrap confidence intervals for indirect effects were calculated using 5000 bootstrapped resamples.

Makeup significantly predicted attractiveness for both male and female raters (*male raters*: $\beta = 0.19, p < 0.001$; *female raters*: $\beta = 0.34, p < 0.001$), with made-up faces rated as more attractive than faces without makeup. Attractiveness significantly predicted sociosexuality for both male and female raters (*male raters*: $\beta = 0.46, p = 0.046$; *female raters*: $\beta = 0.50, p = 0.006$), with more attractive faces rated as being more unrestricted. The total effect of makeup on sociosexuality was significant for both male and female raters (*male raters*: $\beta = 0.18, p = 0.011$; *female raters*: $\beta = 0.66, p < 0.001$), meaning that the faces with makeup were rated as more unrestricted than the faces without makeup. However, the direct effect of makeup on attractiveness, controlling for sociosexuality, was not significant for male raters, $\beta = 0.09, p = 0.245$, just for female raters, $\beta = 0.49, p < 0.001$. This means that attractiveness fully mediates the asso-

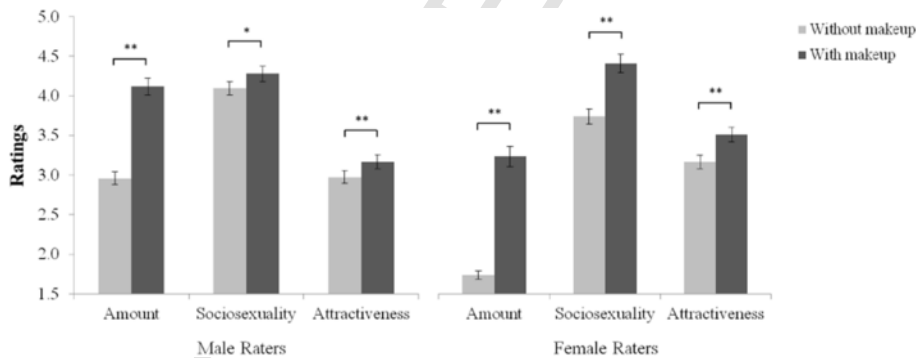


Fig. 1. Ratings of perceived amount of makeup, perceived sociosexuality, and perceived attractiveness for target faces with and without makeup by both male and female raters. Amount of makeup and attractiveness were rated on a 1–7 scale, while perceived sociosexuality was rated on a 1–9 scale. Asterisks indicate significant differences ($*p < 0.05$, $**p < 0.001$). Error bars represent the 95% confidence intervals.

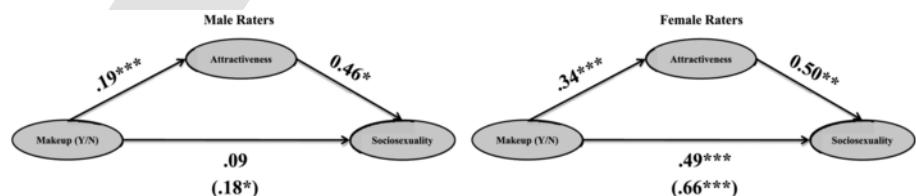


Fig. 2. Diagrams depicting how attractiveness fully mediates the effect of makeup on sociosexuality for male raters and how attractiveness partially mediates the effect of makeup on sociosexuality for female raters. Asterisks indicate significant differences ($*p < 0.05$, $**p < 0.01$, $***p < 0.001$).

ciation between makeup and sociosexuality for male raters, and partially mediates the association between makeup and sociosexuality for female raters. In other words, attractiveness completely explains the observed link between makeup and sociosexuality for male raters. For female raters, attractiveness only explains part of the observed relation between makeup and attractiveness given there was a significant residual direct effect of makeup on sociosexuality, even after controlling for attractiveness.

