Social Attributions from Faces: Determinants, Consequences, Accuracy, and Functional Significance

Alexander Todorov,[1] Christopher Y. Olivola,[2] Ron Dotsch,[3] and Peter Mende-Siedlecki[1]

[1]Department of Psychology, Princeton University, Princeton, New Jersey 08540; email: atodorov@princeton.edu

[2]Tepper School of Business, Carnegie Mellon University, Pittsburgh, Pennsylvania 15213

[3]Behavioural Science Institute, Radboud University, 6525 HR Nijmegen, The Netherlands

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Abstract

Since the early twentieth century, psychologists have known that there is consensus in attributing social and personality characteristics from facial appearance. Recent studies have shown that surprisingly little time and effort are needed to arrive at this consensus. Here we review recent research on social attributions from faces. Section I outlines data-driven methods capable of identifying the perceptual basis of consensus in social attributions from faces (e.g., What makes a face look threatening?). Section II describes non-perceptual determinants of social attributions (e.g., person knowledge and incidental associations). Section III discusses evidence that attributions from faces predict important social outcomes in diverse domains (e.g., investment decisions and leader selection). In Section IV, we argue that the diagnostic validity of these attributions has been greatly overstated in the literature. In the final section, we offer an account of the functional significance of these attributions.

Contents

INTRODUCTION

People rapidly make attributions from faces, such as whether a person is trustworthy. As Solomon Asch, one of the founding fathers of modern social psychology, put it, "We look at a person and immediately a certain impression of his character forms itself in us. A glance, a few spoken words are sufficient to tell us a story about a highly complex matter. We know that such impressions form with remarkable rapidity and with great ease. Subsequent observations may enrich or upset our view, but we can no more prevent its rapid growth than we can avoid perceiving a given visual object or hearing a melody" (Asch 1946, p. 48). Although Asch did not use faces in his experiments, it is hard to imagine a better class of stimuli to apply his insights to. Willis & Todorov (2006) presented participants with unfamiliar faces for 100, 500, or 1,000 milliseconds and asked for their impressions of the targets on various trait dimensions, such as trustworthiness and aggressiveness. A hundred-millisecond exposure was more than sufficient for participants to form specific impressions. The only effect of additional time was to increase confidence in judgments. Subsequently, these findings have been replicated many times with better masking procedures to control the exact presentation of faces and with ever-shortening presentations (Ballew & Todorov 2007; Bar et al. 2006; Borkenau et al. 2009; Porter et al. 2008; Rule et al. 2009a; Todorov et al. 2009, 2010). Now we know that exposure of as little as 34 milliseconds to a face is sufficient for people to form an impression and that these impressions do not change with exposures longer than 200 milliseconds. Impressions from faces are natural assessments (cf. Kahneman 2003) that have more to do with perception than with thinking.

In every ancient culture, one can find beliefs that the face is a window to a person's true nature. Although the specific beliefs may have varied from culture to culture, they all shared the assumption that there is a direct correspondence between facial appearance and personality. This assumption reached its heyday in the nineteenth century. Johann Kaspar Lavater (1800), a Swiss pastor, is given most of the credit for spreading the ideas of physiognomy, the "art" of reading personality in faces. Cesare Lombroso (1876/2006), the founding father of criminal anthropology, wrote about how criminals could be identified by external, physical characteristics. Francis Galton developed the first morphing techniques to identify specific human types ranging from the ideal English man to the criminal (Galton 1907).

Although their ideas were discarded in twentieth-century science, and for good reasons, physiognomists were onto something. Lavater (1800, p. 9) was probably wrong about most claims he made in his bestselling book, but he was right about this one: "Whether they are or are not sensible of it, all men are daily influenced by physiognomy." Here is a simple demonstration of

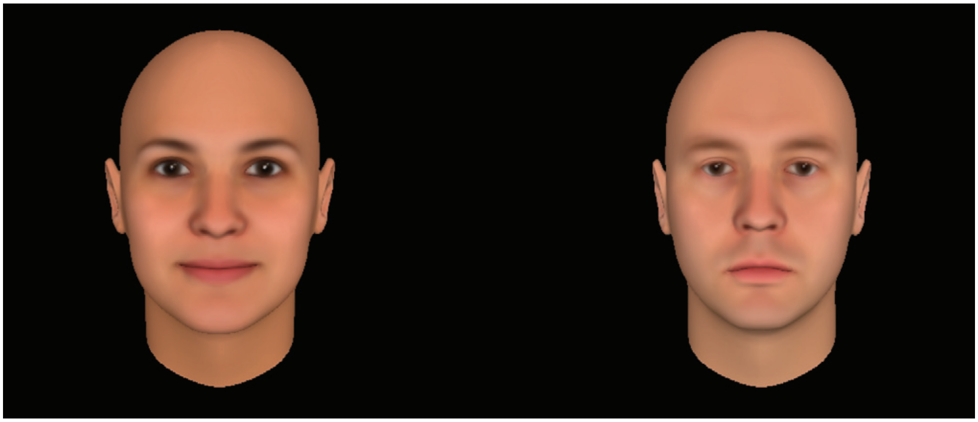

Figure 1

Faces generated by a data-driven computational model of judgments of extroversion (Todorov & Oosterhof 2011).

how easy it is to make a decision based on appearance. Imagine you walk into a party, and the first two unfamiliar people you see are those presented in **Figure 1**.

Who would you approach? If you are like most people and are at the party to have fun and not to console others, the choice is obvious and immediate. The person on the left appears much more extroverted, lively, and ready to have fun.

As physiognomists suspected, there is consensus in impressions from facial appearance, a fact that was established early on in psychology (Cleeton & Knight 1924, Hollingworth 1922, Hull 1928, Litterer 1933, Secord et al. 1953). In fact, even 3- to-4-year-olds show a level of consensus in social attributions from faces that is consistent with what is found in adults (Cogsdill et al. 2014). The images in **Figure 1** are compelling because they were designed to capture the consensus in judgments of extroversion. In Section I, we describe state-of-the-art, data-driven approaches to identifying the perceptual determinants of social attributions. The faces in **Figure 1** were generated by a computational model using one of these approaches (Todorov & Oosterhof 2011). However, there is more to social attributions than just specific configurations of facial features. In Section II, we describe how exposures to different types of faces and knowledge shape social attributions. In Section III, we show that these attributions have real-world consequences. Although Sections I and III might seem to confirm the physiognomists' intuitions, in Section IV we argue against their main claim that character attributions from faces are accurate. In the final section, we provide an account of the functional significance of these attributions. In a nutshell, attributions from faces are constructed from adaptive cues that can be informative in the immediate situation but are poor indicators of stable personality traits.

I. PERCEPTUAL DETERMINANTS OF SOCIAL ATTRIBUTIONS FROM FACES

Since Galton's time, scientists have tried to figure out what features in the face lead to specific impressions. Given that there is consensus among judges in attributing personality traits to faces, it should be possible to identify the features or configurations of features that give rise to these attributions. Modern work on this topic in social psychology can be traced back to Paul Secord (Secord 1958, Secord et al. 1954). For example, Secord and colleagues (1954) had participants rate

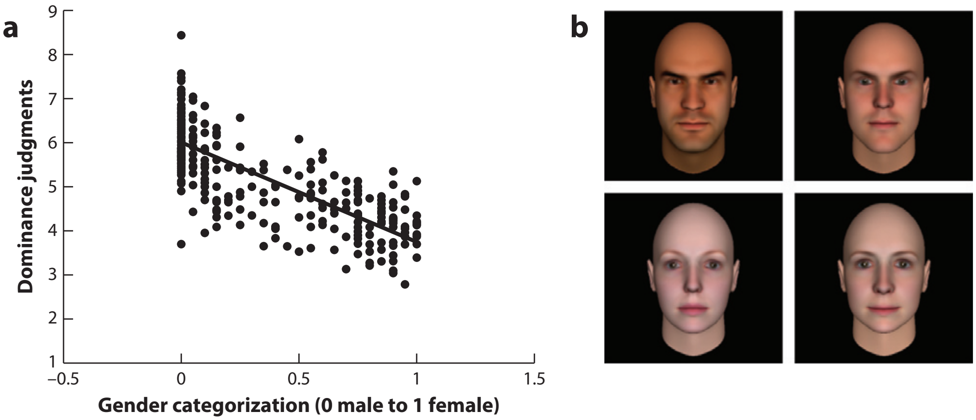

Figure 2

The relation between masculinity/femininity and judgments of dominance. (*a*) Scatterplot of dominance judgments and gender categorization of a random sample of 300 computer-generated faces. Judgments and categorization are averaged across participants. Each point is a face. (*b*) The two faces perceived as most dominant (*top row*) and the two faces perceived as least dominant (*bottom row*).

faces either on physiognomic features (curvature of the mouth, distance between eyes, fullness of lips, etc.) or on personality attributes (proud, easygoing, intelligent, etc.). Besides finding that the consensus in personality judgments was comparable to the consensus in facial feature judgments, they found a broad correspondence between the similarity clustering of both types of judgments. For example, faces perceived as distinguished, intelligent, and determined were older, had thin lips, and had wrinkles at the eye corners.

