11-24-2009

Face Gender and Emotion Expression: Are Angry Women More Like Men?

Ursula Hess
University of Quebec Montreal

Reginald B. Adams
Pennsylvania State University

Karl Grammer
University of Vienna

Robert E. Kleck
Dartmouth College

Face gender and emotion expression: Are angry women more like men?

Ursula Hess University of Quebec at Montreal, Canada

Reginald B. Adams Jr. The Pennsylvania State University, USA

Karl Grammer University of Vienna, Austria

Robert E. Kleck Dartmouth College, USA

Certain features of facial appearance perceptually resemble expressive cues related to facial displays of emotion. We hypothesized that because expressive markers of anger (such as lowered eyebrows) overlap with perceptual markers of male sex, perceivers would identify androgynous angry faces as more likely to be a man than a woman (Study 1) and would be slower to classify an angry woman as a woman than an angry man as a man (Study 2). Conversely, we hypothesized that because perceptual features of fear (raised eyebrows) and happiness (a rounded smiling face) overlap with female sex markers, perceivers would be more likely to identify an androgynous face showing these emotions as a woman than as a man (Study 1) and would be slower to identify happy and fearful men as men than happy and fearful women as women (Study 2). The results of the two studies showed that happiness and fear expressions bias sex discrimination toward the female, whereas anger expressions bias sex perception toward the male.

Keywords: categorizaton, face gender recognition, emotion expression, visual cognition

Citation: Hess, U., Adams, R. B., Jr., Grammer, K., & Kleck, R. E. (2009). Face gender and emotion expression: Are angry women more like men?. *Journal of Vision, 9*(12):19, 1–8, http://journalofvision.org/9/12/19/, doi:10.1167/9.12.19.

Introduction

A long dominant model of face processing (Bruce & Young, 1986) posited separate functional routes for the recognition of facial identity and facial expression. Supporting this model are studies on special patient populations, which appear to demonstrate double dissociations between the ability to read identity cues and emotion cues from a face (but see Calder & Young, 2005). A recent neurological model of face processing (Haxby, Hoffman, & Gobbini, 2000) similarly delineated two functionally dissociable neural processing routes associated with facial identity and facial expression. However, more recent reflections suggest that a strict functional distinction may be oversimplified, suggesting instead that some of the functions required for each of these tasks may be subserved by overlapping and interacting systems (e.g., Calder & Young, 2005; Haxby et al., 2000). Based on this thinking one may posit that facial expressive cues can interfere with the perception of certain aspects of facial identity such as the identification of a person's sex.

In fact, there is evidence suggestive of the possibility of such overlap. In a recent study, Neth and Martinez (2009) showed that variations of the facial structure, specifically the distance between the eyes and the mouth, made expressionless faces appear to express either anger or sadness. This is in line with suggestions by Todorov (2008) that facial features in neutral faces can resemble emotion expressions and that this resemblance drives personality judgments. Even more relevant in the present context, Becker, Kenrick, Neuberg, Blackwell, and Smith (2007) demonstrated that faces in which brow ridge distance was manipulated were rated as more angry to the same degree that they were rated as more masculine. They trace this link to the fact that angry features have evolved to mimic masculinity and happy features to mimic neoteny and femininity.

Hess, Adams, and Kleck (2007) suggest that it is not masculinity/femininity per se that drives this effect but rather the related and more behaviorally proximal constructs of dominance and affiliation, which permeate all domains of social perception and have direct behavioral implications. Using a double oddball paradigm, Hess, Adams, and Kleck (2009a) found that angry and dominant faces on one hand and happy and affiliative faces on the other were categorized together, thus supporting the notion that the perceptual markers for anger and dominance as well as happiness and affiliation have some morphological characteristics in common.