1.3. Discussion

In Study 1, we found that when a large sample of women were shown wearing makeup, they were perceived as being more attractive and more unrestricted in terms of their sociosexuality by both male and female raters compared to when the same women did not wear makeup. Interestingly, the effect sizes for the male raters were consistently smaller than those for the female raters, suggesting that female raters perceive a larger effect of makeup. We also found significant, positive correlations between the perceived amount of makeup worn and the perceived attractiveness and sociosexuality of the woman. These findings provide evidence that both men and women associate makeup use not only with higher attractiveness, but also with more unrestricted sociosexuality. When we ran mediation analyses, however, we found that attractiveness fully mediated the relation between makeup and sociosexuality for male raters and partially mediated the relation between makeup and sociosexuality for female raters. This suggests that, for men, there is no direct effect of makeup on sociosexuality once attractiveness is controlled, but for women, there is still a direct association of makeup on sociosexuality, even after controlling for attractiveness. It is not clear, though, whether this perceptual association is valid. Accordingly, we conducted a second study to test the validity of this association by examining (a) whether makeup habits (i.e., time and money spent on makeup) predict actual sociosexuality (self-reported by women), and (b) whether the apparent amount of makeup worn predicts women's actual sociosexuality.

2. Study 2

2.1. Methods

2.1.1. Procedures and targets

The 69 target women whose photographs were used in Study 1 answered a questionnaire inquiring how much time they usually spent each day applying and removing makeup, how much money they usually spent on makeup each month, how much spending money they had available each month, and all the items from the Sociosexual Orientation Inventory (Simpson & Gangestad, 1991). Some of the women did not answer all of the questions and, therefore, the following analyses contain fewer than 69 targets. Additionally, given that part of the calculation for the SOI score involves the addition of items, only participants who answered all of the SOI questions were included in those analyses.

2.2. Results

The target women reported spending an average of 12.27 min ($SD = 8.20$) each day applying and removing makeup, spending an average of \$11.33 ($SD = 9.21$) on makeup each month, and having an average of \$112.46 ($SD = 96.28$) of spending money available each month. Spearman correlations were conducted for the analyses using these three questions as their values were not normally distributed.

A correlation was run between the targets' reported amount of time spent each day applying and removing makeup with their self-reported sociosexuality. No significant relationship was found, $r(61) = 0.25$, $p = 0.051$, though there was a trend toward unrestricted women spending more time. A percentage of how much money targets spent each month on makeup was calculated by dividing the amount of money they usually spent on makeup each month by how much spending money they had available each month. A correlation was then run between the targets' percentage of money spent on makeup with their reported sociosexuality. No significant relation was found, $r(55) = -0.02$, $p = 0.863$. Neither the time spent applying and removing makeup nor the proportion of disposable income spent on makeup was statistically-significantly associated with actual sociosexuality.

We also ran correlations between measures of the perceived amount of makeup worn by each target woman (as assessed by the raters) and her self-reported sociosexuality. For the measures of perceived amount of makeup worn, we used the ratings of perceived amount collected in Study 1. Specifically, we used two measures. The first was the perceived amount of makeup worn by each target woman in the makeup condition. The second was the perceived amount of makeup worn by each target woman in the makeup condition minus the perceived amount of makeup worn by the same target woman in the no makeup condition. We refer to these measures as makeup amount and difference makeup amount, respectively. Actual (self-reported) sociosexuality was not significantly correlated with either makeup amount, *male raters*: $r(61) = 0.02$, $p = 0.890$; *female raters*: $r(61) = 0.08$, $p = 0.553$, or with difference makeup amount, *male raters*: $r(61) = 0.11$, $p = 0.382$; *female raters*: $r(61) = 0.10$, $p = 0.436$.

2.3. Discussion

We found that actual sociosexuality, as self-reported by female targets on the Sociosexual Orientation Inventory (Simpson & Gangestad, 1991), was not associated with the time or money target women spent on makeup. However, it must be noted that there was a trend between time spent on makeup and sociosexuality. Moreover, their actual sociosexuality was not associated with the apparent amount of makeup they applied to their faces in the photographs. These findings suggest that makeup use is not a valid cue of women's sociosexuality. This stands in contrast to our findings from Study 1, that makeup use (including the amount applied to the face) is used as a cue for perceiving sociosexuality from the face. Viewed together, these results suggest that makeup is used as a cue for perceiving the sociosexuality of targets, but that it is an invalid cue. Why is makeup used as a cue for perceiving sociosexuality when it is not a valid cue? One possibility is that the link between perceived and actual sociosexuality, in general, is not valid. To test this possibility, in Study 3, we investigated whether perceived sociosexuality predicts actual sociosexuality.

