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Social Psychological Face Perception: Why Appearance Matters

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Abstract

We form first impressions from faces despite warnings not to do so. Moreover, there is considerable agreement in our impressions, which carry significant social outcomes. Appearance matters because some facial qualities are so useful in guiding adaptive behavior that even a trace of those qualities can create an impression. Specifically, the qualities revealed by facial cues that characterize low fitness, babies, emotion, and identity are overgeneralized to people whose facial appearance resembles the unfit (anomalous face overgeneralization), babies (babyface overgeneralization), a particular emotion (emotion face overgeneralization), or a particular identity (familiar face overgeneralization). We review studies that support the overgeneralization hypotheses and recommend research that incorporates additional tenets of the ecological theory from which these hypotheses are derived: the contribution of dynamic and multi-modal stimulus information to face perception; bidirectional relationships between behavior and face perception; perceptual learning mechanisms and social goals that sensitize perceivers to particular information in faces.

Although we are admonished 'don't judge a book by its cover', we repeatedly defy that warning as we go about our daily lives responding to people on the basis of their facial appearance. The impact of faces is shown in our impressions of people as well as in our behavior towards them, such as whom we help, whom we hire, or whom we ask for a date (Zebrowitz, 1997). Appearance matters not only when our reactions to a face are arguably relevant to our choices, but even when those choices should be driven by more objective information. For example, facial appearance predicts criminal justice decisions (Eberhardt, Davies, Purdie-Vaughns, & Johnson, 2006; Stewart, 1980; Zebrowitz & McDonald, 1991), as well as congressional elections (Todorov, Mandisodza, Goren, & Hall, 2005). Why does facial appearance matter? Why do particular faces create certain impressions? What cues drive our impressions of these faces? Here, we describe how hypotheses derived from an ecological approach to social perception provide insights into social psychological face perception and the role of facial appearance in impression formation.

The Conceptual Framework

The ecological approach to social perception, grounded in Gibson's theory of object perception (Gibson, 1979), holds that people's faces provide adaptive information about the social interactions they afford. For example, the 'cute' face of a baby elicits approach and protective responses (Berry & McArthur, 1986; Zebrowitz, 1997); an angry face potentiates avoidance and defensive responses (Balaban, 1995; Marsh, Ambady, & Kleck, 2005). Although ecological theory assumes that our perceptions of faces will often be accurate, it also proposes that attunements to certain facial information can produce biased perceptions through *overgeneralization effects* (Zebrowitz, 1996, 1997; Zebrowitz & Montepare, 2006). Specifically, the qualities that are accurately revealed by the facial cues that characterize low fitness, babies, emotion, and identity tend to be perceived in people whose facial appearance resembles the unfit, babies, a particular emotion, or a particular identity. Thus, according to the ecological approach, facial appearance matters because some facial qualities are so useful in guiding adaptive behavior that even a trace of those qualities can elicit a response. The errors produced by these overgeneralizations are presumed to be less maladaptive than those that might result from failing to respond appropriately to persons who vary in fitness, age, emotion, or familiarity. Moreover, generalizing across faces is just one instance of the broader cognitive mechanism of stimulus generalization that is essential for adaptive behavior. The world would be quite overwhelming if we had no expectations about our social and non-social environment because we failed to generalize from known cases to similar unknown ones.

The focus of ecological theory differs markedly from traditional impression formation research that, until quite recently, has largely eschewed effects of external appearance, focusing primarily on internal mechanisms (Gilbert, 1998). On the other hand, ecological theory intersects with evolutionary psychology theories (Zebrowitz & Montepare, 2006), and it has much in common with a long line of research on nonverbal communication that is also concerned with reactions to facial cues (DePaulo & Friedman, 1998). It also complements contemporary models of face perception in the cognitive neuroscience literature. One is the dual process model that differentiates mechanisms for the perception of identity versus the perception of emotion and other changeable facial qualities (Bruce & Young, 1986; Haxby, Hoffman, & Gobbini, 2002; but see Calder & Young, 2005). Another is a model that predicts face recognition from the position of faces in a mental face-space where faces are coded relative to an average face with distances between faces representing similarities in their appearance (Busey, 2001; Lee, Byatt, & Rhodes, 2000; O'Toole, Wenger, & Townsend, 2001). Ecological theory adds to these models by emphasizing that face perception guides behavior, expanding the domain of face perception to include perceived traits and social interaction

opportunities, and predicting these perceptions from the overgeneralization of adaptive responses.