To the degree that markers of sex and markers of dominance/affiliation overlap, Becker et al.'s (2007) and Hess et al.'s (2007) views converge toward the notion that there is overlap between men's faces and anger and women's faces and happiness. Specifically, a square jaw

doi: 10.1167/9.12.19 Received June 24, 2009; published November 24, 2009 ISSN 1534-7362

and thicker eyebrows entrain perceptions of dominance (Keating, 1985; Keating, Mazur, & Segall, 1981; Senior, Phillips, Barnes, & David, 1999; Zebrowitz, 1997) and are typical for men's faces (Brown & Perrett, 1993; Burton, Bruce, & Dench, 1993), whereas a rounded baby-face with large eyes is both feminine (Brown & Perrett, 1993; Burton et al., 1993) and perceived as more approachable (Berry & Brownlow, 1989) and warm (Berry & McArthur, 1986).

Yet, if emotion signals and markers of sex/dominance overlap, one would expect that emotional expressions directly influence face gender recognition. Face gender recognition is an easy task that can be performed well by adults (e.g., Burton et al., 1993), and even children as young as 9 months (Fagot & Leinbach, 1993). Yet these studies all used pictures of men and women with nonexpressive faces. Campbell, Wallace, and Benson (1996) studied face gender recognition for faces looking ahead compared to faces looking down and found that decisions were slower and masculinity ratings were lower for men's faces that looked downward, yet no difference was found for women's faces. They attribute this finding principally to the fact that one important marker of sex—the vertical upper-lid-to-brow distance—is smaller in men than in women and becomes less salient when eyes are averted down, thus making the task more difficult. However, they also note that looking down is a submissive, hence feminine, gesture and that this may also have contributed to the effect. Le Gal and Bruce (2002) assessed the concurrent judgment of sex and emotion expression (anger and surprise) and concluded that the two are processed in a functionally independent manner. Interestingly though, they found that faces were rated as more masculine when showing anger compared to surprise expressions, a finding consistent with the predictions made by both Becker et al. (2007) and Hess et al. (2007).

The present studies aimed to extend work on the perceptual overlap between markers of sex/dominance and facial expressions of anger and happiness by examining the influence of emotional expression on face gender recognition. Specifically, anger expressions emphasize some of the features that make a face appear dominant and masculine (e.g., the mouth region often appears more square and frowning reduces the distance between eyebrows and eyes), whereas smiles foreshorten the chin region and tend to round the jaw line making the face more feminine. We further assessed whether fear, which enlarges the eye region in a way more typical for women, would have a similar effect.

Overview

To assess our hypothesis, two studies were conducted. Study 1 employed an avatar created using the software Poser 5. This avatar is equipped with morph targets, which represent all FACS (Facial Action Coding System; Ekman & Friesen, 1978) Action Units (realEmotions; Grammer, Tessarek, Hofer, Oberzaucher, & Atzmueller, 2005). The morph targets change the facial surface in the same way a muscle contraction would. Thus it is possible to realistically display facial expressions based on action unit combinations known to be associated with anger, happiness, and fear, respectively. We included fear because it, like happiness, has been associated with femininity. In particular, fear expressions are characterized by large eye regions and generally appear more juvenile and less mature and masculine (Marsh, Adams, & Kleck, 2005; Sacco & Hugenberg, 2009). The expressions were morphed into 7 equal steps between the two expressions resulting in a continuum going from angry to happy to fearful to angry. Including blended emotions enabled us to examine the influence of perceptual information due to expression on gender discrimination in a stepwise fashion, including responses to mixed emotions, which are not so clearly associated with culturally learned gender stereotypes. We predicted that the higher the percentage of anger in the face morphs, the more "likely to be a man" the face would be rated, whereas morphs with higher percentages of happiness and fear would be rated as more "likely to be a woman."

Study 2 used a speeded reaction time task. Participants saw male and female faces with expressions of anger, happiness, fear, and sadness, as well as a neutral expression. We predicted that emotion expression would interact with gender such that participants would rate men showing anger more efficiently than women showing anger, and the converse for happiness and fear. Sadness is also a stereotypically female emotion (Hess et al., 2000), yet does not change facial appearance in a manner that directly overlaps with gender-typical facial appearance as do happiness and fear—hence this expression was also included to help assess the relative importance of the stereotypical "femininity" of an expression versus the perceptual overlap effects predicted here.