Leslie Zebrowitz and her colleagues have conducted the most systematic research on the social perception of faces since Secord's work (McArthur & Baron 1983; for a recent review, see Zebrowitz 2011). In a number of studies, they have shown that global face characteristics, such as a baby-faced appearance, influence social attributions (Berry & McArthur 1986, McArthur & Apatow 1984, Montepare & Zebrowitz 1998, Zebrowitz & Montepare 1992). For example, adult faces with a baby-faced appearance are perceived as physically weak, naïve, submissive, honest, kind, and warm. Similar findings have been obtained for other global attributes such as attractiveness, which people associate with competence and intelligence (Eagly et al. 1991), and masculinity/femininity, which people associate with dominance (Boothroyd et al. 2007, Buckingham et al. 2006, Oosterhof & Todorov 2008). **Figure 2** illustrates how perceptions of dominance are strongly related to masculine appearance. Simple male/female categorization judgments of a random sample of computer-generated faces were correlated −0.78 with judgments of dominance (**Figure 2*a***). Not surprisingly, whereas the two most dominant-looking faces are typical male faces, the two least-dominant faces are typical female faces (**Figure 2*b***).

The interplay between emotional expressions and social attributions from faces has also been extensively studied. For example, whereas angry faces are perceived as more dominant (Hess et al. 2000, Knutson 1996, Montepare & Dobish 2003), smiling faces are perceived as more trustworthy (Krumhuber et al. 2007). More importantly, this relation extends to emotionally neutral faces. The resemblance of these faces to specific emotional expressions predicts what personality traits are attributed to the faces (Montepare & Dobish 2003, Oosterhof & Todorov 2008, Said et al. 2009, Todorov & Duchaine 2008, Zebrowitz et al. 2010). For example, angry-looking faces are perceived as aggressive. It is also the case that structural facial features affect perception of emotional expressions (Marsh et al. 2005, Neth & Martinez 2009, Oosterhof & Todorov 2009, Sacco & Hugenberg 2009).

To summarize, the standard hypothesis-driven approach has identified multiple determinants of social attributions from faces. However, there may be other information that is important for social attributions but is not captured by this approach. The challenge for this approach is that the space of possible hypotheses is infinitely large. For example, the interplay of just 20 binary features results in over one million combinations (Todorov et al. 2011). Moreover, it is far from clear how one should define what counts as a facial feature (mouth versus corner of mouth versus lips versus image pixel, etc.). This difficulty is further compounded by the fact that some features may not have labels and, moreover, that both perceivers and experimenters may be unaware of the effects of these features on social perception (Dotsch & Todorov 2012).

Todorov and his colleagues have advocated an alternative, data-driven approach to model social perception of faces in an unbiased fashion (Oosterhof & Todorov 2008, Said & Todorov 2011, Todorov et al. 2011, Todorov & Oosterhof 2011). In principle, this computational approach seeks to identify *all* of the information in the face that is used to make social attributions. These methods are capable of capturing the variance in facial structure that leads to specific social attributions such as trustworthiness and competence.

The first computational model of social attributions from faces (Brahnam 2005) was based on a principal components analysis of the pixel intensities of 2D facial images. In this approach, faces are represented as a linear combination of the principal components (eigenfaces) derived from the analysis (Turk & Pentland 1991). Brahnam (2005) was able to build models of several social judgments and to synthesize novel faces from these models. However, no attempt was made to identify the configurations of features that lead to specific attributions.

Subsequent models of social attributions have relied on the statistical face space developed by Blanz & Vetter (1999, 2003). With this approach, faces are represented as points in a multidimensional face space derived from 3D laser scans of real faces. Given this statistical face space, it is possible to (*a*) generate an infinite number of different faces and (*b*) create a parametrically controlled model of any judgment of randomly generated faces. This model is a new vector in the face space that accounts for the maximum variance of the judgment. Using the model, we can visualize all changes in the face that affect the specific judgment. Many such models have been extensively validated (Oosterhof & Todorov 2008, Todorov et al. 2013, Walker & Vetter 2009). **Figure 3** illustrates this approach for judgments of threat. Threatening faces are more facially mature, extremely masculine, and seem to display more negative emotions than unthreatening faces (**Figure 3*a*–*c***). This model of threat can be applied to new face identities to increase or decrease how threatening they look (**Figure 3*c***).

These data-driven models allow nearly complete experimental control of the face stimuli. The models can be applied to as many face identities as needed, and faces can be parametrically manipulated to the degree desired in the specific experiment. As we describe in Section III, faces generated by these models have been successfully used in experimental studies of the effects of appearance on social outcomes. It is also possible to control for the shared variance of different attribute models. Social judgments from faces are highly correlated, and subsequently, the resulting models are also correlated. It has been shown that the divergent validity of these models is directly related to their similarity (Todorov et al. 2013). As the models become more similar (e.g., threat and dominance), it is hard to distinguish faces manipulated by these models. However, it is still possible to extract signals that differentiate the two models. **Figure 4** illustrates this for a model of trustworthiness. This model is correlated with a model of attractiveness (**Figure 4*a***). More trustworthy-looking faces are more attractive. These two models (vectors in face space) can be made orthogonal (**Figure 4*b***) or negatively correlated by subtracting attractiveness