3. Study 3

3.1. Methods

We examined associations between the perceived sociosexuality ratings made on the photographs in Study 1 and the actual self-reported sociosexuality of the photographed target women collected as part of Study 2. All of the participants and measures used in Study 3 are reported in the methods sections of Studies 1 and 2.

3.2. Results

To determine whether perceived sociosexuality is a valid cue of actual sociosexuality, we ran correlations between the target women's reported levels of sociosexuality (i.e., their scores on the Sociosexual Orientation Inventory) collected in Study 2 and their perceived levels of sociosexuality (i.e., raters' ratings for each woman on "I can imagine this person being comfortable and enjoying 'casual' sex with different partners") from Study 1, both for the images with and without cosmetics. For female raters, there were no significant correlations for either the images without cosmetics, $r(61) = -0.23$, $p = 0.074$, or those with cosmetics, $r(61) = -0.20$, $p = 0.115$. For the male raters, however, we found significant *negative* correlations for both the images without cosmetics, $r(61) = -0.31$, $p = 0.014$, and for those with cosmetics, $r(61) = -0.35$, $p = 0.006$. In other words, target women who reported being more restricted in their sociosexuality were actually perceived as being more unrestricted in their sociosexuality by the male raters.

Given our mediation results from Study 1 and because previous work has documented the importance of attractiveness for the association between perceived and actual sociosexuality (Boothroyd et al., 2008; Gangestad et al., 1992), we also ran partial correlations with the attractiveness ratings from Study 1 as a control variable. When we did so, both relations for the male raters were no longer significant (images without cosmetics, $r(58) = -0.20$, $p = 0.117$; images with cosmetics, $r(58) = -0.24$, $p = 0.064$). This indicates that more attractive target women were rated as appearing to be more unrestricted in their sociosexuality by the male raters, even though they were not. We also ran the same analyses using the reported score on the one-item from the Sociosexual Orientation Inventory that the raters used (i.e., "I can imagine myself being comfortable and enjoying 'casual' sex with different partners") and found the same pattern for male raters. Women's perceived sociosexuality by male raters was negatively associated with their actual sociosexuality, but when perceived attractiveness by male raters was controlled, there was no association.

3.3. Discussion

In Study 3, we found that perceived sociosexuality—ratings of the photographs of the target women—was not associated with the actual sociosexuality reported by these same women for female raters, but it was for male raters. More specifically, the perceived sociosexuality assessments made by the male raters to the photographs were *negatively* associated with the actual sociosexuality reported by these same women. However, when women's rated attractiveness was partialled out, there was no association between perceived sociosexuality and actual sociosexuality among male raters. This finding is consistent with the results of Gangestad et al. (1992).

4. General discussion

In line with previous research (Cash et al., 1989; Cox & Glick, 1986; Graham & Jouhar, 1981; Hamid, 1972; Huguet et al., 2004; Jones et al., 2015; Mulhern et al., 2003; Osborn, 1996), we found that women were perceived as more attractive when they were shown wearing makeup than when not wearing makeup. We extended this finding by showing that, for faces with makeup, women who were perceived as wearing more makeup were also perceived as more attractive. Previous research has found that, when presented wearing makeup, women tend to be rated as more interested in men

(McKeachie, 1952), more promiscuous (Mileva et al., 2016), less modest, and more likely to have an extramarital affair (Osborn, 1996). Study 1 replicates these findings with a much larger sample of both target women and raters, revealing that female faces presented with makeup are also perceived as conveying more unrestricted sociosexuality than faces without makeup, by both male and female raters. We also extended this finding by showing that, for faces with makeup, women who were perceived as wearing more makeup were also perceived as being more unrestricted. These results support the hypothesis that makeup use predicts perceived sociosexuality.