Study 1

Methods

Participants

A total of 143 men, 156 women, and 1 gender unknown individual with a mean age of 26 years participated. Participants were recruited at Dartmouth College as well as in parks and public places in Montreal, Canada. Participants completed the questionnaire in either English or French, depending on their preference.

Material

Poser 5 with realEmotions was used to create an avatar whose facial expressions were determined by specific FACS (Ekman & Friesen, 1978) action unit combinations. Expressions of anger, fear, and happiness were created and morphed to create three continua: angry–happy,

happy–fearful, and fearful–angry. Each continuum was represented by 7 expressions, for a total of 19 different expressions. Each expression was rated by at least 15 participants and each participant saw only one face. Figure 1 shows the three poles of the expression continua.

Dependent variable

Participants responded to the question, "does this person look more like a man or a woman"?, by indicating their choice on a 7-point scale, anchored with 1—definitely a man and 7—definitely a woman.

Procedure

The experimenters introduced themselves as students at Dartmouth College/the University of Quebec at Montreal and asked for a few minutes time. Participants who agreed were given a clipboard with a page that showed a face stimulus and the rating scale. The experimenters were blind regarding the hypotheses being tested and had previous experience in collecting data of these sorts. The respondents' answers were anonymous. Following the task, participants were instructed to indicate their own sex and age on the bottom of the page.

Results

Initial analyses did not reveal effects of sex of rater and this factor was therefore dropped from subsequent analyses. A one-way analysis of variance was conducted across the continua. A significant main effect of emotion expression emerged, $F(18,266) = 2.22$, $p = 0.004$. Specifically, as shown in Figure 2, the angry face was rated as most likely to be a man. Interestingly, the face that was rated as most likely to be a woman was neither the happy nor the fearful face, as predicted, but rather a morphed face in between these two (the stars in Figure 2 indicate faces that were rated significantly more likely to be a woman than the anger face). Thus, when fear and happiness were combined the face was rated as even more like a woman ($m = 3.87$, $SD = 1.60$) than either happy and fearful faces were. In fact, a "pure" fearful face ($m = 2.33$, $SD = 1.45$) was rated to be more likely to be a man than a "pure" happy face ($m = 2.87$, $SD = 1.67$) and did not differ significantly from the angry face ($m = 1.87$, $SD = 0.84$).

The change in gender perception showed a significant linear trend from angry to the fearful/happy combination. For the anger–happiness continuum, a significant linear trend was found such that perceived femininity increased as a direct function of a smaller percentage of anger and a larger percentage of happiness. In addition, with lower percentages of fear and higher percentages of anger, perceptions of masculinity increased again. Thus, although the face used in this study was overall rated as more likely to be a man than a woman when displaying expressions of anger (and the pure expression of fear), across the broader range of happiness and fear the face is perceived as more likely to be a woman to the degree it shows happiness or a combination of happiness and fear.

