



Intergroup Perception and Cognition: An Integrative Framework for Understanding the Causes and Consequences of Social Categorization

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Abstract

The primary aim of this chapter is to provide a framework to understand and synthesize the processes of person construal—early perceptions that lead to initial ingroup/outgroup categorizations—with the processes involved in intergroup relations. To this end, we review research examining the initial perception and categorization of ingroup and outgroup members and its downstream consequences. We first discuss bottom-up processes in person construal based on visual features (e.g., facial prototypicality and bodily cues), and then discuss how top-down factors (e.g., beliefs, stereotypes) may influence these processes. Next, we examine how the initial categorization of targets as ingroup or outgroup members influences identification, stereotyping, and group-based evaluations, and the relations between these constructs. We also explore the implications of the activation of these constructs for a range of social judgments

including emotion identification, empathy, and intergroup behaviors. Finally, we describe a variety of well established and more recent strategies to reduce intergroup bias that target the activation of category-based knowledge, including intergroup contact, approach orientations, evaluative conditioning, and perspective taking.

It is an exciting time to be an intergroup researcher. New methodologies and ways of thinking about intergroup biases are abundant. Based in part on multidisciplinary work in this area, research on social categorization processes has made robust advances (Amodio, 2014a; Freeman & Ambady, 2011; Hugenberg, Young, Bernstein, & Sacco, 2010; Kawakami, 2014). These advances have been particularly informative about the earliest stages of processing ingroup and outgroup members and have been fueled by work in social neuroscience, social vision, face perception, emotion, and social cognition. Our goal in this chapter is to provide a framework for understanding the initial perception and categorization of ingroup and outgroup members and the downstream consequences of these processes.

Our chapter is organized in two major sections: *Person Construal* and *Persons Construed*. As depicted in Fig. 1, Section 1, *Person Construal*, reviews the processes involved in the initial perceptual encoding of others. Drawing on social cognitive and neuroscience evidence, we explore the interaction of bottom-up target effects (e.g., visual cues) and top-down effects (e.g., expectancies and situational factors) as they relate to early attention, affective responses, and memory for ingroup and outgroup members. Section 2, *Persons Construed*, focuses on how this initial categorization leads the perceiver to imbue a target with a wealth of category-based knowledge. These processes include the activation of self-outgroup associations (identification), group characteristics (stereotypes), and evaluations (prejudice). We then examine the implications of the activation of these constructs for a range of social judgments, including emotion identification, empathy for outgroups, and decision making and behaviors in an intergroup context. Finally, we explore strategies to reduce these biases.

The importance of initial categorical processes and the accompanying activation of group-based knowledge to intergroup relations is undeniable (Dovidio, Kawakami, & Gaertner, 2002; Dovidio, Kawakami, Johnson, Johnson, & Howard, 1997; Fiske, 1998). Yet the way we measure intergroup processes and biases has changed dramatically over the past 20 years (Gawronski & Payne, 2011; Sherman et al., 2008), and these advances, in turn, have significantly influenced how we conceive of these processes.