Our mediation analyses showed that the relation between makeup and sociosexuality was no longer significant for male raters once attractiveness was controlled. This result is consistent with Guéguen and Jacob's (2011) finding that the effect of makeup on men's tipping behavior was mediated by the perceived attractiveness of the waitress. For female raters, on the other hand, the relation between makeup and sociosexuality remained significant even after controlling for attractiveness. One possible reason for finding only this association in female raters is that women may be more discerning at perceiving makeup given their personal experiences with applying cosmetics. Additionally, women may have greater insight into the various motivations behind wearing makeup and could, therefore, be more perceptible about its effects.

Our results from Study 2, however, reveal that makeup use is *not* an accurate cue for sociosexuality. We found that makeup habits were not associated with reported sociosexuality. More specifically, there was no significant relation between target women's scores on the Sociosexual Orientation Inventory and the time they spent each day applying and removing makeup, although there was a trend. There was also no relationship found between their sociosexuality scores and the percentage of disposable income they spent on cosmetics each month. Similarly, we found that the apparent amount of makeup applied by target women did not predict their reported sociosexuality. These findings, therefore, do not support the hypothesis that makeup use predicts actual sociosexuality.

The results of Studies 1 and 2 suggest that even though makeup is perceived as a valid signal of sociosexuality, it is not. Further research needs to determine why makeup use is perceived to signal sociosexuality when, in fact, it does not do so. Here, we propose five possible explanations. The first explanation is that the association is purely cultural in origin. In other words, that there is no underlying validity to the association outside of particular cultural contexts. Cross-cultural work would be helpful for determining whether this is the case.

A second possible explanation is that this association may exist only for women in early adulthood. Wearing makeup makes young women and teenagers appear older (Russell et al., in revision). Further, Russell and colleagues found evidence for a social association between makeup use and adulthood (i.e., when a young target was described as wearing makeup, she was perceived as being older). This finding may explain why makeup use is perceptually linked with more unrestricted sociosexuality, since sexual behavior is also associated with adulthood. Future research should explore the associations between makeup and sociosexuality/attractiveness with an older age range. Similar to the current research, previous studies have used only young female targets (McKeachie, 1952; Mileva et al., 2016; Osborn, 1996). Future work should include older faces to determine whether older women are also perceived as being more unrestricted when wearing cosmetics.

A third possibility is that the link between makeup and sociosexuality is an overgeneralization from the effects of ovulation. During ovulation, women's skin increases in homogeneity, their lips become

fuller, and there is increased redness in the face (Burriss et al., 2015; Oberzaucher, Katina, Schmehl, Holzleitner, & Grammer, 2012). These changes are mimicked by makeup use because foundation evens the skin and can make it appear redder while lipstick increases the appearance of fullness in the lips (Caisey, Grangeat, Lemasson, Talabot, & Voirin, 2006). Moreover, during ovulation, women display more flirting behaviors (Cantú et al., 2014) and their sexual attraction to, and fantasies about men other than their primary partners, increase (Gangestad, Thornhill, & Garver, 2002). This suggests that women may become somewhat more unrestricted during ovulation, when their skin naturally appears more similar to made-up skin. If so, the association between makeup and sociosexuality may be an overgeneralization stemming from this visual association.

A fourth possibility is that, under other conditions, makeup does, in fact, predict women's actual sociosexuality. For instance, in our study, women applied their 'everyday' makeup. However, it may be that women's evening makeup more accurately signals their sociosexuality, since evening makeup is more typically worn in courtship settings. The trend we found between time spent applying/removing makeup and self-reported sociosexuality suggests that further investigation is still needed. Future research employing different types of cosmetics and different rating contexts should address this issue.

Finally, a fifth possibility is that women who normally wear makeup and women who do not normally wear makeup differ from each other in other ways. Specifically women who normally wear makeup may have more unrestricted sociosexuality when compared to women who normally do not wear makeup. If there is such a difference and it is perceivable, people may correctly associate makeup use with more unrestricted sociosexuality. However, the relevant difference would be between these two groups of women. Because we only examined differences among one of these groups—those that normally wear makeup—our studies cannot address this possibility. This account could be tested by investigating whether there are sociosexuality differences between women who normally wear makeup and women who do not normally wear makeup.

