

JUDGING THE BOOK BY ITS COVER: A STUDY ON NAÏVE FACIAL
INFERENCES OF LEADERSHIP TRAITS AND HORMONES

By

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A THESIS

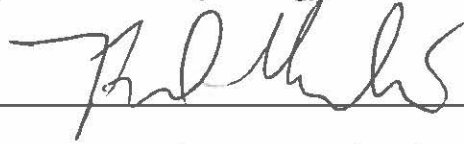
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First impressions carry much weight in social interaction. Working off of the evidence that individuals are remarkably accurate at judging faces for various traits, this study seeks to understand if this ability extends to judging a face for that person's hormonal profile. Forty-six undergraduates rated male and female faces across six personality dimensions – leadership, competence, dominance, facial maturity, likeability, and trustworthiness – as well as two hormonal traits – masculinity and stress (terms representing the general effects of the hormones testosterone and cortisol). Significant differences in the mean ratings made by male and female perceivers of target faces were found for likeability, facial maturity, and masculinity. A correlation between male targets' testosterone over cortisol ratio (T/C) and whether or not they were smiling was also found. Males' T/C ratio was also indicative of others' perceptions of them as more trustworthy, more likeable, and less stressed.

Keywords: hormones, leadership traits, gender, face perception

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I. INTRODUCTION

Humans have a particular interest in being able to “know” what to expect from one another. Being able to – or at least believing that you can – predict another’s behavior based on what you already know about them is a hallmark of human relationship. How exactly we “read” other people is a subject of considerable interest within social and personality psychology. Though this subject can be approached in a variety of ways, many have chosen to focus their interest on the study of the human face. Questions of concern across decades of research include the general – “What do we learn from ‘first impressions’?” – to the functional – “What is going on in the brain when we look at other human faces?” – to the structural – “Do we find thin-lipped or full-lipped people to be more trustworthy?”. What can be gleaned from the massive literature on the subject is that we are intrigued both personally and scientifically by the power of the face, and, above all, there is an eagerness to explore how much we can – and *do* – learn from the face.

Facial Inferences and Predictive Power

In 2008 and 2009, Rule and Ambady explored the ways in which impressions of human faces could predict an objective performance outcome. In their first study, they examined the relationship between naïve perceivers’ impressions of Fortune 500 CEOs’ faces and the financial performance of the companies these CEOs helmed. The perceivers were “naïve” in the sense that they did not recognize the faces they were seeing and did not know that these

faces were those of CEOs. The researchers found a significant correlation between the naïve perceivers' ratings of these CEOs' faces on leadership traits and their companies' profits. These initial findings provide strong support for the hypothesis that not only do inferences made from faces say something about subjective preferences, but they can also predict objective outcomes (Rule & Ambady, 2008b). Their findings extend the predictive power of facial inferences beyond the subjective – whether or not the perceiver judged the face to represent a particular trait – to the objective – where judgments of leadership ability and success correlated significantly with real-world demonstrations of this success (e.g. company profits).

Beyond the predictions of CEOs' traits and company profits, other studies have been done to investigate the predictive power of facial inferencing for different traits and under different circumstances. There has been significant research done on how naïve facial inferences for traits (in particular, trustworthiness and competence) relate to a candidate's success in political elections. Ballew and Todorov (2007) found that first impressions of competence – without time for reflective judgment – accurately predicted the outcomes for gubernatorial elections. Importantly, this study simultaneously investigated the effects of exposure and deliberation on the perceivers' accuracy. They found that even just 100 ms of exposure to the candidates' faces was enough for perceivers to accurately judge the election's outcome. In fact, they found that instructing the perceivers to reflect on their judgment before making a final decision actually led to *reduced* accuracy.

In a third example of the predictive power of facial inferencing, Rule and Ambady (2008a) assessed the accuracy of predicting sexual orientation from brief exposures to male faces. They found that male sexual orientation was accurately predicted at above chance rates for exposures to facial images as fast as just 50 ms, with no reduction in accuracy for longer exposure times. Furthermore, Rule, Ambady, and Hallett (2009) extended these findings by studying if similar accuracy could be obtained for female sexual orientation. They found that static facial images were enough for perceivers to accurately judge sexual orientation, that these judgments could be made at just 40 ms exposure times, and that automatic or “snap” judgments were more accurate than deliberated judgments. Unlike other social categories that bear more obvious physical demarcations – race, age, and sex – physical cues to sexual orientation are much more subtle. These findings provide powerful support for the claim that inferences made from facial images occur rapidly and accurately, even for the most implicit traits or qualities.

The current investigation is concerned with objective outcomes like Rule and Ambady’s (2008b; 2009) CEOs’ profits, though in a different way. We examined whether a perceiver’s subjective judgment of a target face correlated with objective biological measures of that target’s hormone levels. Through a task that exposed naïve perceivers to images of people’s faces, we asked them to rate each face on eight different traits: (1) leadership, (2) competence, (3) dominance, (4) facial maturity, (5) likeability, and (6) trustworthiness – the same six used by Rule and Ambady (2008b; 2009) in their studies of CEOs faces – and then, (7) masculinity, and (8) stress. “Masculinity” and “stress” are

operationalized terms for testosterone and cortisol – hormones whose functions are not necessarily generally understood by the average person. This study investigates the correlation between the ratings naïve perceivers give a target face for these two operationalized hormones, and the targets' actual hormonal baselines.

Neuroscience Behind First Impressions

Extensive research has been done to locate the regions of the brain involved in both the processing of facial stimuli and the rapid evaluation of these stimuli. Though the current study is not investigating the neurological processes behind facial inferences, these findings help explain the accuracy of subjective impressions on objective outcomes. In other words, research done on the neurological processes behind first impressions lends support for why and how these impressions may be so accurate.