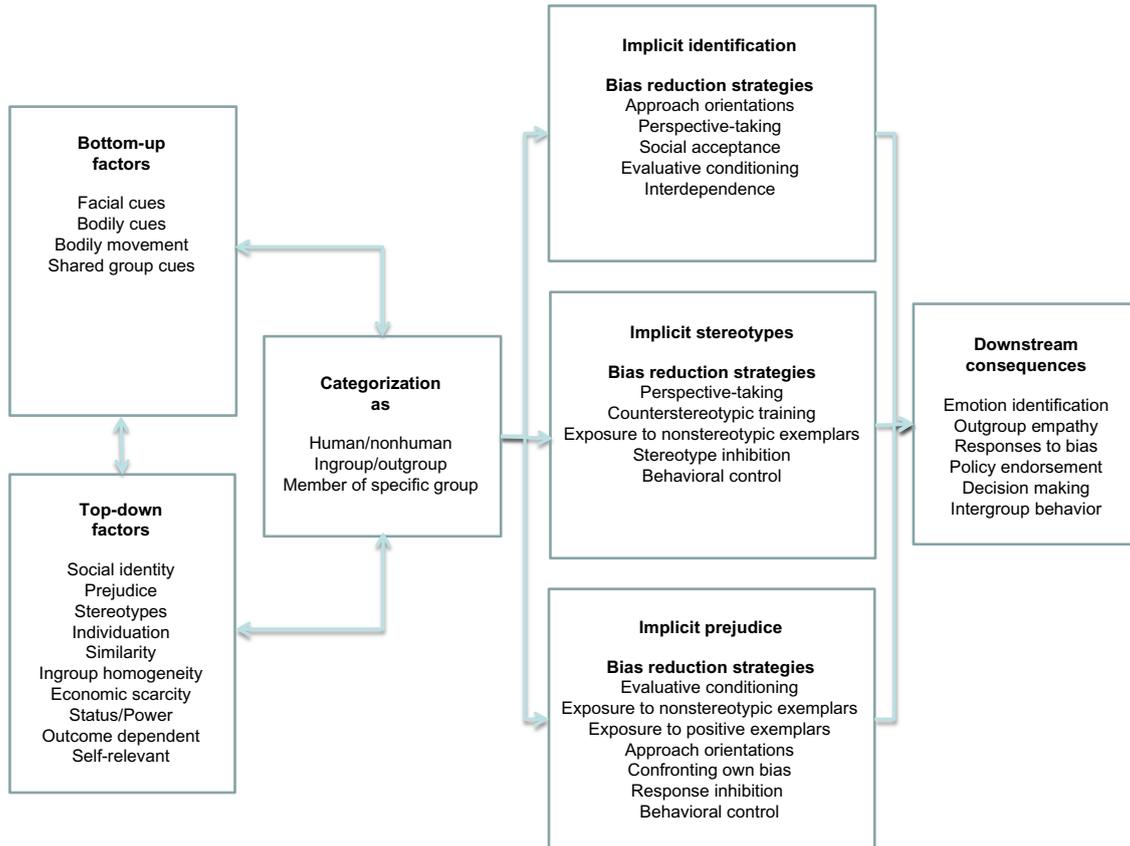


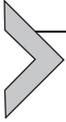
Fig. 1 A framework for understanding the causes and consequences of social categorization.

Today, the term *intergroup bias* includes a broad collection of reactions to outgroup category members, ranging from the earliest stages of neural responses associated with face encoding and affective responses, to shifts in attention and eye gaze, to the automatic activation of conceptual associations, to manifold downstream consequences that include deficits in emotion recognition and identification of outgroup faces, and ultimately a lowered willingness to interact with an outgroup member. The list goes on.

One important distinction in the conceptualization and measurement of these biases is between explicit and implicit processes (Amodio & Mendoza, 2010; Dovidio, Gaertner, & Kawakami, 2010; Greenwald & Banaji, 1995). Unlike explicit biases, implicit processes can operate outside of conscious awareness. In particular, people may be unaware that they possess specific associations with social categories or unaware of how these associations affect their responses to outgroup members. This distinction is important in an intergroup context because we live in a society with strong norms against racial prejudice that discourage expressions of bias (Crandall, Eshleman, & O'Brien, 2002; Nosek, Hawkins, & Frazier, 2012; Plant & Devine, 1998). Because of these standards, people are motivated to avoid acting in ways that would indicate that they are treating people from other groups differently (Apfelbaum, Sommers, & Norton, 2008; Kawakami, Karmali, et al., under review; Norton, Sommers, Apfelbaum, Pura, & Ariely, 2006). Responses on measures targeting implicit constructs are typically considered to be less controllable and thus are often more negative and show more bias than responses on measures targeting explicit processes (Dovidio, Kawakami, Smoak, & Gaertner, 2009; Nosek, 2007). In this chapter, we focus for the most part on implicit processes.

A primary goal of the current framework, however, is also to move beyond the common binary implicit–explicit framework (Amodio, 2014b). By doing so, we can investigate not just whether a process is implicit or explicit, but rather focus more on the specific function served by a mental process in intergroup categorizations and social interactions. This framework allows us to delve deeper into the complex ways in which we discriminate based on initial categorical information. Although early stage processing of categorical features is often considered implicit because of the limited processing time related to these measures (Amodio, Harmon-Jones, & Devine, 2003; Bean et al., 2012; Ito & Urland, 2005), later stage responding and interacting with category members can also be implicit (Bargh & Williams, 2006). In this chapter, we highlight a process-focused approach related to initial early and later stages of person construal and

factors that can potentially influence this process. Our goals are to provide a nuanced understanding of intergroup biases and to suggest new ways to reduce the negative impact of perceived category membership.