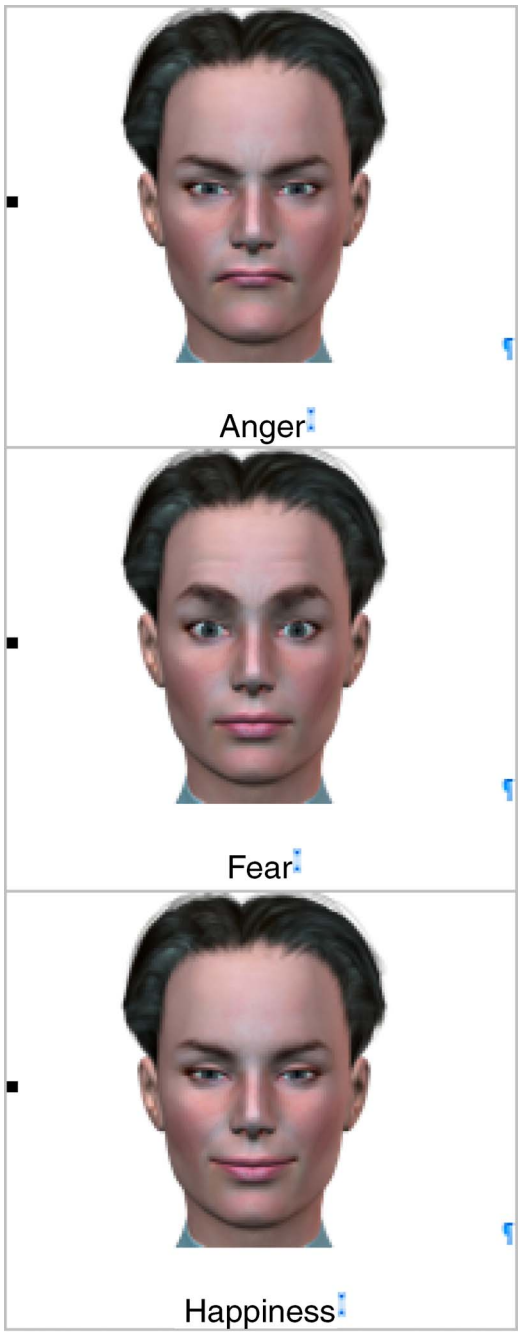

Figure 1. Endpoint expressions for the three continua.

Discussion

The results of Study 1 suggest that participants who see a face that shows anger associate this face more readily with

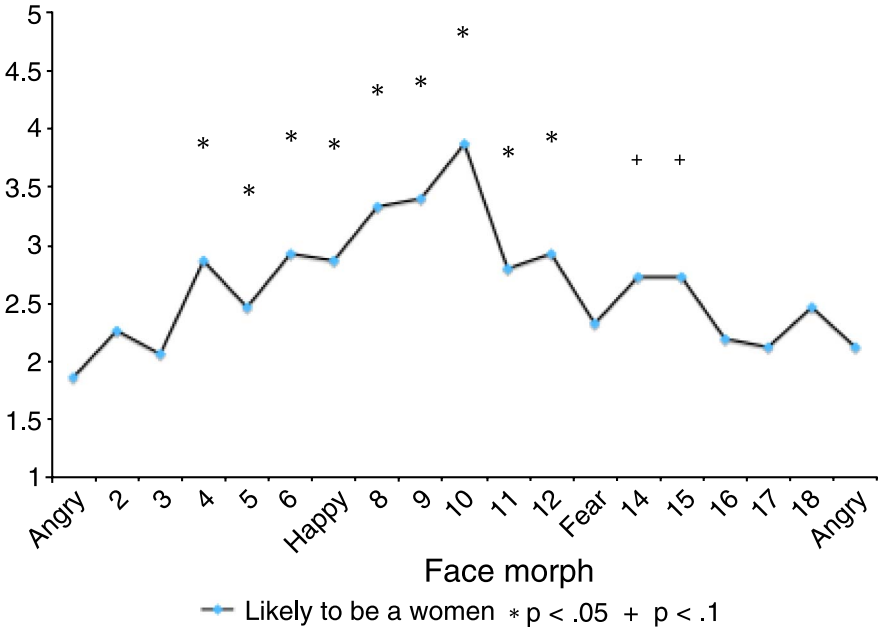

Figure 2. Ratings of "likelihood to be a woman" as a function of continuum type.

a man than with a woman. This effect varies almost linearly with the level of anger that is morphed into the face. That is, anger expressions, which enhance features associated with male faces, tend to bias sex judgments in that direction.

Conversely, combinations of fearful and happy faces were rated as more likely to be a woman. As mentioned above, both fear and happiness expressions change the face such that it is more congruent with a feminine appearance. However, they do so in different ways. Whereas, the smile foreshortens the distance between the lips and chin and makes the face appear rounder, fear expressions are characterized primarily by large eyes. The combination of these markers seems to be sufficiently strong to bias the person judgment toward the feminine. It should be noted that this combination of expressions is an unusual facial gesture, which cannot be said to be stereotypically feminine. These findings extend findings by Becker et al. (2007) by providing unique support that it is the perceptual overlap and not the stereotypicality of an expression that biases the gender judgment.