Following their work establishing that objective performance outcomes could be predicted by naïve facial inferences of both male and female CEOs (Rule & Ambady, 2008b; 2009), a study was designed to test the role of the amygdala – a brain region involved in emotional evaluation – in this process. Rule *et al.* (2011) hypothesized that the amygdala would respond when perceiving a novel facial stimulus in accordance with actual leadership ability perceived in that face. In other words, the researchers predicted that the amygdala's response to a face would be on account of a genuine prediction of leadership ability in that face by the perceiver. They tested their hypotheses by measuring amygdala response through fMRI while participants judged the

target faces for facial symmetry and then for an explicit judgment of how successful they would be at leading a company. Their results demonstrate that the left amygdala responds to first impressions of faces in relation to both objective measures of successful leadership outcomes – such as company profits – and subjective judgments of the target’s leadership ability.

Todorov and Engell (2008) sought to pinpoint the extent to which the amygdala is involved in evaluation of novel facial stimuli and how it operates in relation to other face responsive regions of the brain. In their fMRI-based study, they found that the amygdala was activated more strongly in response to faces demonstrating negative traits, and that though the amygdala was activated across the spectrum of traits, there was a notable range in the magnitude of the activation. The researchers hypothesize that this range is due to the “valence” content of each face. The term “valence” indicates intensity, either positive or negative, in a person’s facial affect. They conclude that rather than being involved in specific trait evaluation of faces, the amygdala is more likely responsible for general valence determinations – judgments of the positive or negative intensity of faces.

Facial Inferences and Sex

In 2009, Rule and Ambady followed up on their initial study of facial inferences – judgments of traits made from exposures to faces – and objective outcomes – company profits – to explore the role of sex in this process¹. They

¹ Rule and Ambady (2008; 2009) use the term “gender” in their research, however, they are actually studying the role of participants’ and targets’ sex in this process of facial inferencing. In my study, I will

expanded upon their first study by adding the faces of female CEOs from the Fortune 1,000 (of which there were only 20), in order to see if the sex of either perceiver or target (CEO) would change their original findings. They found that though there were differences between ratings of male and females CEOs based on the sex of the perceiver, there was still a significant correlation between ratings of the female CEOs' faces on leadership traits and the success of their companies.

In expanding their study to include female CEOs of the Fortune 1,000, Rule and Ambady (2009) expected to see sex stereotypes concerning *agentic* (competence, dominance, facial maturity) and *communal* (likeability, trustworthiness) traits reflected in the participants' judgment ratings. They did not end up seeing any significant differences in the trait judgments along these lines; however, differences were discovered when the participant sex and CEO sex were crossed. They found that male participants would rate male CEOs as significantly more dominant and facially mature than female CEOs. The researchers were not particularly surprised by this finding and cited one potential explanation being that "men are either more attuned to cues of dominance or that they were simply applying gender stereotypes more than women were when rating the faces" (Rule & Ambady, 2009, p. 648).

In a study done by Chiao, Bowman, and Gill (2008), the researchers investigated the role of sex in political elections. The study built off the understanding that though people *should* choose their preferred candidates

also be studying the role of sex in this process, and have decided to replace "gender" with "sex" for the sake of consistency.

thoughtfully and deliberately, research demonstrates that election outcomes are accurately predicted by rapid facial inferences of a candidate's competence. Thus Chiao, Bowman, and Gill (2008) sought to test this finding directly in regards to sex. The participants completed both an implicit trait rating task as well as a simulated voting task in which they chose between two candidates for the U.S. Presidential election. The results demonstrate that, in consensus with past research, ratings of competence were again highly correlated with voting behavior. Interestingly, they also found that male candidates received more votes if they were rated as both competent and approachable, whereas female candidates received more votes if they were rated as both competent and *attractive*. Within this breakdown, it was the male voters that were significantly more likely to vote for female candidates who were both competent and attractive. These results indicate that attractiveness can play a confounding role in the process of forming first impressions, particularly in regard to male impressions of female faces.

The current study investigated the interaction between the perceiver's sex and the target's sex in a facial inferencing task that used the images of undergraduate students collected for a previous study at a different university. Like in Rule and Ambady's (2008b; 2009) studies, participants were asked to rate these faces along the same six traits (leadership, competence, dominance, facial maturity, likeability, and trustworthiness). Though we were not looking for the ability to predict objective outcomes from the subjective impressions of these traits in the way Rule and Ambady (2008b; 2009) did with the CEOs'

companies' profits, we explored the differences between males' and females' inferences based on the sex of the target face.

Facial Inferences and Hormones

Though no research has been done on a potential correlation between implicit facial judgments and hormone levels, there is a substantial body of literature on the role of the hormones testosterone and cortisol on both physical attributions as well as behavioral outcomes. For example, it has been shown that testosterone, a steroid hormone responsible for masculinization, is highly correlated with dominance in both males and females (Grant & France, 2001). There is also evidence that testosterone and cortisol act together to regulate dominance behaviors – with higher levels of testosterone and lower levels of cortisol correlating with increased dominance (Mehta & Josephs, 2010). In regards to physical manifestations of hormone levels, research demonstrates that higher levels of testosterone are correlated to more masculine facial appearances in males (Penton-Voak & Chen, 2004).

This study offers a first look at whether or not naïve facial inferences – judgments made of target faces that the perceiver has never seen before – can be predictive of a target's hormonal baselines, an objective biological measure. Research has demonstrated that hormone levels – particularly of testosterone and cortisol – are correlated to the ways in which we interact socially, compete, and participate in social hierarchical structures (Mehta & Josephs, 2010). Support for the hypothesis that hormones can be “read” from the face would offer a new layer of understanding to what processes are at play in the snap

judgments we make of people and their personalities, and how these judgments affect our social interactions.

The first goal of this research was to identify if there is an interaction between the sex of the perceiver and the sex of the target in the process of making judgments of a target's face on the traits in question. Secondly, this research sought to investigate whether naïve perceivers can accurately judge hormone levels from a first exposure to a previously unknown face.

Hypothesis 1: There is an interaction between the sex of the perceiver and the sex of the target in the perceivers' judgments of leadership traits. Male and female perceivers will differ in their average judgments of either male or female targets on any given trait.