Impressions Created by Variations in Attractiveness – Anomalous Face Overgeneralization

Attractiveness is the appearance quality that has received the most attention in research on impressions from faces. Dubbed the 'attractiveness halo', people with more attractive faces are judged more positively on a host of dimensions. They are perceived as more outgoing, socially competent and powerful, sexually responsive, intelligent, and healthy (Eagly, Ashmore, Makhijani, & Longo, 1991; Feingold, 1992; Langlois et al., 2000; Zebrowitz, Hall, Murphy, & Rhodes, 2002; Zebrowitz & Rhodes, 2004). Moreover, these trait impressions are accompanied by preferential treatment of attractive people in a variety of domains, including interpersonal relations, occupational settings, and the judicial system (Langlois et al., 2000; Zebrowitz, 1997).

Why do we perceive people with attractive faces to have positive traits? These impressions typically are assumed to reflect cultural teachings. Even if this were true, the origin of these teachings still needs to be explained. The fact that people from diverse cultures as well as infants and young children all show similar reactions to faces that vary in attractiveness suggests that these impressions reflect some universal mechanism rather than arbitrary cultural influences (Dion, 2002; Kramer, Zebrowitz, San Giovanni, & Sherak, 1995; Cunningham, Roberts, & Barbee, 1995; Ramsey, Langlois, Hoss, Rubenstein, & Griffin, 2004). The anomalous face overgeneralization hypothesis provides an explanation consistent with such a mechanism. This hypothesis holds that the adaptive value of recognizing individuals with diseases or bad genes has prepared us to respond to facial qualities that can mark low fitness (Zebrowitz, Fellous, Mignault, & Andreoletti, 2003; Zebrowitz & Rhodes, 2004). Our responses are then overgeneralized to normal individuals whose faces resemble those who are unfit. Thus, we perceive unattractive people more negatively than attractive people because unattractive faces show more similarity to the faces of unfit or unhealthy individuals that are adaptive for us to recognize. Indeed, the attractiveness halo effect seems to be driven more by the perception that 'ugly is bad' than by the perception that 'beautiful is good' (Griffin & Langlois, 2006).

Consistent with the anomalous face overgeneralization hypothesis, a computer model found that the facial metrics of unattractive faces resembled anomalous faces more than did the metrics of attractive faces. In addition, the more that normal faces structurally resembled anomalous ones, the more negative were impressions of their traits (Zebrowitz et al., 2003). Also consistent with anomalous face overgeneralization, the specific facial qualities that influence attractiveness are ones that evolutionary psychologists have linked to fitness. These include facial averageness (a facial configuration

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close to the population mean), symmetry, sexual dimorphism, and youthfulness. It has been argued that averageness and symmetry show developmental stability, or the ability to develop normally/according to design despite environmental stressors (Scheib, Gangestad, & Thornhill, 1999). Averageness also signals genetic diversity (Thornhill & Gangestad, 1999), which is associated with a strong immune system (Penn, Damjanovich, & Potts, 2002). High masculinity in male faces may indicate fitness because it shows an ability to withstand the stress that testosterone places on the immune system (Folstad & Karter, 1992). High femininity in female faces may signal fitness by association with sexual maturity and fertility. Youthfulness is related to fitness inasmuch as aging often carries declines in cognitive and physical functioning.

Fitness-related facial cues create the same impressions as faces that vary in attractiveness. This parallel is important because it corroborates the hypothesis that different impressions of unattractive and attractive faces reflect reactions to anomalous facial cues that signal fitness and health. Like less attractive faces, more unsymmetrical faces and faces lower in averageness are perceived as less intelligent and healthy (Rhodes, Zebrowitz et al., 2001; Zebrowitz et al., 2002; Zebrowitz & Rhodes, 2004). Similarly, women's impressions of less masculine-looking men as less healthy and dominant parallel impressions of less attractive faces (Luevano & Zebrowitz, 2007) as do men's impressions of women who lack feminine high cheekbones as less bright, healthy, and sociable (Cunningham, 1986). Impressions of older faces also parallel impressions of less attractive faces, with older faces often perceived as less healthy, cognitively competent, socially powerful, sociable, and warm than younger ones (Montepare & Zebrowitz, 2002; Zebrowitz et al., 2003). Although there are other explanations for negative impressions of old faces, anomalous face overgeneralization provides a partial explanation. Older faces are more structurally similar to anomalous faces, which contributes to negative impressions of their traits (Zebrowitz et al., 2003).

Attractiveness research by evolutionary psychologists often has assumed a *linear* relationship between attractiveness and fitness, emphasizing the greater fitness of highly attractive individuals (Buss, 1989). In contrast, the anomalous face overgeneralization hypothesis holds that appearance provides an accurate index *only* of low genetic fitness rather than a continuous index of genetic quality, and that the attractiveness halo effect is a perceptual by-product of reactions to low fitness. This hypothesis raises the question of whether the impressions created by variations in attractiveness are accurate. In fact, attractive people are more healthy, intelligent, and sociable than unattractive people (Feingold, 1992; Langlois et al., 2000; Rhodes, 2006; Zebrowitz et al., 2002), suggesting that our impressions may simply reflect a learned response to their actual traits, rather than overgeneralized reactions to anomalous faces. However, this argument has two shortcomings.