In sum, the present data provide good support for our hypothesis. However, they are based on one exemplar face only. Importantly, the face we used was chosen to be fairly androgynous and had a nonsex-typed hairstyle. Thus, it is possible that the very poverty of sex discrimination cues made it possible for facial expression cues to become a deciding feature. Hence in Study 2 we used a variety of real faces. As these faces did have gender-typed hairstyles, which are a highly determining gender cue, a speeded reaction time task was used in order to be sensitive to processing differences, even when accuracy is high. As mentioned above, sadness was included in this study as an additional emotion of interest because although stereotypically feminine it does not lead to perceptual changes resembling female faces. Hence including this emotion allows for an assessment of the role of stereotypicality of a facial gesture for sex discrimination.

Study 2

Methods

Participants

A total of 56 women and 40 men, all students at Dartmouth College, participated in small groups of no more than five.

Material

Facial expressions of happiness, anger, sadness, fear, and a neutral expression were selected from standardized sets of emotional facial expressions: *Pictures of Facial Affect* (Ekman & Friesen, 1976), JACFEE (Matsumoto & Ekman, 1988), and a set developed by Kirouac and Doré (1984). Each participant saw a total of 10 male faces and 10 female faces, 2 male and 2 female faces for each emotion. A total of 5 different sets of faces was prepared. The faces were presented on Superlab, and reaction times were recorded using a serial mouse.

Dependent variable

Participants were instructed to press as fast as possible either the left or the right mouse button to indicate their choice of gender. Button assignment was counterbalanced

across participants. Reaction times shorter than 300 ms or longer than 2000 ms were excluded. Only RTs for correct answers (90.6%) were included. As results were the same for transformed and untransformed reaction times, results are reported for the untransformed data.

Procedure

Participants were greeted by the experimenter and seated in front of a computer. The experimenter explained the participants' task and asked them to complete a consent form. Participants who completed the consent form then started the program. The first screen presented the instructions. Once participants had indicated that they had read the instructions the faces were presented.

Results

Initial analyses did not reveal a sex of rater effect and this factor was therefore omitted from the subsequent analyses. A 2 (sex of face) × 5 (emotion) repeated measures analysis of variance was conducted on the reaction time measure (no corrections for sphericity were performed as ε's were >0.85, suggesting adequate sphericity). A significant main effect of face sex, $F(1,348) = 4.14$, $p = 0.045$, emerged such that male faces ($m = 699.21$) were responded to faster than female faces ($m = 720.22$). Further, as expected a main effect of emotion, $F(4,348) = 2.40$, $p = 0.050$, and an emotion × face sex interaction was found, $F(4,348) = 3.23$, $p = 0.013$. Specifically, for male faces no difference in speed of sex recognition as a function of emotional expression emerged. However, for female faces, emotion expression had an impact on reaction times. As predicted, post-hoc tests ($p < 0.05$) showed that reaction times to women's faces were significantly slower when showing an angry expression ($m = 767.65$) than when showing a happy ($m = 703.66$) or fearful ($m = 709.07$) expression, for which reaction times did not differ. RTs for angry expressions were also marginally different from sad expressions ($m = 727.43$). The latter were very similar to RTs for neutral expressions ($m = 728.46$), which did in fact not differ significantly from RTs for any other expression.

Discussion

In sum, the data from Study 2 confirm that sex is more difficult to detect in female faces showing anger than in female faces showing happiness or fear. Yet, for male faces emotion expression did not make a difference. Male faces were in fact overall recognized faster as male regardless of emotion, yet this difference was largely due to the differences in RTs to male and female anger expressions. This raises the question as to why emotion expression did not affect face gender recognition for male faces. Interference in RT tasks is usually considered a sign of increased difficulty. Thus, anger expressions because they make a face appear more masculine (Becker et al., 2007) make female faces less recognizable as women, whereas happy and fear expressions make that recognition easier as they make faces appear more feminine (Becker et al., 2007; Marsh et al., 2005; Sacco & Hugenberg, 2009). However when male faces showed expressions that render them more feminine (happiness and fear) they were nonetheless recognized with the same ease as male faces showing an expression that enhances the perceptual cues that signal male gender. Hence it seems that subtle changes in these perceptual cues influenced the ease of deciding that a face is female but not that a face is male. This suggests that the judgment of maleness is more resistant to the presence of female features than is the case for the reverse constellation.