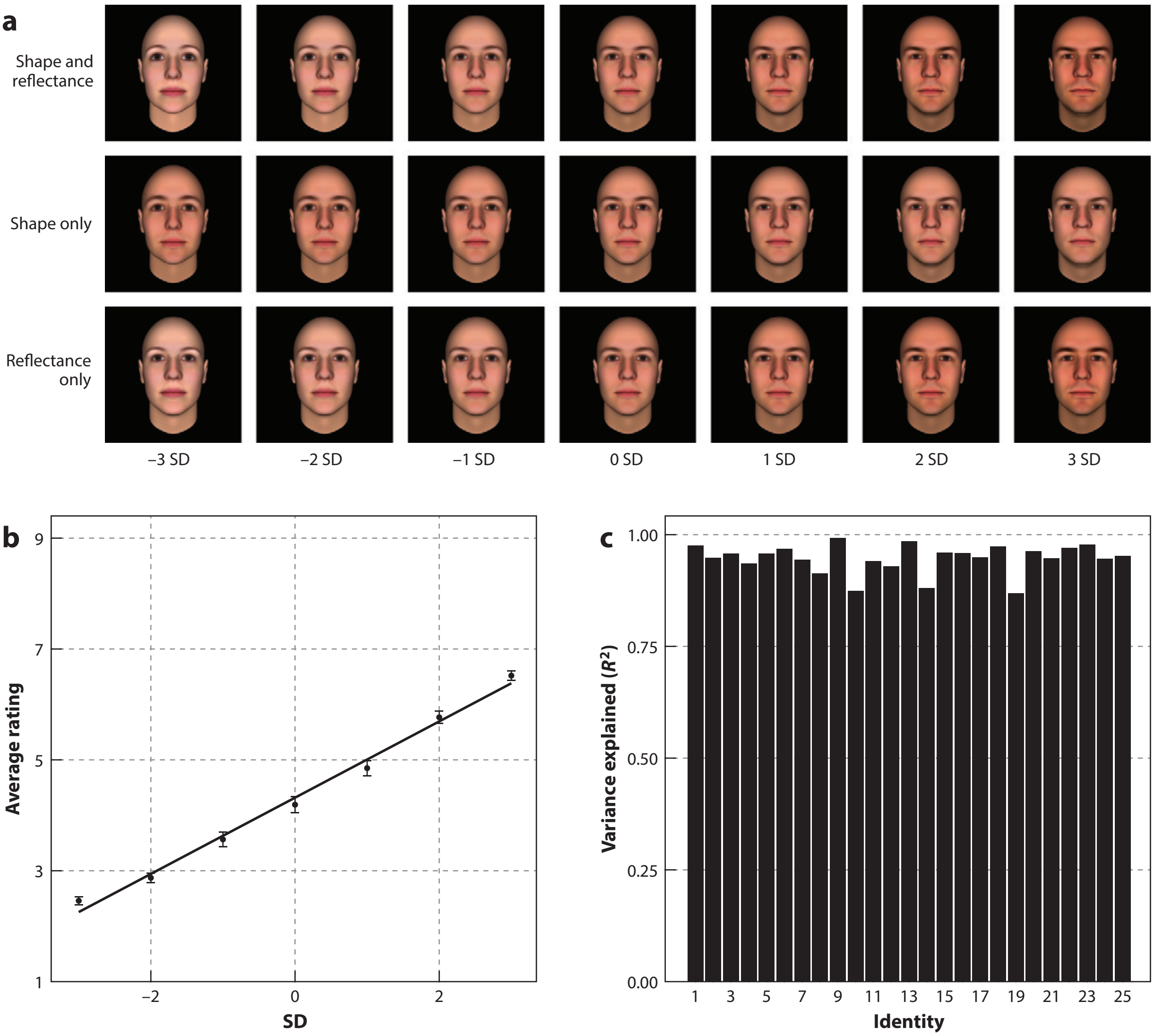

Figure 3

A data-driven computational model of judgments of threat. (*a*) Manipulation of both the shape and reflectance of a face (*top row*), the shape only (*middle row*), and the reflectance only (*bottom row*). Increasing values indicate increased perceptions of threat. (*b*) Linear fit of judgments of threat as a function of the model values of the faces. Error bars indicate standard error of the mean. (*c*) Explained variance in linear models for each of 25 identities used to validate the computational model.

from trustworthiness (**Figure 4*c***). In the latter case, more trustworthy-looking faces are less attractive.

Similar methods with convergent results have been developed by other research groups (Kleisner et al. 2013, 2014; Sakuta et al. 2009; Walker & Vetter 2009; Walker et al. 2011). Moreover, some of these models can be applied to real images of faces that can be manipulated to evoke specific social attributions (Walker & Vetter 2009). The models also seem to generalize across cultures (Walker et al. 2011), although more work is needed in cross-cultural contexts.

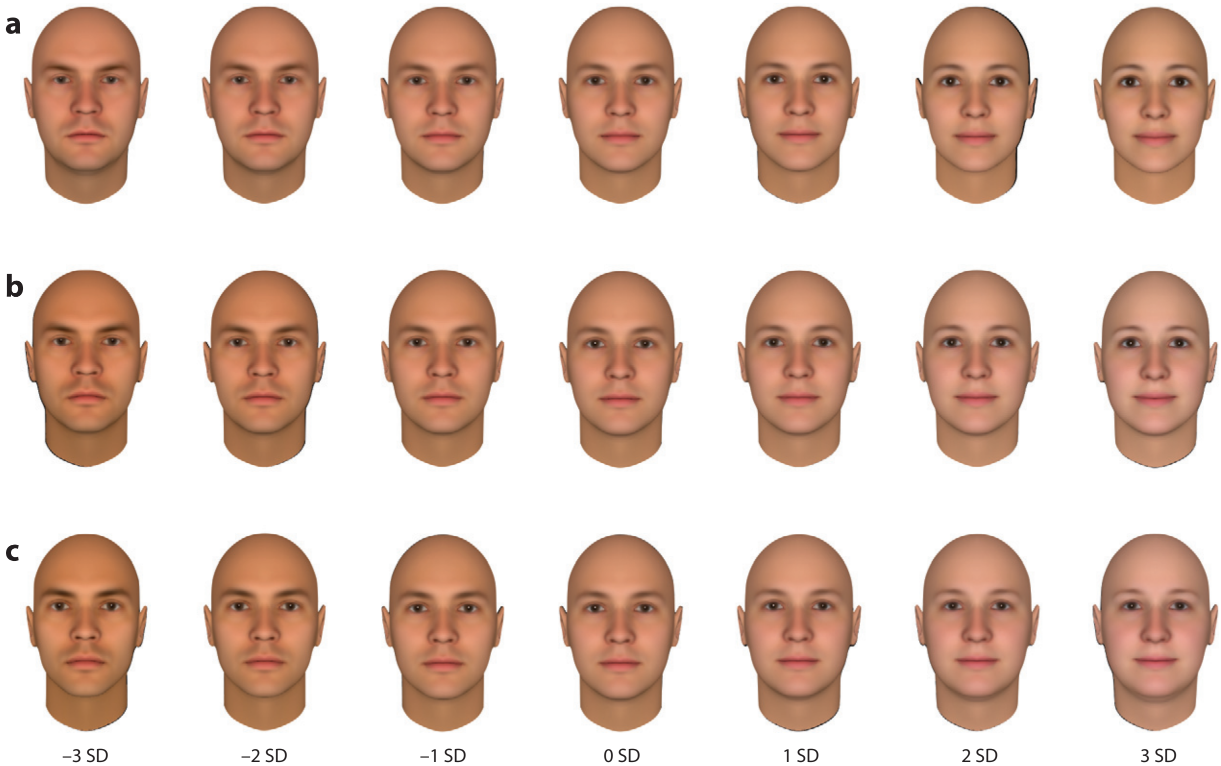

Figure 4

A model of trustworthiness judgments with different degrees of control for attractiveness. (*a*) The model is not corrected for attractiveness. More trustworthy faces are also perceived as more attractive. (*b*) The model is orthogonal to a model of attractiveness. (*c*) The model subtracts the model of attractiveness. More trustworthy faces are perceived as less attractive. Adapted from figure 10 in Todorov et al. (2013), with permission.

One of the main disadvantages of data-driven methods is that they are dependent on the stimuli used to build the model. Specifically, if configurations of features that are important for social attributions do not vary in the original set of judged faces, these methods would not identify the importance of these features. This is nicely illustrated in research by Sutherland and colleagues (2013). Instead of computer-generated faces, they employed a large sample of diverse faces drawn from the Internet. Using morphing methods and face averaging—essentially the technique that was first developed by Galton—they were able to identify multiple cues that covary with social attributions. Importantly, age emerged as a very important cue for judgments of attractiveness, trustworthiness, and dominance (**Figure 5**). Older faces were perceived as less attractive (**Figure 5*a***), more trustworthy (when feminine; **Figure 5*b***), and more dominant (when masculine; **Figure 5*c***).

Data-driven methods: stimulus-driven techniques for identifying quantitative relationships between high-dimensional variables (e.g., images) and behaviors (e.g., decisions) not constrained by prior hypotheses

Sutherland and colleagues (2013) replicated the two-dimensional structure of social judgments proposed by Todorov and his colleagues (Oosterhof & Todorov 2008, Todorov et al. 2008), with axes approximated by trustworthiness and dominance judgments, but they also found a third dimension—youthfulness-attractiveness—that was necessary to fully describe the structure of social attributions from faces. The importance of age did not emerge in the models proposed by Todorov and his colleagues (Todorov & Oosterhof 2011, Todorov et al. 2008) because their computer-generated faces did not vary sufficiently on age.

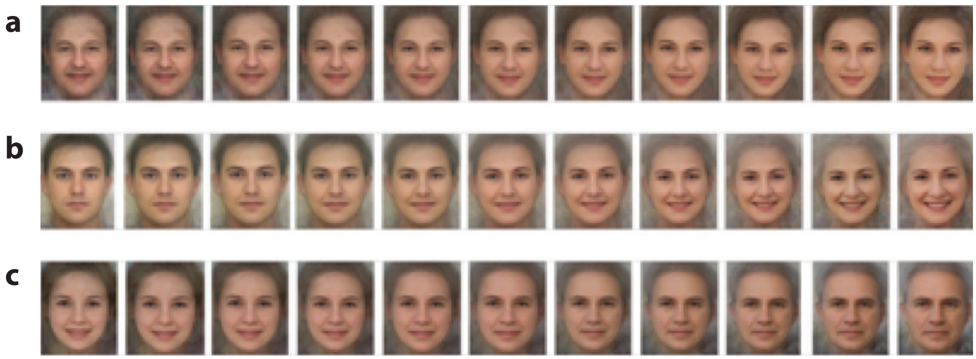

Figure 5

Models of social attributions from faces created from morphing of faces. (*a*) A morphing continuum of attractiveness. (*b*) A morphing continuum of trustworthiness. (*c*) A morphing continuum of dominance. Adapted from figure 1 in Sutherland et al. (2013), with permission.

Reverse correlation methods: whereas stimulus attributes vary randomly, the response is fixed. The response is used to classify the variation in the stimuli

Psychophysical reverse correlation methods (Gosselin & Schyns 2003, Kontsevich & Tyler 2004, Mangini & Biederman 2004) are an alternative class of data-driven techniques that allow for unconstrained visualization of the facial information diagnostic for social perception. With this approach, participants judge noisy images of faces that are created by superimposing random noise on one or more images of faces. The random noise distorts the face at the pixel level, providing variation in faces that is less constrained in comparison with the computational approach (although the underlying face image may provide another source of bias). The goal is to compute a classification image, which visualizes the facial characteristics that drive social judgments.