First, accurate impressions of health and intelligence are limited to perceptions of people in the bottom half of the attractiveness continuum. Although greater attractiveness is associated with *impressions* of greater intelligence and health across the whole continuum, attractiveness and *actual* intelligence or health are related only among people who range from unattractive to average and not among those who range from average to attractive (Zebrowitz & Rhodes, 2004). This observation is consistent with the fact that subtle negative deviations from average attractiveness can signal low fitness. For example, the facial characteristics associated with fetal alcohol syndrome or minor facial anomalies signal lower intelligence and maladaptive social traits (Paulhus & Martin, 1986; Streissguth, Herman, & Smith, 1978). Thus, the level of attractiveness provides a valid cue to low, but not high, intelligence or health. An important caveat to this finding is that attractiveness is by no means a perfect predictor of these traits even in the range where it has some validity. Moreover, although people do show some accuracy when they use lower than average attractiveness to form impressions of health and intelligence, they also overgeneralize and use higher than average attractiveness to form these impressions, which is not valid (Zebrowitz & Rhodes, 2004).

A second problem with invoking accuracy to explain trait impressions of faces that vary in attractiveness is that this begs the question of the origin of those traits. As suggested above, one possibility is that unattractive facial cues are linked to congenital risk factors for certain negative traits even within a normal population. Another developmental path between low attractiveness and negative traits is through self-fulfilling prophecies – the negative expectations about unattractive people resulting from anomalous face overgeneralization may be fulfilled. For example, the perception that unattractive people are less socially competent than attractive individuals has some accuracy because it fosters social interactions that elicit the expected behavior (Snyder, Tanke, & Berscheid, 1977).

Recent research has begun to elucidate the neural mechanisms for reactions to variations in facial attractiveness. This work can be placed into the framework of neural mechanisms for face perception in general (Haxby et al., 2002; Ishai, Schmidt, & Boesiger, 2005). Within this framework, there is a core system that is involved in face recognition and processing changeable facial qualities, such as eye gaze and emotion expression, as well as an extended system that is involved in processing facial qualities like emotional salience, valence, and the social meaning of faces. Although much remains to be learned about how these two systems operate, activation to faces in one system can be highly connected to activation in the other, depending on the particular faces viewed. Research has shown that compared with average attractive faces, both high attractive faces and anomalous faces elicit more activation in the amygdala (Winston, O'Doherty, Kilner, Perrett, & Dolan, 2007; Zhang, Zebrowitz, & Aharon, 2007), a region in the extended system that responds to emotionally

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salient stimuli (Fitzgerald, Angstadt, Jelsone, Nathan, & Phan, 2006; Hamann & Mao, 2002; Sander, Brechmann, & Scheich, 2003). In contrast, there is a dissociation between attractive and anomalous faces in areas of the extended system that respond to stimulus valence: attractive faces elicit more activation in regions that respond to a variety of positively valenced simuli, whereas anomalous or unattractive faces elicit greater activation in regions that respond to negatively valenced stimuli (Aharon et al., 2001; O'Doherty et al., 2003; Winston et al., 2007; Zhang, Zebrowitz, & Aharon, 2007). In addition, attractive and anomalous faces elicit highly dissimilar patterns of neural activation across the whole brain as well as in specific regions within the core and extended face perception system, with average attractive faces eliciting neural activation intermediate in similarity (Bronstad, Zebrowitz, Zhang, & Aharon, 2008). Further research is needed to elucidate links between neural responses to variations in facial attractiveness and the attractiveness halo effect.

In summary, the ecological approach argues that anomalous face overgeneralization guides impressions of faces that vary in attractiveness. Faces that are less attractive, less average, less symmetrical, older, or less prototypical for their sex create impressions of lower social competence, social power, sexual responsiveness, intelligence, and/or poorer health as well as more negative social outcomes. Moreover, these effects are seen across faces and perceivers from diverse demographic groups. Although the more negative impressions of unattractive than average faces show some accuracy, there is presently no evidence of accuracy in the more negative impressions of average than attractive faces. The latter may be explained by an overgeneralization from reactions to faces with striking or minor anomalies to average faces in the normal population that resemble them. Moreover, insofar as overgeneralization contributes to self-fulfilling prophecies, it could also account for accurate impressions of average vs. attractive faces, should such effects be found. Finally, research is beginning to reveal that distinct patterns of brain activation may be associated with the divergent behavioral reactions to attractive and unattractive faces.