The present data do not allow us to draw a firm conclusion, but it is possible to speculate that in some ways a judgment of male represents a default and that participants scan faces for the presence of single male features and then rapidly decide that the person must be male. Hence the decision that a person must be female can only be made once no such feature is found. This resonates with the notion found in Western philosophy that the female is defined by the absence of maleness (Aristotle, 384–328 BC; St. Thomas Aquinas, 1225–1274). If participants indeed have to decide that a person is not a man in order to come to the conclusion that she is a woman, this pattern of reaction times would in fact be expected. Yet, this interpretation may stretch the limits of what a single RT task can tell us.

What does seem evident is that male faces have more pronounced, dominant features, whereas women are more likely to have softer, and hence maybe more androgynous looking features. This might explain the increased effects in women and fits with the results from Study 1 using an androgynous face.

Conclusions

Two studies confirmed that expressions of happiness/fear bias gender discrimination toward the female, whereas anger expressions seem more closely linked to maleness. Thus, a person who shows a happy/fearful expression is perceived as more likely to be a woman, and women who show happy or fearful expressions are identified more quickly as women. In contrast, women who show anger expressions are identified more slowly as women, and a person who looks angry is more likely to be considered to be a man.

These findings support the notion shared by Becker et al. (2007), Marsh et al. (2005), as well as Hess et al. (2007) that anger, fear, and happiness share common signal features with sex markers. That is, the pulling up of the

eyebrows in fear enhances the distance between eyes and brows, a female sex marker. Smiling in turn enhances the appearance of roundness of the face, which is also a female sex marker. Conversely, those aspects of the face that make a face appear both dominant and masculine are made more salient by anger expressions. Specifically, the tightening of the lips in anger makes the mouth region appear more square and the drawing together of the eyebrows enhances the prominence of the eyebrows. As mentioned above, these features are also relevant for the perception of dominance and affiliation. Thus, these expressions resemble both the morphological markers for the behavioral intentions of dominance and affiliation and certain markers of sex.

However, there is an alternative explanation to these findings. Specifically, emotionally expressive faces, especially faces signaling threat, demand attentional resources (for a review see Palermo & Rhodes, 2007). Attended processing in turn would allow for the influence of top-down processes such as the influence of gender stereotypes. Specifically, people have strong beliefs regarding how likely it is for men and women to show certain emotions (see, e.g., Fischer, 1993). Thus, it is frequently considered to be less appropriate or likely for women to show anger than it is for men (Hess, Adams, & Kleck, 2005), whereas women are also expected to show more fear and sadness than men (Hess et al., 2000; Plant, Hyde, Keltner, & Devine, 2000). Women are also expected to smile more than men and in a wide variety of situations, including when experiencing negative emotions (for a review see, e.g., Hess, Beaupré, & Cheung, 2002). In a recent study, Hess, Mallen, and Lipp (2009) found that during passive viewing of angry, happy, and sad expressions the late positive component of the ERP—indexing the perception of a counter-stereotypical event—was larger for women showing anger and for men showing sadness. This finding supports the notion that gender-based expectations regarding emotional displays are rapidly and implicitly activated. It is hence possible that the strong association of emotion and gender judgments observed in the present research is partially due to the influence of stereotype-based expectations. However, this explanation is rendered less likely by the absence of an effect for sadness, a stereotypically female emotion (Hess et al., 2000), in Study 2 as well as by the fact that the strongest bias toward a feminine judgment in Study 1 was found for the happy/fear blend, which is not a stereotypical facial gesture at all. However, it would be interesting to assess to what degree top-down processes can interact with perceptual processes under different conditions.

The present research supports the notion that facial expressions that contain features that also serve as sex markers can bias sex detection. Importantly, some of the same features also signal behavioral intentions, specifically, dominance and affiliation (see Hess, Adams, & Kleck, 2009b). In a related vein, anger and happiness have also been associated with another evolutionarily important behavioral intention, trustworthiness. Thus, trustworthy faces, which expressed happiness were perceived as happier than untrustworthy faces, and untrustworthy faces that expressed anger were perceived as angrier than trustworthy faces (Oosterhof & Todorov, 2009). Together these findings converge to the notion that the face is a complex social signaling system in which signals for emotions, behavioral intentions, and sex all overlap. In turn, these perceptual overlaps may be one source for the differential attribution of emotional and behavioral traits to men and women.