Hypothesis 2: There is a significant correlation between naïve perceivers' judgments of targets' "masculinity" and "stress" and the targets' actual hormonal baselines.

II. METHODS

Participants

Participants for this study ($N = 46$) either volunteered to participate without receiving compensation ($n = 12$) or were recruited through University of Oregon Human Subjects Pool ($n = 34$), which consists of students enrolled in psychology and linguistics courses at the university. Those that were recruited through the Human Subjects Pool received credit towards the class they were enrolled in at the point of participation. This credit could have been earned through alternative assignments as well; participating in research was not the only way to earn the extra credit. Data was collected during the Spring 2013 and Fall 2013 terms. During Spring 2013, participants received 1.5 credits for their participation. However, during Fall 2013, the study was revised to award participants only 1 credit as it was only taking participants roughly 45 minutes to complete the study tasks.

The participants of this study were not selected for or against based on sex, ethnicity or race, age, sexual orientation, or mental or physical ability. The average age of participants was 20.2 years ($SD = 2.02$). The self-reported sexual orientation of participants was 89.1% straight, 4.3% gay, 2.2% bisexual, and 4.3% other. The self-reported ethnicity of participants was 69.6% European-American, 13 % Asian or Pacific Islander, 6.5% Hispanic or Latino, and 10.9% other.

Each of the 46 participants ($n_{male} = 13$; $n_{female} = 33$) was presented with a series of faces that they rated on each of the six traits (leadership, competence,

dominance, facial maturity, likeability, and trustworthiness), as well as the two hormones (operationalized as masculinity and stress). The participants were randomly assigned to an either all-male ($n = 24$) or an all-female ($n = 22$) condition, creating four different interactions: male perceivers who saw male target faces (M x M, $n = 7$), male perceivers who saw female target faces (M x F, $n = 6$), female perceivers who saw male target faces (F x M, $n = 17$), and female perceivers who saw female target faces (F x F, $n = 16$). This single-sex design attempted to minimize the risk of comparative rating for masculinity as well as other “agentic” traits that are considered socially “sexed” (e.g. dominance, competence, and facial maturity) (Rule & Ambady, 2009). In other words, we tried to avoid a rating pattern in which perceivers automatically placed female faces on the lower end of the scale for masculinity in comparison to male faces. We wanted perceivers to make their judgments of female target faces for masculinity based on the faces alone, not how the female faces compared to the male faces.

Stimuli

The facial images used in this experiment were taken of participants in past research at the University of Texas at Austin several years ago. Each of those participants signed a consent form allowing their image to be used in future research and publication. The 83 target images ($n_{female} = 41$, $n_{male} = 42$) have been standardized in size and converted to grey scale in order to minimize extraneous stimuli. They have been cropped to avoid extraneous detail from

clothing labels and jewelry, but they were not cropped around the targets' faces as was done in Rule and Ambady's (2008b; 2009) studies.

Not all of targets were photographed in exactly the same way, which means that some of the images are inconsistent in their dimensions and focus. Additionally, the past participants were not given specific directions for how to pose and so the images represent a spectrum of facial affect ranging from broad grins to straight poker faces (See Image 1 for examples).

Procedure

Upon arriving at the lab, participants were presented with a consent form that informed them of the purpose of the study, the different components that they would be asked to participate in (e.g. computer-based questionnaires and the trait-rating task), and that their participation was entirely confidential and voluntary. They were given opportunity to ask any questions they may have had of the researcher before signing their consent.

The questionnaires – a standard demographics survey, the Big Five Inventory (John et al., 1991), the Psychology Research Form-Dominance Scale (Jackson, 1967), the Social Dominance Orientation Scale (Sidanius & Pratto, 2001), and the Positive and Negative Affect Schedule (Crawford & Henry, 2004) – gathered information about the participants' demographics, their personalities, their perception of social dominance, and their current state of mind and mood (See Appendix for all materials used in this study). Most measures aimed to collect information that could be useful for future researchers using this data set.

At the start of the computer-based rating task, participants were informed that they were going to be presented with several series of images of people's faces, and that for each series they would be asked to rate the faces on a different trait. Participants rated each face on each of the eight traits (leadership, competence, dominance, facial maturity, likeability, trustworthiness, masculinity, and stress) along a 7-point Likert scale with 1 being "*Not at all X*" and 7 being "*Very X*" (See Figure 1). The participants were randomly assigned to either an all-male or an all-female condition before they arrived in the lab; within their assigned condition, the participants rated all of the male faces ($n=42$) or all of the female faces ($n=41$) on each trait.

The images were presented in random order within each block, and, similarly, the blocks of traits were also randomized. Participants received instructions at the beginning of each new block asking them to rate the following faces on *X* trait (See Figure 1). For each face, the 7-point scale continued to appear below to remind the participants of the rating criteria (See Figure 2). Following Rule and Ambady's (2008b; 2009) experimental design, the participants were not time-limited in how long they took to rate each face. However, based on Rule *et al.*'s findings that snap judgments were more accurate than deliberated judgments, the participants were each verbally instructed by the researcher to, "Rate each face as quickly as you can and rely on your gut instinct."

Following completion of the rating task, participants were debriefed by the researcher and given a form that explained the purpose of the study in more

depth and provided them with contact information should they have any further questions or feedback.

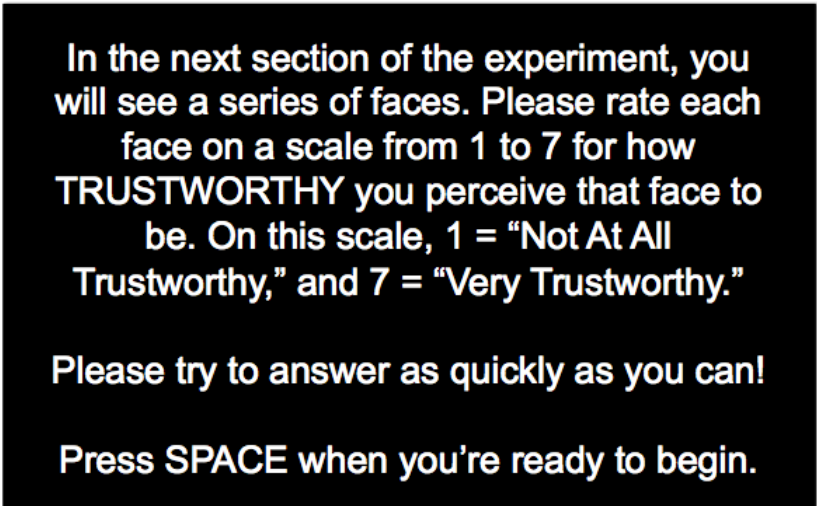


Figure 1. A sample instructional slide from the rating task. This figure demonstrates the standard introductory slide instructing participants to rate the following faces on X trait.