In Study 3, we found that women's reported sociosexuality did not correlate with female raters' perceptions of women's sociosexuality and, in fact, it correlated negatively with male raters' perceptions of women's sociosexuality, although this relation was no longer significant when we statistically controlled for women's attractiveness. This finding is consistent with Gangestad et al.'s (1992) finding that when attractiveness is partialled out, the association between perceived sociosexuality and women's reported sociosexuality is no longer significant. Although previous research has found that people can accurately perceive several personality traits from faces (e.g., propensity to deceive; Berry & Wero, 1993), our research suggests that this is not the case for sociosexuality. More specifically, we found that raters' perceptions of female unrestrictedness are flawed, with increased attractiveness leading men to inaccurately perceive greater unrestrictedness.

Falsely perceiving more attractive women as being more unrestricted in their sociosexuality may be adaptive for men for two reasons. The first reason is that men may overestimate unrestricted sociosexuality in attractive women due to sperm competition/paternity certainty concerns. Attractive women receive more attention from males and, therefore, more opportunities for mating (whether in the context of long-term relationships or short-term ones; Rhodes, Simmons, & Peters, 2005). This increased male attention could put men at risk of cuckoldry if they are in a relationship with highly attractive partners (Goetz et al., 2005). Hence, a predisposition to overestimate unrestricted sociosexuality could serve as a 'preventative

tactic' (Shackelford & Goetz, 2007) intended to minimize cuckoldry risk when choosing a relationship partner.

The second reason for why falsely perceiving more attractive women as being more unrestricted may be adaptive is because it more closely aligns the desirability of a potential partner with her presumed availability. For instance, if a man sees an attractive woman but perceives her as restricted, he may not risk approaching her and, thus, lose out on a potentially desirable partner. On the other hand, if a man incorrectly perceives her to be more unrestricted than she really is, this may increase the probability of approaching her. Indeed, research has found that men tend to over-perceive the sexual interest of attractive women when speed dating (Perilloux, Easton, & Buss, 2012) and that men, compared to women, rely more heavily on attractiveness when judging sexual interest (Treat, Church, & Viken, 2017). In Study 3, we found a significant negative association between women's actual sociosexuality and their perceived sociosexuality, but only in male raters, which was no longer significant once women's attractiveness was controlled. This finding suggests that there may be some sort of wishful thinking effect among men in which attractive women are falsely, but optimistically, perceived as more willing to engage in casual sex.

Such wishful thinking may be heightened in young men (such as our participants), since they have limited experience with women and therefore have not yet learned which cues are valid indicators of sociosexuality. Our target women were also young and thus their makeup skills were likely not very advanced. It would thus be beneficial for future studies to examine how perceived sociosexuality is moderated by the age of the raters as well as the age of the targets and their makeup expertise. Additionally, future research would benefit from examining the link between makeup use and sociosexuality across different cultures, since the use and meaning of ornamentation, such as makeup, is culturally-dependent.

In conclusion, we found that makeup increases perceptions of unrestricted sociosexuality as well as physical attractiveness. This indicates that makeup is perceived to be a signal of greater unrestricted sociosexuality in women. Our findings, however, also show that this association is not a valid cue of women's sociosexuality, as we found no systematic connection between women's cosmetic use and their actual sociosexuality. Moreover, we found no relation between female raters' perceptions of women's sociosexuality and women's actual sociosexuality and, for male raters, once women's attractiveness was taken into account, there was no link between perceived sociosexuality and actual sociosexuality. Thus, unlike other personality traits, perceived sociosexuality does not appear to be a valid cue of sociosexuality, at least for women. Our evidence suggests that makeup is perceived to signal sociosexuality but does not actually signal sociosexuality, likely because makeup makes the face more attractive, which is incorrectly associated with sociosexuality.

Uncited reference

Boothroyd et al., 2005

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