Impressions Created by Variations in Babyfaceness – Baby Face Overgeneralization

Babyfaceness, like attractiveness, creates impressions of people's traits. Adults with babyfaces are perceived to have childlike traits – to be naïve, submissive, weak, warm, and honest. Moreover, babyfaced people of all ages and both sexes experience social outcomes that are consistent with their perceived traits. For example, they are passed over for mentally challenging tasks and leadership positions, but favored for jobs that require congeniality. They also are more likely than maturefaced peers to be exonerated when charged with intentional crimes, but more likely to be found at fault when charged with negligence (for a review, see Montepare & Zebrowitz, 1998).

How can we explain reactions to babyfaceness? Drawing on ethological evidence that facial cues elicit favorable responses to babies, coupled with the evolutionary importance of responding to these cues (Eibl-Eibesfeldt, 1989; Lorenz, 1942), the babyface overgeneralization hypothesis posits that strong prepared responses to infantile facial cues may be overgeneralized to non-babies (Montepare & Zebrowitz, 1998). This explains why we perceive people whose faces resemble those of babies to have childlike traits. Cross-cultural agreement in these impressions (Zebrowitz, Montepare, & Lee, 1993) together with reactions to babyfaces by infants and young children support the notion that these reactions reflect an intrinsic prepared response (Keating & Bai, 1986; Kramer et al., 1995; Montepare & Zebrowitz-McArthur, 1989).

Verifying the impact of babyfaceness on impressions, the same facial features that differentiate real babies from adults create impressions of childlike traits. Babyish features include larger eyes, higher eyebrows, smaller nose bridges, rounder and less angular faces, thicker lips, and lower vertical placement of features, which creates a higher forehead and a shorter chin. Faces of any age that have one or more of these features are perceived as more babyfaced, warm, honest, as well as physically, socially, and intellectually weaker than faces with more mature features (Keating, 2002; Montepare & Zebrowitz, 1998; Zebrowitz, 1997). Moreover, an objective computer assessment of how structurally similar adult faces are to babies predicts impressions of these traits (Zebrowitz et al., 2003).

Combinations of babyish facial cues often influence impressions more than individual cues and these stronger effects may reflect something more than a mere addition of features. Indeed, researchers have found that modifying one facial feature can alter the spatial arrangements among all features, which may in turn impact impressions (Keating & Doyle, 2002). Thus, in exploring impressions created by babyfaces, it is important to consider not only combinations of facial features but also unique spatial configurations. Computer modeling techniques have provided information about one such configuration. Specifically, age-related changes in head shape can be modeled using a growth-simulating cardioidal strain transformation (Todd, Mark, Shaw, & Pittenger, 1980). Impressions of faces subjected to this transformation parallel responses to variations in babyfaceness. Facial profiles with more immature levels of cardioidal strain were perceived as more lovable as well as less reliable, intelligent, strong, and threatening than those with more mature levels of strain (Berry & McArthur, 1986).

Are impressions of people with babyfaces accurate? Limited research addressing this question has produced mixed results. Berry and colleagues found that that more babyfaced college students were in fact warmer and less aggressive (Berry, 1990a, 1991; Berry & Landry, 1997). However, other researchers using a representative, longitudinal sample found that only older adult women displayed personality traits consistent with impressions of babyfaced individuals (Zebrowitz, Collins, & Dutta, 1998). In contrast,

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impressions of babyfaced boys were inaccurate. Compared with mature-faced boys, babyfaced boys were more negative, quarrelsome, assertive, and hostile and showed higher academic achievement, all of which contradict impressions of babyfaced individuals (Zebrowitz, Andreoletti, Collins, Lee, & Blumenthal, 1998; Zebrowitz, Collins et al., 1998). In addition, more babyfaced young men were more likely to earn military awards, contradicting impressions of their submissiveness and physical weakness (Collins & Zebrowitz, 1995). Moreover, in a sample of young men at risk for delinquency, more babyfaced men were more likely to be delinquent, and if delinquent, to commit more offenses (Zebrowitz, Andreoletti et al., 1998).

The mixed results surrounding accuracy highlight the need to consider the origins of actual relationships between babyfaceness and traits. Behavior of babyfaced boys and young men that contradicts impressions may reflect a self-defeating prophecy effect, whereby babyfaced males counter the undesirable expectation that they will exhibit childlike traits by behaving in a contrary way (Zebrowitz et al., 1998). The failure of babyfaced girls to show contradictory behavior, and for older babyfaced women to confirm the stereotype, may be explained by the fact that childlike traits parallel stereotypes of femininity (Zebrowitz, Collins et al., 1998). Thus, babyfaced young girls may not try to refute expectations, and babyfaced women may ultimately confirm them as a self-fulfilling prophecy. Sample differences may also account for the inconsistencies among the studies. For example, the babyfaced adolescents who show anti-social behavior that contradicts impressions of their physical and social weakness may not be found in the college samples where babyfaced individuals show lower aggressiveness.