Figure 2. A sample "face" slide from the rating task. This figure represents the typical "face" slide in which the participant is presented with one face to rate on X trait following the 7-point Likert scale.



Image 1. Three examples of facial stimuli. These images demonstrate a range of potential affect within the sample of facial images used for this study.

III. RESULTS

There were 46 participants in this study, however this total was heavily skewed towards female participants: 71.7% female and only 28.2% male ($n_{female} = 33$, $n_{male} = 13$). That said, the four conditions were not evenly weighted, and the aggregated ratings present an unequal distribution of perceivers.

Perceiver x Target Sex Interaction

First, ratings for each target face on each of the eight dimensions (leadership, competence, dominance, facial maturity, likeability, trustworthiness, masculinity, and stress) were averaged across all participants so that each target face had eight mean scores associated with it (See Table 1 for descriptive statistics).

Second, male and female perceivers' ratings were separately averaged together for each target face on each of the eight dimensions. Ultimately, each target face ended up with 16 mean scores: male and female average ratings for each of the eight dimensions (See Table 2 for descriptive statistics).

These scores were then submitted to a within-subjects repeated measures analysis of variance (ANOVA) in which the perceiver's sex was treated as the independent variable, with the dependent variables being male aggregate ratings and female aggregate ratings for each face on each trait.

From Rule and Ambady's (2009) findings, we expected there to be a difference in ratings for dominance and facial maturity when perceiver sex and target sex were crossed. Rule and Ambady (2009) explained that this finding

was unsurprising due to both gender stereotypes as well as noted physiological differences between males and females. This study was interested in replicating these findings amongst a younger sample of targets and perceivers.

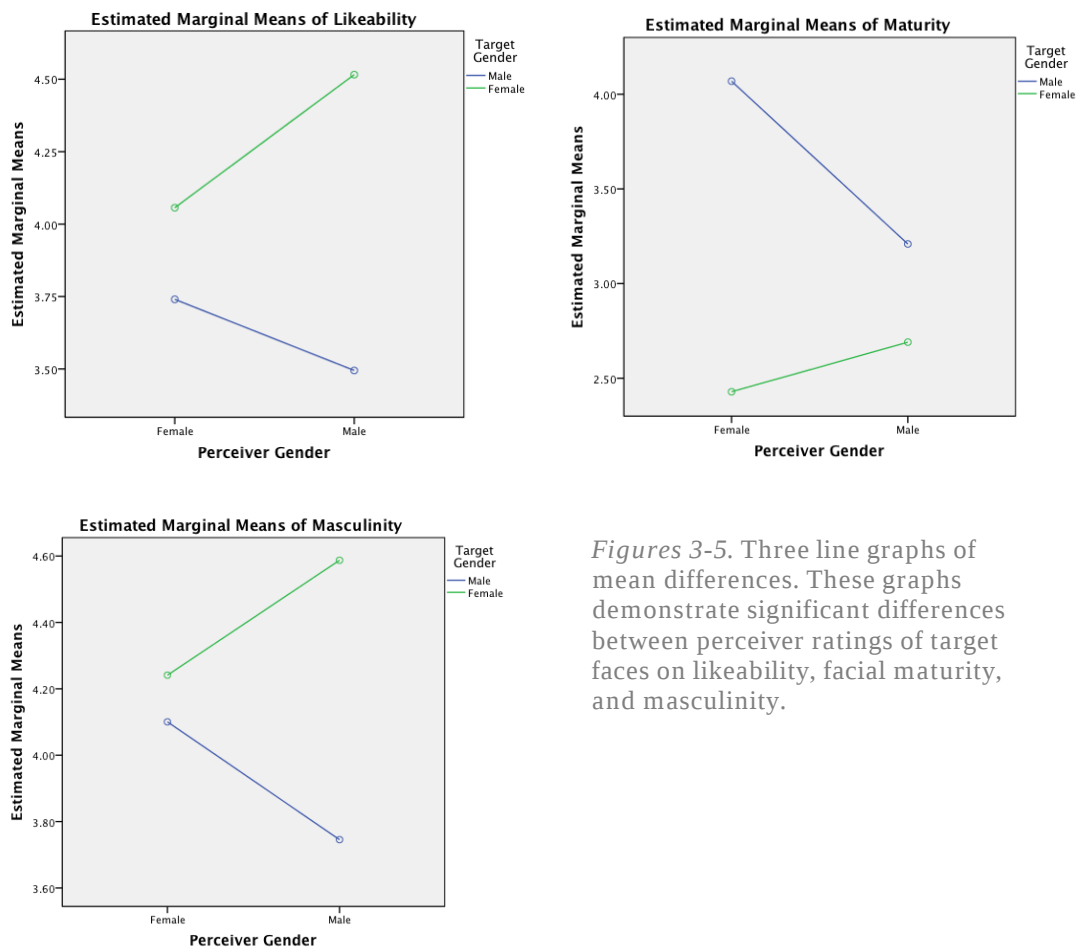
Table 1. Mean and standard errors for female and male targets on each traits, as rated by aggregated male and female perceivers.