1. PERSON CONSTRUAL

Human survival depends on group living—on the sharing of resources and protection within a group and the ability to manage coalitions and conflicts with other groups. For the social psychologist, this fundamental reliance on group membership raises a crucial question: how do we determine which people belong to which groups? According to classic theory on intergroup relations, the starting point for intergroup relations is social categorization—the cognitive process of classifying people according to their social category (Allport, 1954; Campbell, 1965; Tajfel & Turner, 1979, 1986). However, recent research on person construal (Freeman & Ambady, 2011) and social vision (Johnson & Adams, 2013; Johnson, Lick, & Carpinella, 2015; Ofan, Rubin, & Amodio, 2011; Ratner & Amodio, 2013) has pushed back the starting point for understanding intergroup relations to the basic perceptual building blocks of explicating how low-level perceptual processing of features of others, such as facial cues, bodily cues, and vocal cues, can be extracted and integrated to categorize them. Put simply, this emerging body of research investigates not only the implications of social categorization, but its determinants as well.

The traditional approach to social categorization assumed a “feed-forward” process, whereby early perceptual cues of stimuli are spontaneously extracted and lead in a bottom-up manner to a single, dominant categorization of the stimulus (for review, see Freeman & Johnson, 2016; Macrae & Bodenhausen, 2000). Indeed, it is the case that bottom-up features from stimuli play a significant role in categorization; perceivers are very sensitive to category-diagnostic cues of race or sex in others’ faces and bodies. In race categorizations, facial features such as skin color and facial physiognomy are important in category decisions about others; for example, targets with darker skin tone and more Afrocentric facial features are more likely to be categorized as Black (Dunham, Stepanova, Dotsch, & Todorov, 2015; Krosch & Amodio, 2014; MacLin & Malpass, 2001, 2003; Stepanova & Strube, 2009, 2012a, 2012b). Further, targets with more prototypical phenotypic characteristics are ascribed more stereotypic traits, behaviors, and outcomes (Blair, Judd, & Chapleau, 2004; Blair, Judd, Sadler, & Jenkins, 2002; Eberhardt,

Davies, Purdie-Vaughns, & Johnson, 2006; Maddox, 2004; Maddox & Gray, 2002; but see Wilson & Rule, 2015).

More recently, however, a number of theorists have challenged this feed-forward perspective on categorization, arguing instead that categorization is the product of both bottom-up and top-down influences. Indeed, in their influential dynamic interactive theory of person construal, Freeman and Ambady (2011) argue that low-level perception and higher-order social cognition interact over time to create a relatively stable categorization of targets. Thus, whereas perceptual cues of targets can and do feed forward to influence categorization, so too can top-down expectancies and motives feed downward to affect categorization. Finally, from Freeman and Ambady's perspective, both bottom-up and top-down sources of person construal mutually constrain one another in a connectionist model, which allows categories to be mutually activated (e.g., simultaneous activation of male and female categories) and to change over time, ultimately settling into a stable categorization of a target (e.g., as either male or female).

Adopting this same perspective that both bottom-up cues of stimuli and top-down beliefs and motives of perceivers interact to determine person construals, we first address how bottom-up cues of targets can be used to generate social categorizations of others. Specifically, we highlight (1) how people extract key information from the faces and bodies of others, (2) how this information signals whether others are human (or not), and (3) how this information signals a person's social group membership. We then discuss how top-down characteristics of the perceiver (e.g., expectations, attitudes, stereotypes) or the situation (e.g., intergroup motives, intergroup anxiety) can influence these categorization decisions and feed down into the perceptual stream to alter the meaning or interpretation of the original percept.

1.1 Perceiving Persons and Groups From the "Bottom-Up"

Person perception often begins when light reflected off a face hits the retina. This initial percept triggers a chain of bottom-up processes through which the mind encodes it as a face, determines its physical attributes and identity, and begins to infer social categories and its significance to the perceiver. In this section, we describe research on the bottom-up processes through which others' faces and bodies are resolved into person construals, before moving to a discussion of top-down effects.