As in the case of facial attractiveness, research has begun to elucidate the neural substrate for reactions to variations in babyfaceness. Faces of babies elicited greater activation in the amygdala than did maturefaced adults, which is consistent with the greater emotional salience of babies. More remarkable was the equally high activation elicited by babyfaced men. Facial qualities previously shown to elicit strong amygdala activation, such as smiling, attractiveness, and structural distinctiveness, could not account for this effect. Babyfaced men were distinguished only by their resemblance to babies (Zebrowitz, Luevano, Bronstad, & Aharon, 2007). In addition, an examination of similarities in the pattern of neural activation elicited by faces in the whole brain as well as in specific regions within the core and extended face perception system revealed that babyfaced adults were closer to babies than were maturefaced adults (Bronstad et al., 2008). Thus, the preparedness to respond to infantile facial qualities generalizes to babyfaced men in perceivers' neural responses just as it does in their behavioral reactions.

In summary, reactions to people with babyfaces are consistent with the babyface overgeneralization hypothesis. Faces are perceived to have more childlike traits when they have distinctive infantile features that even

computer models identify. Moreover, these impressions hold true across diverse faces and perceivers, and they are mirrored in behavior towards babyfaced individuals. Similar reactions to the faces of babies and babyfaced adults are also evident in the neural responses they elicit. Although these results support a babyface overgeneralization effect, variations in the accuracy of impressions may be explained by self-fulfilling and self-defeating prophecy effects instigated by social expectancies fueled by babyface overgeneralizations.

Impressions Created by Variations in Facial Expression – Emotion Face Overgeneralization

When people display a facial expression of emotion, we make judgments not only about their affective state, but also about their behavioral tendencies and traits. For example, when people display happy faces we perceive them as having traits associated with high affiliation and high dominance. When they display angry faces we perceive them as having traits associated with low affiliation and high dominance. Facial expressions of sadness and fear elicit impressions of traits associated with moderate affiliation and low dominance (Hess, Blairy, & Kleck, 2000; Knutson, 1996; Montepare & Dobish, 2003; Zebrowitz, Kikuchi, & Fellous, 2007).

What might account for the trait impressions created by facial expressions? Darwin's view that emotion expressions had evolutionarily adaptive value for social communication (Darwin, 1872) highlights the fact that facial expressions provide information not only about people's affective states but also their potential behaviors (Ekman, 1997; Frijda, 1995; McArthur & Baron, 1983). In particular, displays of emotion may indicate approach, attack, or avoidance tendencies. For example, happiness conveys not only a person's positive affective state, but also a tendency to approach in a friendly, confident, and assertive way. On the other hand, anger conveys a tendency to attack in a domineering, hostile, and unfriendly manner. Accurate impressions of these transient behavioral tendencies are overgeneralized to impressions of more stable traits – a *temporal extension* effect whereby 'the perceiver regards a momentary characteristic of the person as if it were an enduring attribute' (Secord, 1958). Consequently, an angry person is viewed not only as likely to act momentarily in an unaffiliative or dominant way, but also as likely to possess enduring low affiliative or high dominant traits. Even partial components of emotion expressions elicit similar trait impressions. For example, lower eyebrows, a hallmark of an anger expression, create impressions of higher dominance, at least in Western cultures (Keating, Mazur, & Segall, 1981).

Why do particular facial expressions look the way they do? One possibility is that they alter muscle actions and physiological states to prepare individuals for particular adaptive behavioral actions, as an extension of the vascular theory of emotional efference might suggest (Zajonc,

Murphy, & Inglehart, 1989). Another possibility, proposed by Marsh, Adams, and Kleck (2005), is that both the morphology of emotion expressions and the impressions they elicit derive from the adaptive utility of their mimicking variations in facial maturity – a variant of the babyface overgeneralization hypothesis. More specifically, Marsh et al. (2005) argued that fear and anger expressions evolved to mimic babies' faces and mature faces, respectively, because it is adaptive for those experiencing fear to elicit reactions paralleling those elicited by helpless babies and for those experiencing anger to elicit reactions paralleling those elicited by powerful adults. They found that faces expressing anger were in fact judged as more maturefaced than those expressing fear. Anger and fear expressions were also judged to differ in specific facial qualities that differentiate faces of babies and adults as well as in traits associated with babyfaceness. Also consistent with this hypothesis, both *subjective ratings* of emotions' resemblance to babies (Marsh et al., 2005) as well as *objective indices* from computer models (Zebrowitz, Kikuchi et al., 2007), showed that fear expressions or closely related surprise expressions resemble babies more than do neutral ones, whereas anger expressions resemble babies less. The parallel effects for surprise and fear are consistent with the fact that surprise expressions are often precursors to fear expressions and structurally resemble them (de Bonis, 2003; Calder, Burton, & Miller, 2001; Posamentier & Abdi, 2003). It is also noteworthy that impressions of happy faces were not due to a resemblance to babies. This lends additional support to the Marsh et al. (2005) hypothesis because the evolutionary argument for impressions of fear/surprise and anger would be undercut had babyfaceness also contributed to impressions of happy people, for whom there is no obvious adaptive value to mimicking helpless babies or powerful adults.