Dotsch & Todorov (2012) used this method to visualize trustworthiness and dominance, yielding classification images that resembled the earlier face space models (**Figure 6**). They observed that information in mouth, eye, eyebrow, and hair regions informed social judgment (see also Éthier-Majcher et al. 2013).

Robinson and colleagues (2014) used a similar technique, called "Bubbles" (Gosselin & Schyns 2001), to identify the facial regions that influence trustworthiness and dominance judgments. They also found that variations in mouth, eye, eyebrow, and jaw regions predicted these judgments. They were even able to flip the social perception of the same face from trustworthy to untrustworthy (and from dominant to submissive) by manipulating the contrast on the previously identified diagnostic regions and spatial scales. Using reverse correlation with dynamic stimuli, Gill and

Figure 6

Classification images of judgments of trustworthiness, untrustworthiness, dominance, and submissiveness. Adapted from figure 3 in Dotsch & Todorov (2012), with permission.

colleagues (2014) demonstrated that facial movements signaling trustworthiness, dominance, or attractiveness can similarly override social attributions based on static cues.

Reverse correlation techniques are extremely potent data-driven methods for mapping facial information onto social perception and have been used successfully in closely related areas, such as the perception of emotion (Jack et al. 2012a,b), ethnicity (Dotsch et al. 2008, 2011), stereotypes (Dotsch et al. 2013, Dunham et al. 2014, Imhoff et al. 2013), groups (Imhoff & Dotsch 2013, Imhoff et al. 2011, Ratner et al. 2014), romantic partners (Karremans et al. 2011), and presidential candidates (Young et al. 2014).

II. NONPERCEPTUAL DETERMINANTS OF SOCIAL ATTRIBUTIONS FROM FACES

Although the models described in Section I are excellent for discovering configurations of facial features that are important for social attributions, they are not sufficient to completely characterize the determinants of these attributions. For example, if the models of social attributions capture all the meaningful face variation, changes in appearance on orthogonal dimensions should not lead to systematic changes in social attributions. This is clearly not the case, as demonstrated in research by Said et al. (2010). Although they generated 100 random dimensions in face space, all of them orthogonal to social dimensions, and selected the dimension for which changes in appearance seemed the least socially meaningful, changes in appearance on this dimension still led to systematic changes in judgments.

An additional source of systematic variance in social attributions is the typicality of faces. To illustrate this point, we generated nine random face dimensions that are orthogonal to all social dimensions that we have created so far. **Figure 7*a*** shows examples of faces generated by one of these nine dimensions. Participants judged faces that varied on these dimensions either on typicality or on trustworthiness. Not surprisingly, as faces moved away from the average face at the center of the dimension, they were judged as more atypical (**Figure 7*b***). More surprisingly, this was also the case for judgments of trustworthiness (**Figure 7*c***). The more atypical the faces, the more untrustworthy they were perceived to be.

These findings suggest that experimental manipulations that shift the typicality of faces should lead to changes in social attributions. One of the simplest ways to do this is to adapt participants to weird-looking faces (Webster & MacLin 1999). Rhodes and colleagues (2003) have shown that a few minutes of adaptation to atypical faces (e.g., whose eyes are extremely close to or distant from each other) shifts ratings of both typicality and attractiveness in the direction of the face distortion. We expect that if participants are asked to make social attributions in a similar paradigm, the effects will be the same. Greater familiarity with one's in-group can also shift the perceived typicality of faces and can partially explain in-group face preferences (Zebrowitz et al. 2007, 2008).

Momentary, incidental associations with faces can also affect their evaluations. Fenske and colleagues (2005) have shown that faces for which participants had to withhold a response in a go/no-go task were rated as less trustworthy than faces for which they did not have to withhold a response (see also Doallo et al. 2012). That is, whereas faces associated with an approach response were perceived as trustworthy, faces associated with an avoidance response were perceived as untrustworthy. Similarly, faces associated with an unreliable eye gaze in a gaze-cuing task were perceived as untrustworthy (Bayliss & Tipper 2006). Even simply inhibiting attention to peripheral distractor faces during a visual search paradigm resulted in those faces being perceived as less trustworthy (Frischen et al. 2012, Raymond et al. 2005).

Social category knowledge also has pervasive effects on face perception. Early on, Secord and colleagues (1956) studied the effect of category-based stereotypes on personality attributions. They

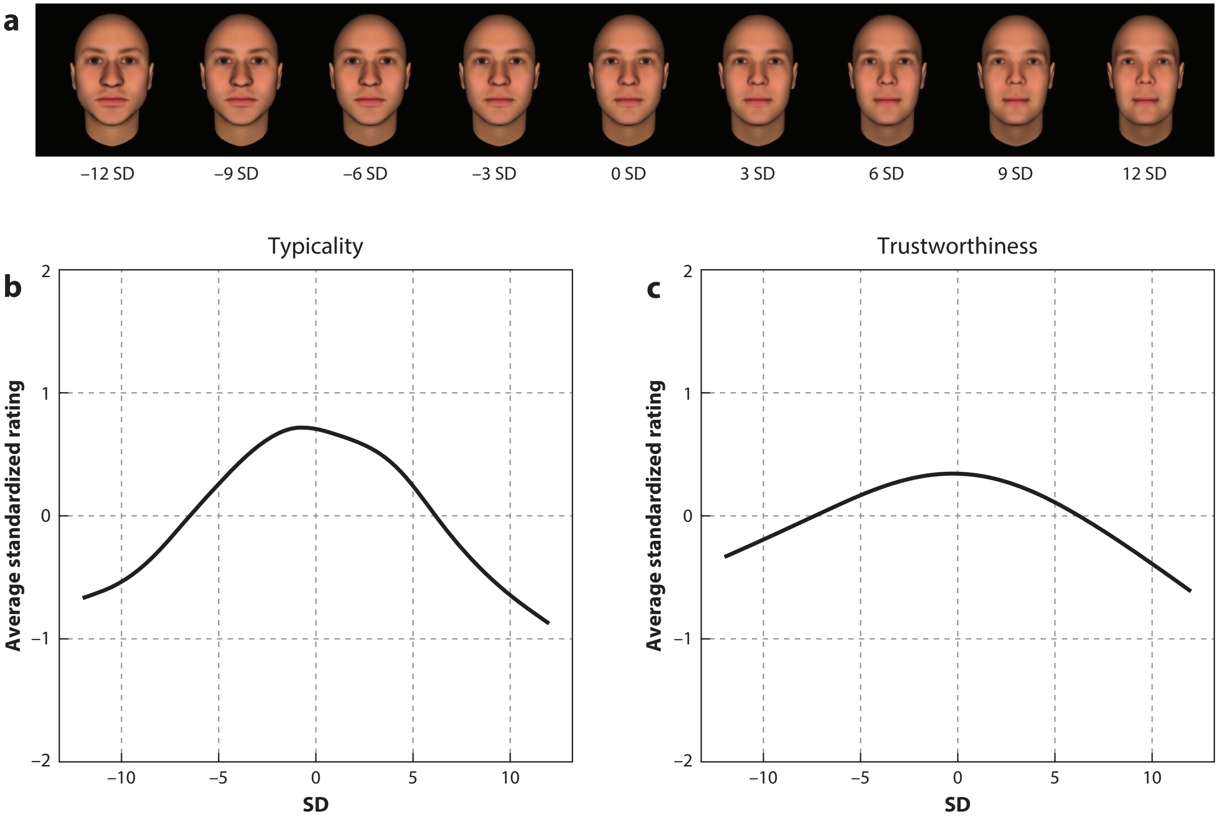

Figure 7

The use of typicality information in judgments of trustworthiness. (*a*) Faces from a randomly generated dimension in face space orthogonal to social dimensions, including trustworthiness. (*b*) Judgments of typicality and (*c*) judgments of trustworthiness of faces as a function of their position on a randomly generated face dimension. The judgments are averaged across nine randomly generated dimensions.

found that once a face is classified as African American, stereotypes are applied indiscriminately no matter how African American the face looks. It is not surprising that the most popular test of implicit group biases—the implicit association test (Greenwald et al. 2003)—typically uses faces as stimuli to represent the groups. Recent research also demonstrates that implicit ethnic biases predict evaluations of face trustworthiness (Stanley et al. 2011). Moreover, additional work has begun to examine how social context (Ito et al. 2011), cultural context (Freeman et al. 2013), and status cues (Freeman et al. 2011) influence the perception and social categorization of faces.