Trait	All Perceivers			
	Female Targets		Male Targets	
	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>
Leadership	3.84	.11	3.34	.12
Competence	4.47	.09	3.59	.11
Dominance	3.46	.11	3.21	.13
Facial Maturity	4.34	.09	3.99	.12
Likeability	4.18	.13	3.67	.14
Trustworthiness	4.19	.11	3.63	.14
Masculinity	2.50	.12	3.82	.14
Stress	2.69	.17	3.48	.13

Table 2. Means and standard errors for female and male targets on each trait, as rated by female and male perceivers.

Trait	Female Perceivers				Male Perceivers			
	Female Targets		Male Targets		Female Targets		Male Targets	
	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>
Leadership	3.91	.09	3.45	.13	3.64	.17	3.00	.12
Competence	4.47	.11	3.77	.13	4.45	.09	3.16	.07
Dominance	3.57	.1	3.28	.14	3.13	.14	3.04	.12
Facial Maturity	2.43	.13	4.07	.16	2.69	.11	3.21	.11
Likeability	4.06	.13	3.74	.16	4.52	.16	3.49	.13
Trustworthiness	4.16	.11	3.61	.17	4.27	.15	3.67	.09
Masculinity	4.24	.1	4.10	.14	4.59	.09	3.75	.11
Stress	2.71	.17	3.44	.14	2.61	.16	3.58	.11

There were no significant differences in how perceivers of each sex rated targets of each sex on competence, dominance, leadership, stress, and trustworthiness. However, we did find a significant interaction between perceiver sex and target sex for ratings of likeability [$p = .003$], maturity [$p < .001$], and masculinity [$p = .012$] (See Figures 3-5).



Figures 3-5. Three line graphs of mean differences. These graphs demonstrate significant differences between perceiver ratings of target faces on likeability, facial maturity, and masculinity.

As can be seen in the graphs above, for each of the traits (likeability, facial maturity, and masculinity) there are significant differences between perceiver ratings across the target sexes, and within the perceiver sex.

With likeability, there is a significant difference in how male perceivers rated male and female targets. Namely, male perceivers rated female targets as significantly more likeable than male targets. Along those lines, there is also a steep difference between how male and female perceivers rated the same female target faces. With facial maturity, the significant difference is in female perceivers' ratings of male faces as significantly more facially mature than female faces. Similarly, there is a steep difference between male and female perceivers' ratings of male faces with female perceivers rating them as significantly more mature. Lastly, with masculinity, male perceivers rated male faces significantly less masculine than female perceivers did. Male perceivers also rated female faces as significantly *more* masculine than female perceivers rated those same female faces.

Hormonal Correlation

We factored in whether or not targets were smiling in their facial images to determine if this difference correlated with their varying hormone levels and others' perceptions of their faces. We computed a ratio of each target's standardized and positively converted testosterone and cortisol levels. This ratio of testosterone over cortisol (T/C) in men was associated with perceptions of trustworthiness [$r = .34, p = .03$], likeability [$r = .37, p = .02$], and more smiling [$p < .05$]. Thus, men with a higher testosterone and lower cortisol were more likely to be smiling in their photos.

There was also a marginally significant correlation between this T/C ratio and perceivers' ratings of stress [$r = -.28, p = .03$]. More smiling was strongly correlated with perceptions of trustworthiness, likeability, and lower stress, and mediated the association between the T/C ratios and perceptions of these traits.

IV. DISCUSSION

In examining the sample for an interaction between perceiver and target sex in ratings across various traits, our findings did not replicate those of Rule and Ambady (2009). They found a significant difference in male perceivers' ratings of male faces and female faces for facial maturity, with the male perceivers rating male faces as significantly more facially mature, and also as rating female faces as significantly less facially mature than female perceivers rated those same faces. In this study, our results indicate the opposite. Here, female perceivers have rated female faces as significantly less mature than male faces, and they have also rated male faces as significantly more mature than male perceivers rated those same faces. There are several potential explanations for why this has occurred. The difference in results may be due to the fact that this study's sample of perceivers and targets are both significantly younger than the sample used in Rule and Ambady's (2009) study of Fortune 1,000 CEOs. Perhaps the significance is in the fact that male perceivers have rated other male faces as significantly less mature than female perceivers rated those same faces. A potential reason behind this occurrence could be same-sex competitive instinct leading male perceivers to downgrade the facial maturity of other males.

Rule and Ambady (2009) also found a significant difference in how male and female perceivers rated faces for dominance. In this study we did not find a significant difference in dominance ratings across male and female targets, however we did find a significant difference in masculinity ratings. Results

demonstrate that male perceivers rated male faces as significantly less masculine than female perceivers rated those same faces. Additionally, male perceivers rated female faces as significantly more masculine than they rated male faces – though no one male perceiver saw both male and female face in the task. This difference could potentially be explained by gender norms that promote an unwillingness of female perceivers to rate other female faces highly for masculinity. On the other side, male perceivers' lower masculinity ratings for male faces could again be explained by a competition effect in which they might judge other males more harshly for a trait they see themselves possessing.

Lastly, we saw a significant difference between male and female perceivers' ratings of faces for likeability. Again, male perceivers rated female faces as significantly more likeable than female perceivers rated those same faces. Additionally, there was a significant difference between male perceivers' ratings of female faces and their much lower ratings of male faces. Ratings of a target's likeability may be more affected by facial affect (such as smiling) than other traits. If that is the case, this disparity could potentially be explained by more female targets smiling than male target faces. Of the 83 target faces used in this study, 39 were found to be not smiling ($n_{female} = 12$, $n_{male} = 27$), and 44 were found to be smiling ($n_{female} = 30$, $n_{male} = 14$). A chi-square test of independence demonstrated that the relationship between target sex and smiling was significant, $X^2(2, N=83) = 11.58$, $p = .001$. Still, there is a significant difference between male and female ratings of the same female target faces for likeability, which suggests that male perceivers may be more attuned to and influenced by female facial affect. As Chiao, Bowman, and Gill (2008)

demonstrated, male perceivers are more influenced by attractiveness in female faces than other females are; their finding may be pertinent to the significant differences in likeability ratings found in this study.