In addition to the impact of people's transient emotion expressions on perceptions of their traits, the similarity of their permanent facial structure to an emotion expression also influences trait impressions. This emotion overgeneralization effect provides another reason why appearance matters. According to ecological theory (Zebrowitz & Montepare, 2006), the adaptive value of responding appropriately to emotional expressions, such as avoiding an angry person and approaching a happy one, has produced a strong preparedness to respond to emotion faces that is overgeneralized to individuals whose facial structure resembles a particular emotional expression. Consistent with this hypothesis, Montepare and Dobish (2003) found that some neutral expression faces produce perceptions of an angry demeanor and elicit impressions of low affiliative traits; others create perceptions of a happy demeanor and elicit impressions of high affiliative traits. Given that some emotion cues overlap with cues that contribute to babyfaceness or attractiveness, it is possible that trait impressions of neutral expression faces are caused by their structural babyfaceness or attractiveness. However, the influence on trait impressions of neutral faces' resemblance to emotion expressions was independent of babyfaceness and attractiveness. Thus, there

is an emotion overgeneralization effect in impressions of neutral expression faces that resemble some emotion apart from babyface and anomalous face overgeneralization.

Although there is evidence that the perception of facial expressions of emotion has cross-cultural and cross-age generality (Ekman, 1994; Izard, 1994), there is also evidence for greater accuracy in reading the emotion expressions of people from one's own culture or age group (Elfenbein & Ambady, 2003; Malatesta, Izard, Culver, & Nicolich, 1987). Thus, research is needed to determine whether facial expressions and facial structure that resembles expressions create similar trait impressions regardless of the demographic match between perceivers and targets. Research also is needed to assess the accuracy of trait impressions from emotion expressions and emotion overgeneralizations. One study that examined accuracy suggests that neutral faces whose structural properties resemble an emotion expression may provide accurate trait information, at least in older adults (Malatesta, Fiore, & Messina, 1987). More specifically, there was a positive relationship between ratings of the emotional facial demeanor of older adult women posing neutral expressions and their scores on trait scales of emotional dispositions. For example, women whose neutral faces looked angry actually scored higher on a hostile personality dimension.

Considerably more research has investigated the neural substrate underlying reactions to variations in emotion expressions than variations in attractiveness or babyfaceness. Although emotion expressions generally elicit more activation than neutral expressions in the limbic regions of the brain, the differentiation of activation to different emotion expressions has proven to be a complex issue. Indeed, a meta-analysis of brain areas consistently associated with particular emotional states identified six emotion networks that depend on the emotion and the category of eliciting stimuli (Wager et al., 2007). Once the neural correlates of perceiving particular emotion expressions are identified, the emotion overgeneralization hypothesis makes two predictions. One is that that there may be similar patterns of activation to an emotion expression and to neutral expression faces with structural features that resemble that emotion (e.g., fearful and babyfaced). The second is that emotion expressions and other facial qualities that create similar trait impressions (e.g., happy and attractive) may also elicit similar patterns of neural activation.

In summary, the ecological approach argues that impressions created by faces that vary in emotion expression can be explained by the temporal extension of accurate associations between certain emotions and particular behaviors. Thus, emotion expressions give rise to trait impressions that match the behavior expressed during that emotion. Moreover, a facial structure that resembles an emotion expression gives rise to trait impressions like those elicited by the emotion, an emotion overgeneralization effect. Additional research is needed to investigate the accuracy of impressions, whether trait impressions from emotion expressions hold true across

faces and perceivers from diverse demographic groups, and the neural mechanisms for these effects.

Impressions Created by Variations in Familiarity – Familiar Face Overgeneralization

Almost 40 years ago, research showed more positive reactions to previously seen stimuli, including faces, the *mere exposure effect* (Zajonc, 1968). More recently, the research described below has revealed that *perceived familiarity* also can influence reactions to faces. Such effects can be explained by the familiar face overgeneralization (FFO) hypothesis that the utility of differentiating known individuals from strangers has produced a tendency for responses to strangers to vary as a function of their resemblance to known individuals (Zebrowitz, 1996; Zebrowitz & Collins, 1997).