Specific person knowledge has large effects on the evaluation of faces. The copresentation of single behavioral acts with faces leads people to automatically associate trait attributions with those faces (Bliss-Moreau et al. 2008; Goren & Todorov 2009; Todorov & Uleman 2002, 2003, 2004). Importantly, such learned associations between faces and trait attributions can be generalized to novel faces. Kraus & Chen (2010) have shown that novel faces that resemble the faces of one's significant others are evaluated similarly to those significant others (see also Günaydin et al. 2012, Tanner & Maeng 2012). Verosky & Todorov (2010a) have extended these findings. They showed that faces morphed to subtly resemble other faces that were previously associated with positive behaviors were evaluated more positively than face morphs resembling faces that had been associated with negative behaviors. Moreover, these effects persisted even when participants were put under cognitive load and specifically instructed to ignore facial similarity (Verosky & Todorov 2013).

Finally, faces that resemble the self are evaluated more positively than non-self-resembling faces. For example, participants rated morphed faces containing small percentages of their own face as more trustworthy than faces morphed with other faces (DeBruine 2005). Moreover, participants behaved more prosocially toward self-resembling partners in economic games (DeBruine 2002, Krupp et al. 2008). Finally, when choosing between competing political candidates, participants were more likely to prefer individuals whose faces had been altered to resemble their own faces (Bailenson et al. 2008). However, it should be noted that these effects of self-similarity may also reflect self-serving attributions—for example, people are more likely to recognize themselves in trustworthy than in untrustworthy morphs (Verosky & Todorov 2010b).

III. CONSEQUENCES OF SOCIAL ATTRIBUTIONS FROM FACES

Social attributions from faces are not only pervasive but also consequential. Their effects on social outcomes have been demonstrated across a wide range of contexts, from strategic games in the lab (Rezlescu et al. 2012, Tingley 2014) to real-world behaviors, such as voting choices (Antonakis & Delgas 2009, Ballew & Todorov 2007, Lawson et al. 2010, Lenz & Lawson 2011, Little et al. 2007, Olivola & Todorov 2010a, Todorov et al. 2005), sentencing decisions (Blair et al. 2004, Eberhardt et al. 2006, Zebrowitz & McDonald 1991), and dating preferences (Olivola et al. 2014a).

One of the most studied domains within this literature is leadership selection and compensation. Within politics, numerous studies have shown that political candidates receive larger vote shares and are more likely to win elections, the more competent-looking their faces are (Antonakis & Dalgas 2013, Ballew & Todorov 2007, Chen et al. 2014, Laustsen 2013, Lenz & Lawson 2011, Martin 1978, Sussman et al. 2013, Todorov et al. 2005; for a review, see Olivola & Todorov 2010a). Other studies have similarly shown that electoral outcomes are predicted by how dominant (Chen et al. 2014, Chiao et al. 2008, Little et al. 2007), sociable (Castelli et al. 2009), threatening (Mattes et al. 2010, Spezio et al. 2008), stereotypically Republican (Olivola et al. 2012), and even stereotypically politician-like (Olivola et al. 2014b) candidates' faces are. Within business, studies have shown that CEOs who look competent and dominant are hired by more successful companies and receive larger salaries (Graham et al. 2014; Rule & Ambady 2008a, 2009) even though they perform no better than their less competent-looking peers (Graham et al. 2014). Within the military domain, studies have shown that a cadet's future rank attainment is predicted by how dominant he looks (Mazur et al. 1984; Mueller & Mazur 1996, 1997; although for evidence that facial morphological correlates of dominance and aggression negatively predict military rank, see Loehr & O'Hara 2013).

Another important class of inferences concerns judgments of trust, guilt, and criminality. Lab studies have shown that players in strategic economic games are less willing to trust an individual who has an untrustworthy-looking face (Chang et al. 2010, Rezlescu et al. 2012, Schlicht et al. 2010, Stirrat & Perrett 2010, Tingley 2014, van 't Wout & Sanfey 2008), even when his past behavior indicates that he can be trusted (Chang et al. 2010, Rezlescu et al. 2012). More worryingly still, facial appearances can predict sentencing decisions, judgments of guilt, and punishment severity. Experimental studies have shown that defendants who have untrustworthy-looking faces (Porter et al. 2010) or faces that fit the stereotype of the crime they are being tried for (Dumas & Testé 2006, Macrae & Shepherd 1989, Shoemaker et al. 1973) are more likely to receive guilty verdicts, even when there is less evidence of their guilt (Dumas & Testé 2006, Porter et al. 2010). Similarly, another experiment found that individuals who have stereotypically criminal-looking faces are more likely to be selected from a police lineup and thus to face trial (Flowe & Humphries 2011). In the United States, defendants who have Afrocentric facial features (i.e., that are perceived to be stereotypically black) receive harsher sentences (Blair et al. 2004) and are more likely to receive the death sentence (Eberhardt et al. 2006). This relationship holds even after controlling for defendants' actual ethnicity and therefore reflects discrimination based on subtle facial features rather than ethnicity per se. Finally, studies have found that mature-looking defendants are more likely to be found guilty in civil cases (Berry & Zebrowitz-McArthur 1988, Zebrowitz & McDonald 1991), especially when the plaintiffs are baby faced (Zebrowitz & McDonald 1991).

A third domain worth discussing is mate choice, which is clearly important to personal, emotional, and evolutionary success. Although physical attractiveness is obviously an important determinant of dating success, social attributions drawn from facial appearances may also impact mate choices. Little and colleagues (2006) have shown that people find faces more attractive when they are perceived to possess traits that are desired in potential partners (e.g., assertiveness). Olivola et al. (2014a) looked at the facial correlates of success in online dating (using data from a popular dating website) and found that looking fun and outgoing positively predicted dating success for men, whereas looking smart and serious negatively predicted women's dating success. Critically, these correlations held even after controlling for physical attractiveness as well as the information posted on the dating profiles. This shows that the predictive power of face-based trait inferences goes above and beyond physical attractiveness, even when it comes to mate choice.

Most of the studies discussed above were based on observational data (with the goal of predicting real, significant outcomes) and are therefore correlational. However, a number of studies have systematically manipulated facial appearances to demonstrate a causal relationship between face-based social attributions and various important outcomes. Within the domain of politics, for example, Little et al. (2007) altered facial appearances to show that they influence voting preferences. Within the legal domain, several studies have experimentally paired photos with case evidence to show that facial appearances also impact legal judgments (Berry & Zebrowitz-McArthur 1988, Dumas & Testé 2006, Porter et al. 2010). Finally, within the domain of economic exchanges, researchers have recently started using tightly controlled computerized faces, such as those based on the data-driven models described in Section I (e.g., Oosterhof & Todorov 2008), to provide some of the most compelling and direct evidence that face-based social attributions of trustworthiness can bias real financial choices (Rezlescu et al. 2012, Schlicht et al. 2010, Tingley 2014). For example, Rezlescu et al. (2012) ran an investment experiment in which they used faces generated by a model of trustworthiness (Oosterhof & Todorov 2008; see **Figure 4**). Participants played a series of online investment games with what they believed were real people who were represented by computerized faces (which appeared on participants' computer screens). The experimenters took a number of steps to ensure that participants believed they were paired with human players. Not surprisingly, participants invested more money in trustworthy-looking partners. More surprisingly, this was the case even when participants were provided with information about the past investment behavior of their partners, which represented the only useful piece of knowledge in this economic transaction.

Although the evidence for the impact of face-based social attributions is plentiful and compelling, the influence of these attributions depends critically on the context. First, not all face-based trait inferences are predictive in any given domain. Rather, the predictive power of a particular facial trait depends on its relevance to the domain in question. Within politics, for example, competence is perceived to be one of the most important characteristics for candidates to possess (Todorov et al. 2005). Accordingly, facial competence is usually the most powerful face-based predictor of electoral success, even after controlling for a host of other facial judgments (Olivola & Todorov 2010a). In contrast, professional success within the military is predicted by facial dominance (Mazur et al. 1984; Mueller & Mazur 1996, 1997; although see Loehr & O'Hara 2013). Interestingly, recent work by Olivola et al. (2014b) suggests that people believe political leaders tend to look competent and that military leaders tend to look masculine, mature, and "cold" (as opposed to "warm")—three traits that are correlated with perceived dominance.

Second, the impact of social attributions based on facial appearances can vary according to the gender and ethnicity of the target. For example, baby-facedness positively predicts the success of black male CEOs but negatively predicts the success of Caucasian male CEOs (Livingston & Pearce 2009). Poutvaara and colleagues (2009) found that within Finnish elections, facial competence predicted the electoral success of male political candidates but not female candidates; however, Olivola & Todorov (2010a) found that, within US elections, facial competence was a strong predictor of success for female and male political candidates alike.