1.1.1 Basic Processes in Face Perception: Cognitive Processes, Neural Structures, and Intergroup Effects

Faces, it seems, are special in a number of ways. Perhaps most important for the current work, faces are a rich source of social information, providing key cues to others' identities, their intentions and goals, and their social group memberships—a point to which we return below (see [Hugenberg & Wilson, 2013](#), for a review). Successful intragroup and interpersonal functioning depends on our ability to read others' faces. Successful coalition building relies in part on the ability to extract and recall the identities of others. Remembering people who are allies and ingroup members and those who are enemies and outgroup members is a necessary condition for group living and navigating intergroup contexts ([Pokorny & de Waal, 2009](#)). Similarly, facial cues are highly valuable in regulating social interactions ([Argyle & Cook, 1976](#); [Frischen, Bayliss, & Tipper, 2007](#)). Gazing toward a speaker can indicate interest ([Richmond, McCroskey, & Hickson, 2008](#)) and signal impending interaction ([Khalid, Deska, & Hugenberg, 2016](#)), whereas gazing away can signal disinterest or even social rejection ([Wirth, Sacco, Hugenberg, & Williams, 2010](#)). Others' faces can tell us what they are thinking, what they are feeling, and help us predict what they are likely to do ([Cañadas, Lupiáñez, Kawakami, Niedenthal, & Rodríguez-Bailón, 2015](#); [Fridlund, 1994](#); [Nummenmaa, Hyönä, & Hietanen, 2009](#)). Put simply, extracting information from others' faces appears to be a key skill for a group dwelling species like our own.

But faces are special not just because they provide a rich source of information for navigating intra- and intergroup life, but also because of the way that they are processed in the brain. Specifically, faces appear distinct from nonface stimuli in at least two ways: first, faces are processed in a manner that occurs for very few other stimuli. Second, processing appears to be supported by neural structures that are specifically sensitive to faces.

Human's process faces in a manner dissimilar from virtually all other stimuli by integrating the individual features of the face into a unified Gestalt, a process known as *configural face encoding* ([Maurer, Le Grand, & Mondloch, 2002](#)).^a Whereas objects are not processed configurally by most perceivers, in that we can identify them easily in different orientations and with variations in features ([Tanaka & Gauthier, 1997](#)), most faces are. One can easily see the effects of configural processing using the well-established

^a In accordance with [Maurer et al. \(2002\)](#), we define holistic processing as a subset of configural processing.

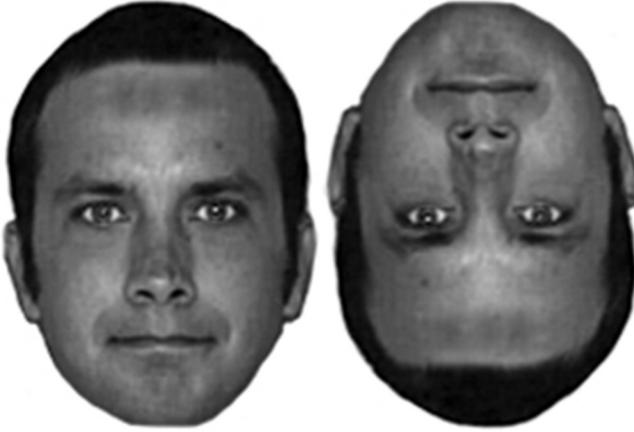


Fig. 2 Upright faces, but not inverted faces, are processed configurally.

face inversion paradigm (Yin, 1969). When the typical eyes-over-nose-over-mouth configuration of features in faces is disrupted by inverting a face, this dramatically reduces perceivers' ability to process the stimulus (see Fig. 2). Face inversion undermines memory for faces, but not for nonface objects such as aircraft and houses (see Valentine, 1988, for a review).

Additional support for the notion of face-specific processing comes from research on *prosopagnosia*, a neurological disorder typically associated with damage or congenital malfunction in the fusiform cortex. People with prosopagnosia are unable to recognize faces of known individuals—an impairment rooted in the inability to process faces configurally (Barton, Press, Keenan, & O'Connor, 2002; Riddoch, Johnston, Bracewell, Boutsen, & Humphreys, 2008). Whereas prosopagnosics can typically process the individual features of faces—eyes, noses, mouths—and even recognize faces by distinct features (such as Gorbachev's prominent birthmark), they cannot fit the features of a face together into a coherent Gestalt. This deficit is striking given the ease with which healthy individuals process faces configurally (Gauthier, Curran, Curby, & Collins, 2003; Tanaka & Curran, 2001), and it highlights the specialized capacity humans have for perceiving faces compared with other stimuli.