In regard to the correlation between perceiver ratings of faces across the eight dimensions and those faces' actual hormone levels, it proved advantageous to have some variability in the faces' affective expressions as smiling proved to be a mediating factor in the association between a male target's T/C ratio, and perceivers' ratings of their face on trustworthiness, likeability, and stress. What we may glean from this finding is that men with high testosterone and low cortisol are more likely to smile than men with low testosterone and high cortisol. This smiling then affects perceivers' judgments of these male faces as more trustworthy, more likeable, and less stressed.

Limitations

In a study that is examining four conditions (male perceivers by male targets, male perceivers by female targets, female perceivers by male targets, and female perceivers by female targets), ideally each condition would have at least 30 participants to demonstrate significant results. This study had only 46 participants in total, with males being heavily underrepresented compared to females in the sample.

For target images, consistency helps minimize any potential third variables. For future studies of this nature, it would be best to ensure that all images are the same proportion and resolution. The images used in this study were of the target's full head, not just cropped tightly around their faces as was

done in Rule and Ambady's (2008b, 2009) research. In regards to affective expression, it would be interesting to collect two images of each target: one in which they pose themselves without direction, and the second in which they are instructed to smile or not, depending on what they did for the first. This would allow for further investigation of the T/C ratio's effect on a subject's choice (or instinct) to smile or not.

Future Steps

Beyond submitting this data to a more rigorous, complex set of analyses, future research with this dataset could work off of Todorov and Engell's (2008) findings that "valence" – intensity of expression either positively or negatively skewed – is responsible for the amygdala's varied responses to faces. Perhaps judging the faces used for their valence would help understand the significant differences – or lack thereof – in perceivers' ratings.

Similarly, in regards to the differences between the sexes, rating the faces for attractiveness might elucidate the variability between male and female perceivers' ratings of female faces for likeability.

A. Consent Forms

ONLINE INFORMED CONSENT TO PARTICIPATE IN RESEARCH **University of Oregon, Department of Psychology**

This consent is for filling out surveys online only. Once you have finished reading, indicate that you agree by clicking on the “I agree” link at the bottom of this consent form.

You will read and sign a paper-and-pencil consent form when you come to the lab for the second portion of the study. You will have an opportunity to ask questions and decide to participate in the second portion or not at that time.

You are being asked to participate in a research study. This form provides you with information about the study. The Principal Investigator (the person in charge of this research) or his/her representative will also describe this study to you and answer all of your questions. Please read the information below. You may ask questions about anything you don't understand before deciding whether or not to take part. Your participation is entirely voluntary and you can refuse to participate without penalty or loss of benefits to which you are otherwise entitled.

Title of Research Study: “Social Context and Facial Features”

What is the purpose of this study? The study we are working on looks at how you perceive other individuals' faces to represent different traits.

What will be done if you take part in this research study? If you decide to participate, you will do the following activities: (1) complete some online questionnaires on your social behavior and emotions and (2) participate in a lab study at the UO psychology department, where you will be asked to have a picture of your face taken and to complete a computer-based rating task. The second portion of the study will be covered by a separate consent form that you will have the opportunity to read, ask questions about, and decide or decline to sign. The online questionnaires in this portion of the study should take no more than 30 minutes to complete.

What are the possible discomforts and risks? For most people, there are no known risks from answering questionnaires. You may feel stimulated, anxious, nervous, tired, or bored during answering. If this occurs, you are encouraged to take a break. Under no circumstances will you be pressured to respond. The records of this study will be kept private. In any sort of report we may publish, we will not include any information that will make it possible to identify a participant. Research records will be kept in a locked file.

What are the possible benefits to you or to others? There are no immediate benefits to you or to others for participating in the study.

If you choose to take part in this study, will it cost you anything? No.

Will you receive compensation for your participation in this study? For completing the entire study, you will receive 1.5 credits (.5 credits for every thirty minutes) towards your psychology course. If you choose to discontinue participation in this online portion of the study at any point after clicking through the consent page, you will receive ¼ credit for each 15 minutes of participation, rounded up to the next 15 minutes. For example, if you complete 1-15 minutes you will receive ¼ credit, if you complete 16-30 minutes you will receive ½ credit, and so on. If you discontinue participating in the middle of this study, contact the listed researcher to receive partial credit.

Participation in this study is entirely voluntary. You are free to refuse to be in the study, and your refusal will not influence current or future relationships with the UO Psychology Department, the UO Linguistics Department, or the University of Oregon. The Psychology and Linguistics Departments have established alternative assignments for students who do not wish to participate as research subjects. Please see your instructor if you would rather complete an alternative assignment.

How can you withdraw from this research study and who should I call if I have questions? If you wish to stop your participation in this research study for any reason, you should contact: Allison Murray (amurray4@uoregon.edu; 510-402-8524). You are free to withdraw your consent and stop participation in this research study at any time without penalty or loss of benefits for which you may be entitled. Throughout the study, the researchers will notify you of new information that may become available and that might affect your decision to remain in the study. If you have any questions about your rights as a research subject, you may contact: the Office for Protection of Human Subjects, University of Oregon at (541-346-2510) or human_subjects@uoregon.edu

How will your privacy and the confidentiality of your research records be protected?

- The records of this study will be kept private. In any sort of report we may publish, we will not include any information that will make it possible to identify a participant. Research records will be kept in a locked file.
- All electronic information will be coded and secured using a password-protected file. Access to the records will be limited to the researchers; however, please note that the Institutional Review Board and internal University of Oregon auditors may review the research records.

I have read this form, and I agree to participate in the study.

University of Oregon Consent Form

University of Oregon, Department of Psychology, Social Psychoneuroendocrinology Laboratory

Informed Consent for Participation as a Subject in “Social Context and Facial Features.”

Investigator: Allison Murray

Introduction

- You are being asked to be in a research study of how you perceive different human faces to represent different traits.
- Your participation in this study is entirely voluntary.
- We ask that you read this form and ask any questions that you may have before agreeing to be in the study.