Some evidence consistent with the FFO hypothesis exemplifies *episodic* familiarity (Peskin & Newell, 2004). For example, people expressed a preference for the job candidate whose face more closely resembled someone who had just treated them kindly, and they avoided a stranger whose face more closely resembled someone who had just treated them irritably (Lewicki, 1985). People also expected greater fairness from a professor whose face more closely resembled the prototypical face of a set of professors known to be fair than that of a set known to be unfair, although they had no conscious awareness of the dimension on which the faces varied (Hill, Lewicki, Czyzewska, & Schuller, 1990).

In addition to idiosyncratic effects of FFO associated with 'episodic' familiarity, a broader consequence is prejudiced responses to strangers of another race, which exemplify *general* familiarity effects (Peskin & Newell, 2004). Faces of strangers from other racial groups seem less familiar than strangers from one's own group. (Although the validity of race as a scientific concept is dubious, it is a widely accepted concept in folk psychology, and we use the 'fuzzy' category system of race to denote the physical appearance of faces.) Consistent with evidence that unfamiliar stimuli are generally less liked (Bornstein, 1989; Hamm, Baum, & Nikels, 1975; Rhodes, Halberstadt, & Brajkovich, 2001; Zajonc, 1968), faces of other-race strangers also are perceived as less likeable than those of own-race strangers (Zebrowitz, Bronstad, & Lee, 2007). Moreover, consistent with FFO, this effect is partially caused by their lower familiarity quite apart from other contributing social factors. The lesser familiarity of other-race faces also contributes to the strength of culturally based race stereotypes, enhancing negative stereotypes of other-race faces and diminishing positive ones. For example, the tendency for White judges to perceive Black faces as less competent than White ones was reduced when face familiarity was controlled, and the tendency for White judges to perceive Asian faces as more competent than White ones was increased when face familiarity was controlled (Zebrowitz et al., 2007).

Other evidence that unfamiliarity influences impressions and associated behaviors is provided by White judges' reactions to faces that are more prototypically Black, regardless of their actual race. Such faces prime negative concepts more than less prototypical Black faces or White ones (Livingston & Brewer, 2002), and they are perceived have more negative traits (Blair, Judd, Sadler, & Jenkins, 2002). Moreover, convicted criminals with a more prototypical Black appearance receive longer prison terms (Blair, Judd, & Chapleau, 2004) and more frequent death sentences (Eberhardt et al., 2006). Similarly, Koreans perceive Korean or White faces that have a more Asian appearance as more familiar, more likeable, and less dangerous (Strom, Zebrowitz, Zhang, Bronstad, & Lee, 2008). It should be emphasized that the foregoing effects were found for faces that were all the same race, indicating that they reflect a reaction to how similar a face is to the average face experienced by the White or Korean judges rather than face race per se.

Neural activation data provide some evidence pertinent to the FFO assumption that an adaptive wariness of unfamiliar-looking strangers contributes to negative evaluations of other race faces. In particular, there is greater amygdala activation when viewing novel other-race than own-race faces, particularly in the initial response to a face (Cunningham et al., 2004; Hart et al., 2000; Ronquillo et al., 2007), and there is also evidence for slower habituation of amygdala activation to other-race than own-race faces (Phelps et al., 2000). These results are consistent with the FFO hypothesis because, as noted earlier, the amygdala is activated more by emotionally salient stimuli. Moreover, relatively greater amygdala activation to Black than White faces was associated with White perceivers' negative race bias on behavioral measures (Cunningham et al., 2004; Phelps et al., 2000). Other-race faces elicit not only more amygdala activation, but also less activation in the fusiform face area, which predicts poorer recognition of them (Golby, Gabrieli, Chiao, & Eberhardt, 2001). It is thus possible that difficulty in the visual processing other-race faces contributes to negative reactions to them, as a perceptual fluency explanation for the mere exposure effect might suggest (Reber, Winkielman, & Schwarz, 1998).

Although some of the foregoing research assessed both Black and White perceivers' neural activation to Black and White faces (Golby et al., 2001; Hart et al., 2000), the rest examined only White perceivers. Moreover, another investigation examining both Black and White perceivers (Lieberman, Hariri, Jarcho, Eisenberger, & Bookheimer, 2005) found that both groups showed more amygdala activation to Black faces. This suggests that the results of studies examining only White perceivers could be construed as reflecting the greater emotional salience of Black faces in general rather than an effect of face unfamiliarity. However, support for the familiarity interpretation is provided not only by Hart et al. (2000), and Golby et al. (2001), but also by research investigating effects of manipulated face familiarity quite apart from race. Here too, there is less amygdala activation

in response to faces with which people have been familiarized during an experiment (Dubois et al., 1999; Schwartz et al., 2003). Clearly more research is needed to better understand the neural substrate for impressions associated with face unfamiliarity. It would be instructive to examine activation to own- and other-race faces in brain regions that respond to positively and negatively valenced stimuli. It also would be useful to investigate whether mere exposure to other-race faces not only increases liking for novel faces of that race, as shown by Zebrowitz, Weineke, and White (2008), but also changes the pattern of brain activation to those faces.