Faces also appear to be processed in specialized regions of the healthy brain (Kanwisher, McDermott, & Chun, 1997). Haxby, Hoffman, and Gobbini (2000) described the neural process of face perception in terms of a core network for face encoding and an extended network supporting effects of person knowledge, social factors, and emotional expression.

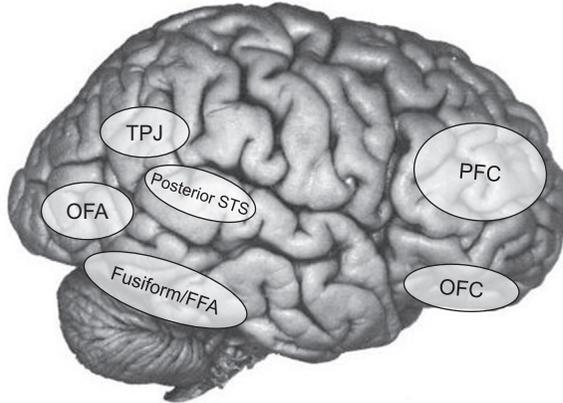


Fig. 3 Lateral view of brain indicating the *occipital face area* (OFA) in the inferior occipital cortex, the *fusiform face area* (FFA) in the fusiform cortex, the posterior superior temporal sulcus (STS), the temporoparietal junction (TPJ), the prefrontal cortex (PFC), and the orbital frontal cortex (OFC).

According to this useful framework (see Fig. 3), the core network includes (but is not limited to) the inferior occipital gyrus (i.e., the *occipital face area*; OFA), the lateral fusiform gyrus (i.e., the *fusiform face area*; FFA), and the posterior superior temporal sulcus (pSTS), with greater involvement typically observed in the right hemisphere (Haxby et al., 2001).

Research on the neural substrates of face perception has helped to distinguish different major components of this process. The OFA supports the featural encoding of faces, whereby specific features (e.g., eyes, nose, or mouth) are independently identified and processed. The FFA, by comparison, supports the configural processing of faces (Kanwisher et al., 1997; McCarthy, Puce, Gore, & Allison, 1997), whereby separate features are integrated into a single Gestalt and represented as a holistic face (i.e., another person). The FFA may further support the encoding of individual facial identity (Hoffman & Haxby, 2000). This may help explain why prosopagnosics can extract features without integrating them—the brain has structures that uniquely support these two different operations. Further, this feature integration process occurs early in the perceptual stream; research using event-related potentials (ERP) has isolated a characteristic neural signal in the occipital–temporal region (N170) at approximately 170 ms after stimulus onset that likely reflects early configural processing (Bentin, Allison, Puce, Perez, & McCarthy, 1996). Although faces are known to elicit greater attention in comparison with most other visual

stimuli (Ro, Russell, & Lavie, 2001; Theeuwes & Van der Stigchel, 2006), research has shown that the N170 response is specifically related to the perceptual encoding of faces and not merely to attention (cf. Jacques & Rossion, 2007). Finally, the STS supports inferences of facial dynamics, including expression and gaze direction (Hasson, Nir, Levy, Fuhrmann, & Malach, 2004; Winston, Henson, Fine-Goulden, & Dolan, 2004). Although these regions are most strongly responsive to faces, other proximal regions are also known to contribute to aspects of face identification (Grill-Spector, Knouf, & Kanwisher, 2004; Hanson, Matsuka, & Haxby, 2004; Haxby et al., 2000).

Components of this “core network” receive input from regions associated with emotion, including the amygdala, orbital frontal cortex (OFC), and insula, and with social cognition, including the medial prefrontal cortex (mPFC), temporoparietal junction (TPJ), and posterior cingulate cortex (PCC). It is believed that this “extended network” modulates the operations of the FFA and other core structures to facilitate the perception of a target’s personal identity, emotional expression, and intentions (Fairhall & Ishai, 2007; Gauthier et al., 2000). For example, in support of this framework, faces expressing anger and fear have been found to enhance activity in the amygdala, insula, and OFC, as noted earlier, and these activations are believed to shape high-level visual and cognitive processes (Bar et al., 2006; Freeman, Ambady, & Holcomb, 2010).