In sum, anger, fear, and happiness seem to selectively enhance those facial features that are pertinent to both the domain of emotions and function as sex markers. Simply, although not all men appear angry nor all women appear happy or fearful, the converse is true, angry men appear more masculine and happy or fearful women appear more feminine.

Acknowledgments

This research was supported by a Grant from the Social Science and Humanities Research Council to Ursula Hess and a National Science Foundation Grant #0544533 to Robert E. Kleck, Ursula Hess, and Reginald B. Adams, Jr. We are grateful to Pascal Thibeault for help with the data collection.

Commercial relationships: none.
Corresponding author: Ursula Hess.
Email: Hess.Ursula@uqam.ca.
Address: Department of Psychology, University of Quebec at Montreal, CP 8888, station “centre-ville”, Montreal, QC H3C 3P8, Canada.

References

Becker, D. V., Kenrick, D. T., Neuberg, S. L., Blackwell, K. C., & Smith, D. M. (2007). The confounded nature of angry men and happy women. *Journal of Personality and Social Psychology, 92,* 179–190. [PubMed]

Berry, D. S., & Brownlow, S. (1989). Were the physiognomists right? Personality correlates of facial babyishness. *Personality and Social Psychology Bulletin, 15,* 266–279.

Berry, D. S., & McArthur, L. Z. (1986). Perceiving character in faces: The impact of age-related craniofacial changes on social perception. *Psychological Bulletin, 100,* 3–10. [PubMed]

Brown, E., & Perrett, D. I. (1993). What gives a face its gender? *Perception, 22,* 829–840. [PubMed]

Bruce, V., & Young, A. W. (1986). Understanding face recognition. *British Journal of Psychology, 77,* 305–327. [PubMed]

Burton, A. M., Bruce, V., & Dench, N. (1993). What's the difference between men and women? Evidence from facial measurement. *Perception, 22,* 153–176. [PubMed]

Calder, A. J., & Young, A. W. (2005). Understanding the recognition of facial identity and facial expression. *Nature Reviews Neuroscience, 6,* 641–651. [PubMed]

Campbell, R., Wallace, S., & Benson, P. J. (1996). Real men don't look down: Direction of gaze affects sex decisions on faces. *Visual Cognition, 3,* 393–412.

Ekman, P., & Friesen, W. V. (1976). *Pictures of facial affect*. Palo Alto, CA: Consulting Psychologists Press.

Ekman, P., & Friesen, W. V. (1978). *The facial action coding system: A technique for the measurement of facial movement*. Palo Alto, CA: Consulting Psychologists Press.

Fagot, B. I., & Leinbach, M. D. (1993). Sex-role development in young children: From discrimination to labeling. *Developmental Review, 13,* 205–224.

Fischer, A. H. (1993). Sex differences in emotionality: Fact or stereotype? *Feminism & Psychology, 3,* 303–318.

Grammer, K., Tessarek, A., Hofer, G., Oberzaucher, E., & Atzmueller, M. (2005). *Facial expression simulation: Introducing reverse engineering to behaviour analysis*. Unpublished manuscript. Ludwig Boltzmann Institute for Urban Ethology.

Haxby, J. V., Hoffman, E. A., & Gobbini, M. I. (2000). The distributed human neural system for face perception. *Trends in Cognitive Sciences, 4,* 223–233. [PubMed]

Hess, U., Adams, R. B., Jr., & Kleck, R. B. (2009a). The categorical perception of emotions and traits. *Social Cognition, 27,* 319–325.

Hess, U., Adams, R. B., Jr., & Kleck, R. E. (2009b). The face is not an empty canvas: How facial expressions interact with facial appearance. *Philosophical Transactions of the Royal Society London B, Biological Sciences, 364,* 3497–3504. [PubMed]

Hess, U., Adams, R. B., Jr., & Kleck, R. E. (2005). Who may frown and who should smile? Dominance, affiliation, and the display of happiness and anger. *Cognition and Emotion, 19,* 515–536.