Purpose of Study:

- The purpose of this study is to look at how you perceive other individuals' faces to be representative of different traits.
- The total number of participants is expected to be around 45.

Description of the Procedures:

If you agree to be in this study, we will ask you to do the following things:

- **Questionnaires:** Before you came into the lab, we asked you to complete questionnaires online regarding your social and emotional behaviors.
- **In-Lab Questionnaire:** Before participating in the experimental task today, we will ask you to fill out one final questionnaire on your current emotional state.
- **Experimental Task:** We will ask you to complete a computer-based rating task in which you will be shown series of individual faces and asked to rate them on different traits. This task will be completed in the lab and may take from 30 minutes up to one hour.

Risks/Discomforts of Being in the Study:

The study has no reasonable foreseeable risks. This study may include risks that are unknown at this time.

Benefits of Being in the Study:

There are no direct benefits resulting from participation in this study.

Payments:

If you decide to participate, you will receive reimbursement in course credits. The entire experiment (including the initial online portion) will last approximately an hour and a half for which you will receive 1.5 credits for your psychology course at the end of the study session. If you are unable to complete the experiment, you are free to leave at any point and will be compensated for the time that you participated.

If you discontinue participation in the middle of the study, you will receive $\frac{1}{4}$ credit for each 15 minutes of participation, rounded up to the next 15 minutes. For example, if you complete 1-15 minutes you will receive $\frac{1}{4}$ credit, if you complete 16-30 minutes you will receive $\frac{1}{2}$ credit, and so on. If you keep your scheduled study appointment but choose not to participate in the study at all, you will still receive $\frac{1}{4}$ credit.

Costs:

There is no cost to you to participate in this research study.

Confidentiality:

- The records of this study will be kept private. In any sort of report we may publish, we will not include any information that will make it possible to identify a participant. Research records will be kept in a locked file.
- All electronic information will be coded and secured using a password protected file.
- Access to the records will be limited to the researchers; however, please note that regulatory agencies, and the Institutional Review Board and internal University of Oregon auditors may review the research records.

Voluntary Participation / Withdrawal:

- Your participation is voluntary. If you choose not to participate, it will not affect your current or future relations with the University.
- You are free to withdraw at any time, for whatever reason. You are free to leave at any point and will be compensated for the time that you participated.
- There is no penalty or loss of benefits for not taking part or for stopping your participation.
- Your decision whether or not to participate will not affect your relationship with the UO Psychology Department, the UO Linguistics Department, or the University of Oregon.
- Please talk to your instructor if you would rather complete an alternative assignment.

Contacts and Questions:

- The researcher conducting this experiment is Allison Murray. For questions or more information concerning this research you may contact her at amurray4@uoregon.edu or 510.402.8524.
- If you have any questions about your rights as a research subject, you may contact: Research Compliance Services, University of Oregon at (541-346-2510) or ResearchCompliance@uoregon.edu

Copy of Consent Form:

You will be given a copy of this form to keep for your records and future reference.

Statement of Consent:

I have read (or have had read to me) the contents of this consent form and have been encouraged to ask questions. I have received answers to my questions. I give my

consent to participate in this study. I have received (or will receive) a copy of this form.

Signatures/Dates

Study Participant (Print Name):

Participant Signature: _____

Date: _____

I have explained the research to the participant, and answered all of his/her questions. I believe that he/she understands the information described in this document and freely consents to participate

Researcher (Print Name):

Researcher Signature: _____

Date: _____

B. Questionnaires

Please answer the following questions about yourself and your behaviors.

1. Age: _____
2. Gender:
 - ☐ Male
 - ☐ Female
3. Sexual Orientation (please be honest; this is totally anonymous!):
 - ☐ Gay
 - ☐ Straight
 - ☐ Bisexual
 - ☐ Other _____
4. Year in school:
 - ☐ First year
 - ☐ Second year
 - ☐ Third year
 - ☐ Fourth year
 - ☐ Fifth year
 - ☐ Other
5. Ethnicity:
 - ☐ European-American
 - ☐ African-American
 - ☐ Asian or Pacific Islander
 - ☐ Native American
 - ☐ Hispanic/Latino
 - ☐ Other _____
7. Please indicate the location where you spent most of your youth (i.e., where you grew up)?
City, State: _____ Zip Code: _____ Country: _____
8. What is your major? _____
9. What is your native language? (Circle one)
 - 1 English
 - 2 French
 - 3 Spanish
 - 4 Hindi
 - 5 Japanese
 - 6 Chinese
 - 7 Korean
 - 8 Other

The Big Five Inventory (BFI)

Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who likes to spend time with others? Please write a number next to each statement to indicate the extent to which you agree or disagree with that statement.

Disagree strongly 1	Disagree a little 2	Neither agree nor disagree 3	Agree a little 4	Agree strongly 5
---------------------------	---------------------------	------------------------------------	------------------------	------------------------

I see Myself as Someone Who...

- | | |
|--|---|
| ___ 1. Is talkative | ___ 23. Tends to be lazy |
| ___ 2. Tends to find fault with others | ___ 24. Is emotionally stable, not easily upset |
| ___ 3. Does a thorough job | ___ 25. Is inventive |
| ___ 4. Is depressed, blue | ___ 26. Has an assertive personality |
| ___ 5. Is original, comes up with new ideas | ___ 27. Can be cold and aloof |
| ___ 6. Is reserved | ___ 28. Perseveres until the task is finished |
| ___ 7. Is helpful and unselfish with others | ___ 29. Can be moody |
| ___ 8. Can be somewhat careless | ___ 30. Values artistic, aesthetic experiences |
| ___ 9. Is relaxed, handles stress well | ___ 31. Is sometimes shy, inhibited |
| ___ 10. Is curious about many different things | ___ 32. Is considerate and kind to almost everyone |
| ___ 11. Is full of energy | ___ 33. Does things efficiently |
| ___ 12. Starts quarrels with others | ___ 34. Remains calm in tense situations |
| ___ 13. Is a reliable worker | ___ 35. Prefers work that is routine |
| ___ 14. Can be tense | ___ 36. Is outgoing, sociable |
| ___ 15. Is ingenious, a deep thinker | ___ 37. Is sometimes rude to others |
| ___ 16. Generates a lot of enthusiasm | ___ 38. Makes plans and follows through with them |
| ___ 17. Has a forgiving nature | ___ 39. Gets nervous easily |
| ___ 18. Tends to be disorganized | ___ 40. Likes to reflect, play with ideas |
| ___ 19. Worries a lot | ___ 41. Has few artistic interests |
| ___ 20. Has an active imagination | ___ 42. Likes to cooperate with others |
| ___ 21. Tends to be quiet | ___ 43. Is easily distracted |
| ___ 22. Is generally trusting | ___ 44. Is sophisticated in art, music, or literature |

Please check: Did you write a number in front of each statement?