Third, the impact of face-based social attributions depends on the characteristics of the judges. Lenz & Lawson (2011) provide strong evidence suggesting that only voters who have limited political knowledge and extensive television exposure are influenced by how competent candidates look. Olivola et al. (2012) found that looking stereotypically like a Republican (as opposed to a Democrat) positively predicted a candidate's electoral success, but only among Republican voters. In contrast, Democrat voters do not seem to be influenced (in either direction) by these political facial stereotypes (despite still being influenced by other face-based trait inferences; see Olivola et al. 2012).

Finally, the biasing impact of facial appearance is often mitigated by access to more relevant information. As we mentioned above, voters who are knowledgeable about politics are less influenced by candidates' facial appearances (Lenz & Lawson 2011). Similarly, the effect of facial trustworthiness on strategic choices diminishes (but does not disappear) when players can learn about their partners' relevant past behaviors (Chang et al. 2010, Rezlescu et al. 2012). Unfortunately, having access to relevant information does not completely eliminate people's reliance on facial appearances to form social judgments (Olivola et al. 2012, Olivola & Todorov 2010b).

IV. ACCURACY OF SOCIAL ATTRIBUTIONS FROM FACES

If social attributions from faces were highly accurate, then the fact that they influence people's judgments and choices would be less troublesome. Clearly, we are highly capable of determining visually obvious characteristics from facial cues, such as a person's gender, ethnicity, and age, but what about our ability to infer characteristics that are not prominently displayed on faces? Psychologists in the early twentieth century were skeptical about the accuracy of physiognomy (Brandenburg 1926). As Hull (1928) put it, "The results as a whole certainly look very bad for the judgment of character on the basis of photographs" (p. 119). Yet, there has been a flurry of recent research claiming to demonstrate that people can accurately guess a variety of internal traits and behavioral tendencies from facial photographs, such as political orientation (Rule & Ambady 2010, Samochowiec et al. 2010, but see Olivola & Todorov 2010b), sexual orientation (Rule & Ambady 2008b, Rule et al. 2009b; but see Olivola & Todorov 2010b), and even criminal behavior (Porter et al. 2008, Valla et al. 2011; but see Olivola & Todorov 2010b, Rule et al. 2013). However, the conclusion that a person's facial appearance is a valid indicator of his/her underlying characteristics suffers from numerous shortcomings that have not been properly addressed in many of these studies. Here, our discussion mainly focuses on studies that attempted to evaluate accuracy by comparing face-based judgments with objective criteria rather than with subjective measures, such as self-reports or peer reports (e.g., Back et al. 2010, Naumann et al. 2009, Vazire & Gosling 2004).

First, despite claiming to study the identification of "perceptually ambiguous" categories from faces (e.g., Tskhay & Rule 2013), many researchers have failed to properly control for all nonambiguous facial cues, such as a target's gender, ethnicity, and age, which may provide obvious indicators of the traits being inferred. For example, a number of studies seemed to show that human judges could accurately determine a target's political orientation from facial cues alone (e.g., Carpinella & Johnson 2013, Jahoda 1954, Olivola et al. 2012, Olivola & Todorov 2010b, Rule & Ambady 2010, Samochowiec et al. 2010). Olivola et al. (2012), for example, found that human judges could (on average) correctly identify which of two rival candidates was the Republican (or Democrat) from pairs of facial photos alone. The average judge correctly guessed 56% of the time, which was reliably above chance. However, Republican candidates are more likely to be male, Caucasian, and older than their Democrat rivals (Olivola et al. 2012, 2014c), which creates a confound. Olivola and colleagues (2014c) reexamined the accuracy achieved by judges after controlling for differences in gender, ethnicity, and age. They found that judgmental accuracy drops to chance levels (50.7%) when the analyses are restricted to elections in which candidates were of the same gender, same ethnicity, and less than 25 years apart in age. This suggests that much of the accuracy achieved by participants in past studies of political facial stereotyping was likely driven by their having easy access to obvious demographic correlates of political affiliation. The same concern can (and should) be extended to other domains of judgment.

Heuristics: simple rule-based algorithms for forming judgments or making decisions, usually from a limited set of cues

Category base-rate: the probability that a person belongs to a specific (social) category, in the absence of any individuating or contextual information

Second, above-chance accuracy is a rather feeble benchmark and says little about the validity of face-based social attributions. Rather than asking whether judgments derived from facial cues exceed mere guessing, researchers should compare these cues with other pieces of information that human judges typically have access to. For example, consider the demographic variables discussed above (gender, ethnicity, and age). These obvious visual cues are valid predictors of a US candidate's political party (Olivola et al. 2012, 2014c), but how do they compare to the more subtle facial indicators of perceptually ambiguous categories (Tskhay & Rule 2013)? Olivola and colleagues (2014c) simulated the predictions of simple judgmental heuristics that categorized politicians' political affiliations by relying solely on any existing differences in gender, ethnicity, and age, in a serial, lexicographic fashion (when no obvious differences existed, these heuristics guessed randomly). These heuristics were at a disadvantage compared to human judges because they could only rely on three pieces of information (and they did so in a noncompensatory way) rather than the entire range of cues provided by faces. Therefore, we should expect that human judges would be at least as accurate as these heuristics in identifying political party. Instead, the authors found that all of their simple heuristics vastly outperformed human participants. This shows that subtle facial cues are much less diagnostic indicators of political affiliation than obvious demographic indicators that are just as easily accessible (if not more). Moreover, these results also suggest that human judges rely too heavily on subtle facial cues and too little on demographic cues.

A similar conclusion was reached by Olivola & Todorov (2010b), who compared the diagnostic validity of subtle facial cues with that of category base-rate information. Human judges often have access to category base-rates (e.g., they know that heterosexual is the most common sexual orientation category in the general population), so they should also make use of this information rather than solely rely on facial appearance. Consequently, we should expect that judges who have access to both facial cues and their own knowledge of the base-rates (or at least which category is the most common) should outperform judges who only have access to the latter piece of information. Instead, in one of their studies, Olivola & Todorov (2010b) found that judges who were presented with facial photos of the targets generally performed worse than those who could only rely on their knowledge of the base-rates. The accuracy levels of judges with access to facial cues were also significantly below the dominant base-rates (i.e., the base-rates of the most common categories) (**Figure 8*a***). This underperformance was most dramatic for characteristics with highly unequal base-rates (such as sexual orientation or drug use) and was only eliminated (or reversed) when the

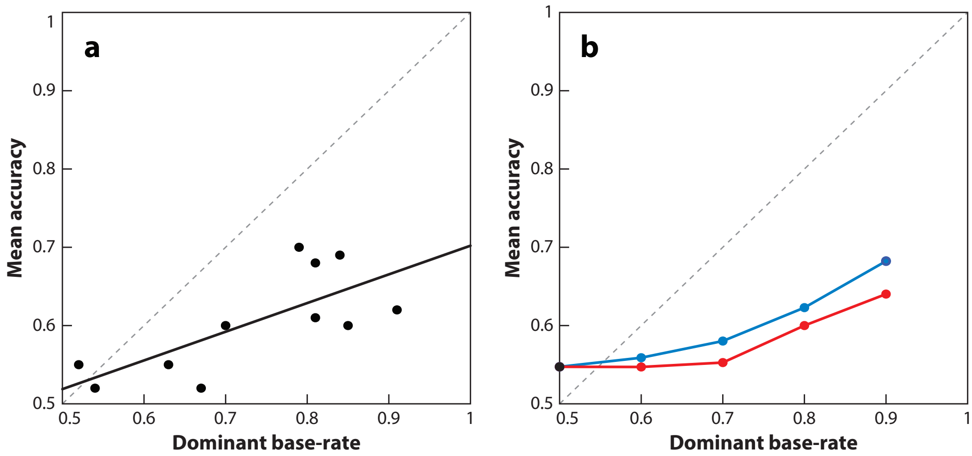

Figure 8

Accuracy of appearance-based category inferences as a function of the dominant base-rate associated with each characteristic (*a*) or condition (*b*). (*a*) Judgments of various characteristics that naturally vary in their base-rates (study 1 in Olivola & Todorov 2010b). The solid black line represents the best linear fit of these data. (*b*) Judgments of political affiliation (study 2 in Olivola & Todorov 2010b), where the base-rates were experimentally manipulated (between participants) and known to participants, so that either Democrats were the dominant category (*blue*), Republicans were the dominant category (*red*), or both categories were equally likely to occur (*black data point*). The dashed gray line in each figure represents the performance that would be achieved by judges who relied only on the dominant base-rates to infer categories.

characteristics being judged had nearly uniform base-rates (i.e., when their defining categories were close to equiprobable, so that knowing the base-rates would not contribute much to judgmental accuracy). In their second study, Olivola & Todorov (2010b) parametrically varied the category base-rates to see how this influenced accuracy levels. Participants were presented with the photos of individual US politicians and asked to guess whether the target was a Republican or a Democrat. The proportion of Republicans that participants saw varied (between subjects) from 10% to 90%, in increments of 10%, and half the participants were explicitly informed of the base-rates at the beginning of the experiment. Participants who knew they would be presented with 90% Republicans (or 90% Democrats) should have achieved at least 90% accuracy by relying on the base-rates and occasionally updating their beliefs with information about facial cues. Instead, participants radically underperformed relative to this easy benchmark (**Figure 8*b***). In fact, they only outperformed the base-rates when these were uniform (i.e., 50% Democrats and 50% Republicans presented). Yet, perfectly uniform base-rates are extremely rare in the real world.