1.1.2 Configural Face Processing and Intergroup Relations

Importantly, research has recently demonstrated that even these earliest stages of face processing can be both cause and consequence of intergroup distinctions and motives. In the current work, we focus on two links between early facial feature integration processes and intergroup processes. First, we discuss how configural face processing (or the lack thereof) is implicated in dehumanization, and second, we discuss how configural face processing can be influenced by intergroup motives.

1.1.2.1 Perceptual Dehumanization

Configural face processing appears to serve as a cue for whether a face is actually a conspecific. Put simply, configural face processing appears to cue humanness, and conversely, the failure to process a face configurally can trigger or signal dehumanization. This hypothesis that dehumanization and configural face processing are mutually caused has received support from a number of sources. Specifically, there is indirect evidence indicating that dehumanized outgroups are often not processed configurally to the same

extent as are ingroups, with different types of faces eliciting differential levels of configural processing. For example, research using composite face tasks reliably finds that outgroups are typically afforded less configural face processing than ingroups (Hugenberg & Corneille, 2009; Michel, Rossion, Han, Chung, & Caldara, 2006; see also Ratner & Amodio, 2013, for neural evidence from the N170). Similarly, facially stigmatized individuals also elicit less configural face processing. Because facial stigmas attract visual attention to the specific stigmatizing feature (feature-based processing; Madera & Hebl, 2012), they can undermine perceivers' ability to process the face (Ackerman et al., 2009). Further, objectified groups, such as sexually objectified women, are perceptually processed more like objects and less like humans, as compared to sexualized men. Specifically, Bernard, Gervais, Allen, Campomizzi, and Klein (2012) employed an inversion task in which they briefly flashed the image of a sexualized man or woman (i.e., nearly nude), either upright or inverted, and then showed participants images of two targets (one actual and one distractor) and asked which they had seen. For male targets, inversion disrupted recognition, which is typical of configurally processed targets (e.g., human faces). For female targets, however, inversion did not influence recognition, a result more typical of objects. Conversely, nonhuman stimuli with humanlike face configurations are spontaneously anthropomorphized. For example, Windhager et al. (2012) found that face-like configurations in the front end of cars (with headlights mapped to eyes and grills mapped to mouths) elicited anthropomorphism. Cars with headlight-to-grill configurations that appeared wider and more angular (i.e., more like a mature face) were seen as more dominant, relative to their rounder (i.e., more like a neotonous face) counterparts.

This argument that configural face processing can trigger ascriptions of humanity has received direct support as well. For example, Hugenberg et al. (2016) recently demonstrated that face inversion disrupts the signal that a face is human—in essence, we found that dehumanization can occur from the “bottom-up.” In our first study, participants completed a modified lexical decision task (LDT). In each trial, participants first saw an upright or an inverted face for 100 ms, followed immediately by a letter string that was a word or a pronounceable nonword. Critically, the actual words in the LDT were either related to humans (e.g., human, person) or machines (e.g., machine, device). We found that upright but not inverted faces facilitated recognition of human-related words. Thus, disrupting configural face processing (via inversion) disrupted the ability of the face to activate human-related concepts.

In a second study, participants were tasked with categorizing a series of upright and inverted human and chimpanzee faces as humans and animals, respectively. Whereas inversion inhibited the categorization of human faces, inversion had no effect on the categorization speed of chimpanzee faces. Thus, the signal that a target is human appears to stem in part from the face configuration, whereas the signal that a target is a chimpanzee may be extracted from features alone. Finally, in a third study, participants were tasked with rating upright and inverted human faces on a variety of personality traits indicative of humanness (e.g., humanlike, creative). The results showed that inverted faces were rated as having lower levels of humanlike characteristics; even the most face valid dimension of humanity—humanlike—yielded the same pattern of results (see [Fincher & Tetlock, 2016](#), for similar results).

In another recent study, we ([Cassidy et al., under review](#)) found that the race of targets also moderated these effects of inversion on ascriptions of humanness. Specifically, for White perceivers, inverted Black faces were especially strongly dehumanized, relative to both upright Black and both inverted and upright White faces. Thus, for an outgroup already targeted with dehumanizing associations and ideologies ([Goff, Eberhardt, Williams, & Jackson, 2008](#)), disrupting the perceptual signal of humanness appears to have a particularly potent effect.