Summary and Future Directions

Four overgeneralization hypotheses derived from an ecological approach to social perception provide an account of why facial appearance matters in impression formation. The qualities that can be accurately revealed by the facial information that conveys low fitness, age, emotion, or familiarity also tend to be perceived in people whose faces merely resemble one of these facial qualities. Additional tenets of the ecological approach (McArthur & Baron, 1983) not reflected in the present review provide further avenues for understanding the social psychology of face perception.

First, whereas we have focused primarily on static appearance cues, ecological theory holds that dynamic and multi-modal stimulus information should have the strongest impact on perceptions. The qualities that are conveyed by facial structure, be it attractiveness, age, emotion, or familiarity, may also be specified in facial movement as well as in voices, bodies, or gesture (Ambadar, Schooler, & Cohen, 2005; Berry, 1990b; Burnham, 1993; de Gelder & Hadjikhani, 2006; Helfrich, 1979; Juslin & Scherer, 2005; Morrison, Gralewski, & Penton-Voak, 2006). Our perceptual systems have evolved to extract useful information from moving, talking faces that are attached to bodies, and we are likely to learn more about how the face perception system works if we study it in more ecologically valid contexts.

Second, although we have focused largely on trait impressions, the ecological theory dictum 'perceiving is for doing' (Gibson, 1979) implies that face perception reveals social interaction opportunities – behavioral affordances – and is thereby closely linked to action. Third, not only should face perception influence behavior, but also behavior influences perception, as emphasized by Gibson (1966, 1979) and more recently highlighted in work on 'embodied cognition', which holds that cognitive processes are strongly linked to the body's interactions with the environment (Barsalou, Niedenthal, Barbey, Ruppert, & Ross, 2003; Sommerville & Decety, 2006; Wilson, 2002). More research is clearly needed to specify the bidirectional relationships between behavior and face perception.

Finally, although we have highlighted universal reactions to particular facial qualities, ecological theory emphasizes variations in perceiver attunements – sensitivity to the stimulus information that reveals particular

affordances. More research is needed to investigate *perceiver* differences in impressions and their underlying mechanisms. According to ecological theory, these include perceptual learning mechanisms that create variations in the similarity among faces and the proximity of particular faces to an average face, as well as social goals that sensitize perceivers to particular information in faces (Elfenbein & Ambady, 2003; Rule, Ambady, Adams, & Macrae, 2007).

Although we may try not to judge people by their appearance, this tendency is ubiquitous. The face overgeneralization hypotheses illuminate exactly what we are doing and why we do it even if our judgments are mistaken. The research supporting these hypotheses should caution those who would fall prey to facial appearance stereotypes when forming impressions of others.

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Short Biographies

Leslie A. Zebrowitz is the Manuel Yellen Professor of Social Relations and Professor of Psychology at Brandeis University, where she has taught since receiving her PhD in Social Psychology from Yale University in 1970. Her research focuses on social perception, particularly first impressions from faces. In addition to publishing numerous scholarly articles on this topic, she is the author of *Social Perception* (Open University Press, 1990); *Reading Faces: Window to the Soul?* (Westview Press, 1997); and co-editor with G. Rhodes of *Facial Attractiveness: Evolutionary, Cognitive, and Social Perspectives* (Ablex, 2002). Her work takes a functional approach to social perception, assuming that first impressions either should be accurate or should reflect perceptual biases that serve some general adaptive function. This perspective has generated a set of overgeneralization hypotheses to account for first impressions from faces that she has been testing with a variety of methods, including connectionist modeling and brain imaging as well as behavioral studies.

Joann M. Montepare is an Associate Professor of Psychology and Chair of the Department of Marketing Communication at Emerson College. Her degree in social-developmental psychology from Brandeis University in 1986 has generated a line of research in person perception, emotion communication, non-verbal behavior and age-identity across the lifespan. This work has appeared in diverse journals including the *Journal of Personality and Social Psychology, Developmental Psychology, Psychology and Aging*, *Advances in Experimental Social Psychology*, *Science*, and *Communication Research*, as well as in chapters (co-authored with Leslie Zebrowitz) in

edited books, including: *Ageism: Stereotyping and Prejudice Against Older Persons* (MIT Press, 2002); *Evolution and Social Psychology* (Psychology Press, 2006); and *The Social Psychology of Stigma* (Guildford Press, 2000). Her research and reflections on social behavior have underscored the need to examine how behaviors change with age and across historical time. This approach has guided work that applies developmental and evolutionary perspectives to address social-psychological questions.

Endnote

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