Again, these results suggest that the participants were relying too heavily on appearances while neglecting the highly valid information offered by the base-rates. In sum, people tend to neglect other sources of information when they are presented with facial cues. Yet cues such as base-rates and demographic indicators are generally easily accessible and highly diagnostic in the real world (as opposed to the artificial confines of controlled laboratory settings). As a result, people may be better off ignoring subtle facial cues.

Third, whereas much attention has been paid to the accuracy associated with face-based trait inferences, there is comparably very little work on the meta-accuracy (or confidence calibration) of these judgments: how well people can evaluate their own ability (or lack thereof) to draw useful inferences from facial cues. Yet, the validity of these judgments also rests on knowing when to deploy them and when to refrain from doing so. Unfortunately, many studies suggest

Meta-accuracy: how accurately people evaluate their own performance on a judgment task (i.e., the relationship between estimated and actual accuracy) that people have very poor meta-accuracy when it comes to these judgments (Ames et al. 2010; Hassin & Trope 2000; Olivola et al. 2014b,c). For example, Olivola et al. (2014b) examined the ability of human judges to distinguish different types of leaders (business CEOs, military generals, politicians, and sports coaches) from their faces. They found almost no relationship between how well participants thought they performed and how well they actually performed. This was true both within judges (participants were not able to predict on which trials they were more likely to have guessed correctly) and between judges (participants who were more confident in their overall performance were no more accurate, overall, than those who were less confident). Similarly, Olivola and colleagues (2014c) found that meta-accuracy for political facial stereotyping was extremely low, with practically no correspondence between predicted and actual ability to infer political affiliation from faces. The low meta-accuracy observed in many studies is worrisome, as it suggests that low performers are no less confident in their ability to draw valid inferences from facial cues than are high performers. Consequently, people may erroneously rely on these judgments when they are not valid and, perhaps, fail to do so when they are (somewhat) valid.

Fourth, an implicit assumption in these studies is that there is a one-to-one mapping from a person's facial appearance to his/her perceived characteristics. However, as Burton and his colleagues have shown, there is a tremendous variation between images of the same individual (Burton & Jenkins 2011, Jenkins et al. 2011). In a particularly striking demonstration, Jenkins and colleagues (2011) sampled images of Dutch celebrities (20 images of each of 20 celebrities) and asked British participants unfamiliar with the celebrities to rate their attractiveness. The within-person variance (of the images of the same person) was comparable to the between-person variance (of the mean ratings of the individuals). The upshot was that for any pair of individuals, it was possible to select images where the attractiveness preference could reverse.

Building on this prior work and to test whether random variations in images of the same individuals can lead to different social attributions, Todorov & Porter (2014) sampled face images from a database created for the development of face recognition algorithms. The models for this database were photographed on multiple occasions and were not given instructions with respect to facial expressions. Although the authors only selected front head images with adequate illumination, hence minimizing differences due to face orientation and lighting, there were dramatic differences in social attributions from different images of the same individual (see also Rule et al. 2013, study 1). Across seven social judgments, the within-person variance either exceeded or was comparable to the between-person variance. **Figure 9** illustrates this for judgments of extroversion. For both males (**Figure 9*a***) and females (**Figure 9*b***), there is a large variation in judgments of different images of the same person. The variation is so large that even for the least and most extroverted-looking people, it is possible to select images where the least extroverted would look more extroverted than the most extroverted.

The variation may seem surprising in light of studies finding accurate judgments of extroversion from facial images (e.g., Borkenau & Liebler 1992, Borkenau et al. 2009, Penton-Voak et al. 2006). To a large extent, the variation in judgments of extroversion in Todorov & Porter's (2014) study resulted from an overreliance on smiling behavior. If the latter is representative of the person across many situations, there should be some correspondence between judgments and personality. However, as shown here, it is easy to generate images of the same individual that lead to very different conclusions.

In subsequent studies, Todorov and Porter showed that participants had specific preferences for images of the same individual and that these preferences shifted as a function of the context (e.g., selecting an image for a political campaign versus selecting an image for an online dating website). Not surprisingly, judgments of images preferred in a particular context (e.g., political campaign) were rated higher (e.g., likelihood of voting) than randomly selected images in the same

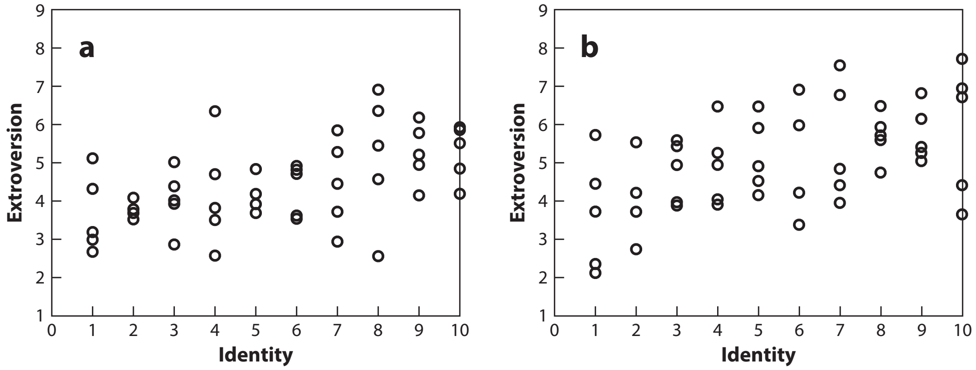

Figure 9

Extroversion judgments of individuals as a function of random variation in their images. Each column shows judgments of the same individual. Individuals are ordered on the *x*-axis according to their mean judgment across images. Perceived extroversion of (*a*) male faces and (*b*) female faces. Adapted from figure 1 in Todorov & Porter (2014), with permission.

decision context. Differences in attributions from images of the same person could be detected even after merely 40-ms presentations of the images.

The fact that face images can be misleading is not surprising. As early as 1927, Laird demonstrated how easy it is to select a sample of face images that can lead either to accurate or inaccurate judgments. These findings have clear implications for accuracy studies. Consider studies on judgments of sexual orientation from facial images (Rule & Ambady 2008b, Rule et al. 2009b). Many of these studies rely on images from online dating websites. To the extent that the images were posted by the website users, an increased rate of identification of their sexual orientation may simply reflect that the users selected the images that best conveyed their intentions. These considerations apply to all studies that use publicly available images and have no control over the production of the images. For example, studies on the accuracy of judgments of criminal inclinations have compared mug shots of arrested people with photographs of students on campus (Valla et al. 2011) and images of America's Most Wanted with images of Nobel Peace Prize winners (Porter et al. 2008). The ability to discriminate these images better than chance may have to do more with the selection of the images rather than with honest signals of criminality. Inferences about accuracy are only justified when the images are produced in a context not designed to elicit specific inferences and are selected in an unbiased fashion.

In all cases, whether an image was selected strategically or not is likely to determine the observed correspondence between judgments from appearance and personality. For example, Gosling and his colleagues (Back et al. 2010, Vazire & Gosling 2004) have shown that information posted by users on websites such as Facebook conveys accurate information about their personalities, but—as pointed out by the researchers—this information was strategically chosen by the users to convey their identity. Without knowledge of the selection and the context of production of the images, it is difficult to evaluate claims that social attributions from face images are accurate.