Finally, recent evidence indicates that this link between configural processing and perceptual dehumanization may actually be the result of a *specific* facial configuration: facial width-to-height ratio (fWHR). Across 10 studies, we ([Deska, Lloyd, & Hugenberg, under review-a](#)) have demonstrated that faces with a larger fWHR are seen as less than fully human in a broad variety of ways. For example, faces with higher fWHR are infrahumanized (as less able to experience secondary emotions; [Leyens et al., 2000](#)), are both animalistically and mechanistically dehumanized ([Haslam, 2006](#)), are denied agentic characteristics such as the ability to self-regulate ([Gray, Gray, & Wegner, 2007](#)), and are overtly likened to humans' evolutionary ancestors ([Kteily, Bruneau, Waytz, & Cotterill, 2015](#)). Further, high fWHR targets are seen as incapable of social roles requiring cognitive and emotional sophistication (e.g., opera critic), but are seen as strong fits to roles that require more brawn than brains (e.g., furniture mover). Although high fWHR targets are not seen as universally bad, they are seen as consistently lacking in human sophistication.

Taken together, these data indicate that the signal that a target is a fellow human appears to arise quite early in the perceptual stream, and can be both cause and consequence of dehumanization. Faces that are not processed

configurally fail to activate human-related concepts, are more difficult to categorize as human, and are seen as lacking in humanlike characteristics. Put simply, the extent to which a person is dehumanized is a product, at least in part, of how faces are perceptually processed, and we believe this underscores how important it is to understand early person construal.

1.1.2.2 Perceptually Unambiguous Categories Are Distinguished Early and Easily From Faces

Most classic models of person perception and intergroup relations argue that some “basic” social categories, such as race, sex, and age, are perceptually obvious and dominant in early social cognition (e.g., Brewer, 1988; Fiske & Neuberg, 1990; Stangor, Lynch, Duan, & Glass, 1992). In fact, social categorization of these perceptually obvious groups does indeed typically occur quickly, effortlessly, and often quite spontaneously in most contexts.

Very rapidly after perceiving a face, low-level perceptual characteristics that distinguish among social categories, such as race, sex, and age, are believed to be extracted quickly by the visual system. Evidence for the early categorization of social features has come from ERP studies, which can assess the effects of social categories on neural responses on the order of milliseconds (Amodio & Bartholow, 2011).

Ito and Urland (2003) first used ERP measures to examine the early and potentially implicit processing of race and gender. In their studies, participants were exposed to faces of White and Black, male and female individuals, and were tasked with simply categorizing the faces by race or sex. The race of the targets affected ERPs as early as 122 ms after stimulus onset, whereas target sex effects occurred approximately 50 ms later. Strikingly, the early neural response to race occurred even when participants were instructed to categorize based on target gender (a pattern that may have reflected implicit racial associations or participant concerns about appearing prejudiced that led them to attend to race rather than gender). Mouchetant-Rostaing, Girard, Bentin, Aguera, and Pernier (2000) demonstrated that targets’ sex had similarly early effects on processing, with sex effects as early as 65 ms (in negative polarity ERP components) and 165 ms (in parietal regions) after stimulus onset. Similar effects for race and sex have been observed with other paradigms as well (Amodio, 2010; Ito & Urland, 2005; Kubota & Ito, 2007; see Amodio, Bartholow, & Ito, 2014, for a review). The brain also responds to age cues on a face very early in the processing stream. Ebner, He, Fichtenholtz, McCarthy, and Johnson (2011), for example, demonstrated

that targets' age (old vs young faces) influenced electrophysiological responses throughout the processing stream, but began as early as 160 ms after stimulus onset.

Because these effects occur so early in the processing stream—sometimes even before the brain typically begins to integrate facial features into a meaningful gestalt (approximately 170 ms after stimulus onset)—they are typically interpreted as revealing bottom-up responses to coarse visual differences between race, sex, and age groups, such as in luminance, low-frequency information (e.g., face shape), or contrast patterns (e.g., skin wrinkles). This means that, at this very early stage of processing, psychologically meaningful categories, such as race, sex, and age, are detected independent of holistic face encoding, and thus separate from the detection of a target's identity.