Hess, U., Adams, R. B., Jr., & Kleck, R. E. (2007). When two do the same it might not mean the same: The perception of emotional expressions shown by men and women. In U. Hess & P. Philippot (Eds.), *Group dynamics and emotional expression* (pp. 33–52). New York: Cambridge University Press.

Hess, U., Beaupré, M. G., & Cheung, N. (2002). Who to whom and why—cultural differences and similarities in the function of smiles. In M. Abel & C. H. Ceia (Eds.), *An empirical reflection on the smile* (pp. 187–216). New York: The Edwin Mellen Press.

Hess, U., Mallen, K. M., & Lipp, O. V. (2009). *Frowning women and sad men—that can's be: An ERP investigation into gender stereotypes of emotion*. Manuscript submitted for publication.

Hess, U., Senécal, S., Kirouac, G., Herrera, P., Philippot, P., & Kleck, R. E. (2000). Emotional expressivity in men and women: Stereotypes and self-perceptions. *Cognition and Emotion, 14,* 609–642.

Keating, C. F. (1985). Human dominance signals: The primate in us. In S. L. Ellyson & J. F. Dovidio (Eds.), *Power, dominance, and nonverbal communication* (pp. 89–108). New York: Springer Verlag.

Keating, C. F., Mazur, A., & Segall, M. H. (1981). A cross-cultural exploration of physiognomic traits of dominance and happiness. *Ethology and Sociobiology, 2,* 41–48.

Kirouac, G., & Doré, F. Y. (1984). Identifacation des expressions faciales émotionnelles par un échantillon québécois francophone. *International Journal of Psychology, 17,* 1–7.

Le Gal, P. M., & Bruce, V. (2002). Evaluating the independence of sex and expression in judgments of faces. *Perception & Psychophysics, 64,* 230–243. [PubMed] [Article]

Marsh, A. A., Adams, R. B., Jr., & Kleck, R. E. (2005). Why do fear and anger look the way they do? Form and social function in facial expressions. *Personality and Social Psychological Bulletin, 31,* 73–86. [PubMed]

Matsumoto, D., & Ekman, P. (1988). *Japanese and Caucasian facial expressions of emotion (JACFEE) and neutral faces (JACNeuf) [slides & brochure]*. San Francisco: San Francisco State University.

Neth, D., & Martinez, A. M. (2009). Emotion perception in emotionless face images suggests a norm-based representation. *Journal of Vision, 9*(1):5, 1–11, http://journalofvision.org/9/1/5/, doi:10.1167/9.1.5. [PubMed] [Article]

Oosterhof, N., & Todorov, A. (2009). Shared perceptual basis of emotional expressions and trustworthiness impressions from faces. *Emotion, 9,* 128–133. [PubMed]

Palermo, R., & Rhodes, G. (2007). Are you always on my mind? A review of how face perception and attention interact. *Neuropsychologia, 45,* 75–92. [PubMed]

Plant, E. A., Hyde, J. S., Keltner, D., & Devine, P. G. (2000). The gender stereotyping of emotions. *Psychology of Women Quarterly, 24,* 81–92.

Sacco, D. F., & Hugenberg, K. (2009). The look of fear and anger: Facial maturity modulates recognition of

fearful and angry expressions. *Emotion, 9,* 39–49. [PubMed]

Senior, C., Phillips, M. L., Barnes, J., & David, A. S. (1999). An investigation into the perception of dominance from schematic faces: A study using the World-Wide Web. *Behavior Research Methods, Instruments and Computers, 31,* 341–346. [PubMed]

Todorov, A. (2008). Evaluating faces on trustworthiness: An extension of systems for recognition of emotions signaling approach/avoidance behaviors. *Annals of the New York Academy of Sciences, 1124,* 208–224. [PubMed] [Article]

Zebrowitz, L. A. (1997). *Reading faces: Window to the soul?* Boulder, CO: Westview Press.