These considerations also apply to seemingly stable face characteristics. Take a recent and extremely popular measure of facial differences: the width-to-height ratio of faces. This measure was initially presented as a sexually dimorphic feature, presumably evolved because of sexual selection pressure, that predicts aggressive behavior in males (Carré & McCormick 2008, Carré et al. 2009). Apparently, men with high width-to-height ratios are "bad to the bone" (Haselhuhn & Wong 2012). This measure is not invariant with respect to image variation, because variables such as expressions, head tilt, and face orientation can change the ratio. Furthermore, it was determined that the measure is not sexually dimorphic (Kramer et al. 2012, Lefevre et al. 2012), and there have been several failures to replicate the finding that it predicts aggressive behavior (Deaner et al. 2012, Gómez-Valdés et al. 2013). The authors who initially reported the latter effect recently reported that this is only the case for men with low social status (Goetz et al. 2013).

Self-fulfilling prophecy: the tendency for beliefs and expectations to influence behaviors in a way that yields confirming evidence of their validity

Reverse causation: erroneously inferring that (variable) *B* causes *A* after observing a correlation between them, when in reality *A* causes *B*

Finally, it is important to remember that even clear evidence (i.e., evidence that avoids the issues discussed above) that facial morphology is a valid predictor of certain traits, characteristics, or tendencies does not imply a direct biological link between facial structure and these variables. It could instead reflect the combined workings of a societal bias, whereby people erroneously associate certain facial cues with certain traits, and a self-fulfilling prophecy dynamic. Individuals with these facial cues may come to internalize what others expect of them or react to these facial stereotypes in ways that confirm society's biases. For example, individuals who look more threatening or less trustworthy may experience more discrimination and negative interactions than their peers do. This, in turn, may lead them to become more aggressive and less cooperative. Or consider the hypothesis that CEOs who look more competent are actually more effective at their job, as suggested by the fact that the companies they work for tend to be more profitable (e.g., Rule & Ambady 2008a, 2009). One might be tempted to conclude that facial competence reflects innate abilities that contribute to successful business leadership. However, recent work shows that the direction of causality is reversed (reverse causation): More competent-looking CEOs are hired by companies that were already more profitable (Graham et al. 2014). Once past profits are controlled for, the relationship disappears, suggesting that CEOs with very competent-looking faces are actually no better than those with less competent-looking faces (Graham et al. 2014). Yet, competent-looking CEOs seem to have the rest of the business world (and perhaps themselves) fooled, as they are still paid higher salaries (Graham et al. 2014).

V. THE FUNCTIONAL SIGNIFICANCE OF SOCIAL ATTRIBUTIONS FROM FACES

As physiognomists suspected and as experimental psychologists in the early twentieth century established, people agree when they make social attributions from faces. In fact, surprisingly little time and effort is needed to arrive at a consensus with regard to these attributions. As we outline in this review, it is possible to identify both perceptual (Section I) and nonperceptual (Section II) determinants of this consensus. Data-driven methods are powerful tools for discovering the perceptual basis of social attributions from faces. These attributions are constructed from multiple cues with complex interactions. For example, although earlier work emphasized the importance of emotional signals to attributions of trustworthiness (Oosterhof & Todorov 2008, Todorov 2008, Todorov et al. 2008), it is clear that many other cues are used to make this attribution. Trustworthy-looking faces not only look happier than untrustworthy-looking faces, but they are also more feminine and older. In a nutshell, social attributions are constructed from cues with adaptive significance, such as masculinity/femininity and resemblance to emotional expressions.

In addition to the physical structure of the face, there are at least five other determinants of social attributions from faces. Faces that are perceived as atypical, as determined by their location within a distribution of faces, are evaluated more negatively. Faces that are associated with members of a social category are evaluated in accordance with beliefs about the respective category. Faces for whom we possess evaluative knowledge are evaluated according to this knowledge. Faces that resemble faces that we like or dislike are evaluated according to these likes and dislikes. Finally, faces that resemble the self are evaluated more positively.

In sum, social attributions are constructed from multiple sources of information. Some of these sources are likely to be universal (e.g., inferences based on masculinity/femininity), some are likely to be culturally specific (e.g., face typicality), and some are likely to be idiosyncratic (e.g., resemblance to significant others). If these attributions did not matter, the consensus and efficiency in making them would just be a curious perceptual fact. But these attributions do matter because they predict a variety of important social outcomes (Section III). People make specific attributions (e.g., competence) relevant to the context (e.g., electing a leader), and these attributions predict their decisions, especially among those with very little other information.

Face typicality: defined by the distance from the average face in a multidimensional face space; typical faces are closer to the average

But why do people constantly engage in these attributions if they are not necessarily accurate? Our answer to this question is not new. It was proposed more than 50 years ago by Paul Secord (1958) and later developed and elaborated by Leslie Zebrowitz and her colleagues (Zebrowitz 2011, Zebrowitz & Montepare 2008). Secord considered several inference mechanisms that drive social attributions from faces. The first one—temporal extension—refers to the proclivity of people to consider momentary states as stable personality attributes. This is at the core of the overgeneralization hypothesis: People use easily accessible facial information (e.g., an expression such as a smile, cues to gender and ethnic group) to make social attributions congruent with this information (e.g., a nice person). The temporal extension hypothesis, closely related to research on emotion overgeneralization, has received broad empirical support (see Section I). Importantly, it can explain why different images of the same person can generate very different social attributions (see Section IV). Slight variations even in neutral expressions can convey different mental states, and these mental states can be interpreted as corresponding to different personality attributes. Although these inferences of momentary states could be indicative of the immediate situation and, hence, useful to the perceiver, they may be unwarranted in the long run as guides to stable attributions.

Another inference mechanism that Secord considered was categorization: If people are able to assign a face to a social category, they will use knowledge of the category to make attributions about the person. As noted in Section II, there is ample evidence for this hypothesis too. Secord also argued for a parataxis mechanism: generalizing the qualities of significant others to strangers who resemble those significant others. Subsequently, Andersen and her colleagues have provided rich support for this hypothesis (Andersen & Baum 1994, Andersen & Cole 1990, Chen & Andersen 1999), and as outlined in Section II, facial similarity is a powerful trigger of these effects. A fourth mechanism Secord considered was inferences based on functional qualities. For example, faces with eyeglasses are judged as more intelligent (Thornton 1943). In fact, in the data-driven model of intelligence created by Sutherland and colleagues (2013), one can see the traces of glasses in the intelligent morphs (the original images were not filtered for glasses or other artifacts).

Some of these cues could have a kernel of truth. As described in Section IV, gender, age, and ethnicity are diagnostic cues for political affiliation. But (*a*) the relationship is far from perfect, (*b*) people tend to make even more specific attributions by going beyond the information afforded by these general categories, and (*c*) these attributions based on minimal information are overweighed in decisions. The face looms large in decisions, and this may be another kind of judgmental illusion (Kahneman 2003, Tversky & Kahneman 1974). In real-life situations, people do not interact with disembodied faces. There is nonverbal information, bodily information, other appearance information (e.g., clothing, neatness), and rich contextual information (e.g., party setting). All of these sources of information contribute to making good enough decisions in social settings, but people may be erroneously assuming that their main source of information is the face. In a telling example, Aviezer and colleagues (2012) showed that in the case of extreme emotions (e.g., winning versus losing in a high-stakes match, pleasure versus pain), people could not tell positive from negative emotions in the face, although they could tell from the body. And yet, they thought that their judgments were based predominantly on facial information.

When making social attributions from faces, people are making too much out of too little information. This may be inconsequential in some situations (e.g., deciding that your bank clerk is too stiff) but may be consequential in others (e.g., deciding that your neighbor is untrustworthy). When these attributions could be consequential, the right course of action is to consult other, more useful, nonfacial information.

SUMMARY POINTS

1. People need surprisingly little time and effort to make social attributions from faces.
2. Data-driven methods are powerful tools for discovering the perceptual basis of social attributions from faces.
3. Social attributions from faces are constructed from multiple sources of information. Some of these sources are likely to be universal (e.g., inferences based on masculinity/femininity), some are likely to be culturally specific (e.g., face typicality), and some are likely to be idiosyncratic (e.g., resemblance to significant others).
4. Social attributions from faces are influenced by a host of nonperceptual factors, including experience, incidental associations, social category knowledge, person knowledge, and self-resemblance.
5. A large and growing body of research shows both correlational and causal evidence linking facial appearance to a variety of important social outcomes.
6. The relationships between facial appearance and social outcomes depend critically on a host of interpersonal and contextual factors.
7. Rigorously evaluating the accuracy of face-based social attributions is challenging, and the conclusions of many recent studies exaggerate the validity of these attributions.
8. Social attributions from faces are much less accurate than previously thought, once relevant confounds are controlled for. They lead judges to neglect more informative cues, and they vary enormously across different images of the very same target.

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Contents

Indexes

Errata

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