PRF

Answer each item by circling "T" for True or "F" for False as the item normally describes you. Please answer all items.

- | | | | |
|---|---|-----|---|
| T | F | 1. | I feel confident when directing the activities of others. |
| T | F | 2. | I would make a poor military leader. |
| T | F | 3. | I would like to be a judge. |
| T | F | 4. | I avoid positions of power over other people. |
| T | F | 5. | I try to control others rather than permit them to control me. |
| T | F | 6. | I don't like to have responsibility for directing the work of others. |
| T | F | 7. | I would like to play a part in making laws. |
| T | F | 8. | I have little interest in leading others. |
| T | F | 9. | In an argument, I can usually win others over to my side. |
| T | F | 10. | I feel uneasy when I have to tell people what to do. |
| T | F | 11. | The ability to be a leader is very important to me. |
| T | F | 12. | Most community leaders do a better job than I could possibly do. |
| T | F | 13. | I am quite effective in getting others to agree with me. |
| T | F | 14. | I am not very insistent in an argument. |
| T | F | 15. | I would like to be an executive with power over others. |
| T | F | 16. | I would not want to have a job enforcing the law. |

SDO-6

Please indicate the extent to which you disagree (1 = Strongly Disagree) or agree (7= Strongly Agree) with the following statements:

- 1 Some groups of people are simply inferior to other groups.
1 2 3 4 5 6 7
- 2 In getting what you want, it is sometimes necessary to use force against other groups.
1 2 3 4 5 6 7
- 3 It's OK if some groups have more of a chance in life than others.
1 2 3 4 5 6 7
- 4 To get ahead in life, it is sometimes necessary to step on other groups.
1 2 3 4 5 6 7
- 5 If certain groups stayed in their place, we would have fewer problems.
1 2 3 4 5 6 7
- 6 It's probably a good thing that certain groups are at the top and other groups are at the bottom.
1 2 3 4 5 6 7
- 7 Inferior groups should stay in their place.
1 2 3 4 5 6 7
- 8 Sometimes other groups must be kept in their place.
1 2 3 4 5 6 7
- 9 It would be good if groups could be equal.
1 2 3 4 5 6 7
- 10 Group equality should be our ideal.
1 2 3 4 5 6 7
- 11 All groups should be given an equal chance in life.
1 2 3 4 5 6 7
- 12 We should do what we can to equalize conditions for different groups.
1 2 3 4 5 6 7
- 13 Increased social equality is beneficial to society.
1 2 3 4 5 6 7
- 14 We would have fewer problems if we treated people more equally.
1 2 3 4 5 6 7
- 15 We should strive to make incomes as equal as possible.
1 2 3 4 5 6 7
- 16 No group should dominate in society.
1 2 3 4 5 6 7

[Note: Questions 6 & 9 are reverse scored]

This scale consists of a number of words that describe different feelings and emotions. Read each item and then circle the appropriate number that indicates to what extent you feel this way right now.

		Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
1.	Interested	1	2	3	4	5
2.	Distressed	1	2	3	4	5
3.	Excited	1	2	3	4	5
4.	Upset	1	2	3	4	5
5.	Strong	1	2	3	4	5
6.	Guilty	1	2	3	4	5
7.	Scared	1	2	3	4	5
8.	Hostile	1	2	3	4	5
9.	Enthusiastic	1	2	3	4	5
10.	Proud	1	2	3	4	5
11.	Irritable	1	2	3	4	5
12.	Alert	1	2	3	4	5
13.	Ashamed	1	2	3	4	5
14.	Inspired	1	2	3	4	5
15.	Nervous	1	2	3	4	5
16.	Determined	1	2	3	4	5
17.	Attentive	1	2	3	4	5
18.	Jittery	1	2	3	4	5
19.	Active	1	2	3	4	5
20.	Afraid	1	2	3	4	5

C. Debriefing Form

Debriefing Form

Background: The study that you just participated in explores the relationship between your gender and your ability to make judgments of certain traits based on just looking at a person's face. Past research suggests that we are very accurate at judging people's faces for certain leadership traits (such as Dominance, Competence, Trustworthiness, etc.). This study is interested in seeing if our accuracy extends beyond these traits to levels of certain hormones in our bodies – such as Testosterone and Cortisol (a hormone involved in the stress response).

Purpose: Through this research, we are hoping to better understand the role our implicit judgments have in our impressions and relationships with other people. First impressions are deemed important in all kinds of interactions – from personal to professional. In studying the accuracy of these impressions in predicting certain traits and even hormone levels in other people, we hope to gain a greater understanding of what makes these first impressions so powerful.

Your Part: Your involvement in this research is very important! Participating in the task helps us see which traits you are most accurate at predicting from a person's face, if there's a relationship between certain traits and certain hormones, and if your gender has any impact on the impressions you make.

Feedback and Further Information:

If you have any questions later on, you can feel free to call or email the principal investigator, Allison Murray (510-402-8524; amurray4@uoregon.edu).

If you have questions regarding your rights as a research participant, please contact Research Compliance Services, University of Oregon at 541-346-2510 or by emailing ResearchCompliance@uoregon.edu.

You can also email the Human Subjects Coordinator for psychology and linguistics research at hscoord@uoregon.edu.

Thank you for participating!

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