Furthermore, these perceptually “basic” social categories, of sex, race, and age, also appear to be accurately extracted from faces even when they are seen only briefly or suboptimally. For example, research has demonstrated that a variety of suboptimal viewing conditions, such as face inversion, blurring, and rapid presentation, dramatically interfere with the extraction of a target's identity, but have little effect on the extraction of sex category information (Cloutier, Mason, & Macrae, 2005; Macrae, Quinn, Mason, & Quadflieg, 2005).

Finally, it appears that these “basic” social categories are often extracted from faces spontaneously and without intent (Cañadas, Rodríguez-Bailón, Milliken, & Lupiáñez, 2013). Although intentions to process faces semantically appear to influence the spontaneous extraction of basic categories from faces (Macrae, Bodenhausen, Milne, Thorn, & Castelli, 1997; Macrae et al., 2005; Quinn, Mason, & Macrae, 2009, 2010), research has demonstrated basic social categorization processes even with subliminally presented faces (e.g., Bargh, Chen, & Burrows, 1996; Chen & Bargh, 1997; Macrae & Martin, 2007), indicating that this process is not dependent on intention or awareness.

1.1.2.3 Social Categorization of “Concealable” Categories From Perceptual Cues

Although facial features can be quite informative about social category memberships (e.g., skin tone, facial neotony), some social categories are not immediately apparent from such cues. Instead, many social categories provide only weak or ambiguous phenotypic signals of category membership. For example, sexual orientation has long been considered a “concealable” social category (Herek & Capitano, 1996) because of the absence of reliable physical cues related to sexual orientation. Similarly,

membership in religious categories (highly pertinent for many modern intergroup conflicts; [Neuberg et al., 2014](#)) is often not associated with clear-cut phenotypic cues.

Despite the intuition that these categories have no apparent perceptual features, recent research suggests that people can differentiate between these categories on the basis of surprisingly minimal cues (see [Alaei & Rule, 2016](#); [Tskhay & Rule, 2013](#), for a review). Although it is a matter of some debate, it appears that perceivers are reliably above chance in categorizing the sexual orientation of faces at zero acquaintance ([Rule, Ambady, Adams, & Macrae, 2007, 2008](#); [Rule, Ambady, & Hallett, 2009](#); but see [Cox, Devine, Bischmann, & Hyde, 2015](#)). In line with the premise that sexual orientation is concealable, these categorizations are imperfect, with perceiver accuracy at 60–70% relative to a guessing rate of 50%, and are often worse than base-rate information in ecological settings ([Olivola & Todorov, 2010](#)). Nonetheless, stimulus exposures as low as 50 ms appear sufficient to elicit the above-chance accuracy observed in most studies ([Rule & Ambady, 2008](#)), and gay vs straight stereotypes are activated spontaneously upon presentation of gay and straight male faces ([Rule, Macrae, & Ambady, 2009](#)), suggesting a process that is efficient and that can occur without explicit intentions.

Similar effects have been observed with religious categories as well. For example, in a set of studies, [Rule, Garrett, and Ambady \(2010a\)](#) presented participants with White faces with neutral expressions and no facial hair, head hair, or other potential exogenous cues to category membership, and instructed them to categorize the stimuli as Mormon or non-Mormon. Just as with prior work on sexual orientation, perceivers could categorize the faces by religion at better-than-chance levels (58% accuracy relative to a guessing rate of 50%). Related work ([Rule, Garrett, & Ambady, 2010b](#)) demonstrated that such categorizations also had implications for face recognition.

These findings corroborate effects seen in classic research. For example, [Allport and Kramer \(1946\)](#) reported that perceivers were slightly better than chance (56% accurate relative to a guessing rate of 50%) at distinguishing the religion of pictures of Jewish and non-Jewish faces, an effect that was acutely true for perceivers high in anti-Semitism. Contemporaneously, [Lund and Berg \(1946\)](#) had a group of 18 participants guess the religious tradition of nearly 3000 individuals who they watched walking through a room and heard being interviewed. These judges showed approximately 87% accuracy in categorizing the religious background of the targets. Although such effects have not always been replicated, there appears to be a small but significant

effect in meta-analyses for accuracy in such categorizations (Rice & Mullen, 2003; Tskhay & Rule, 2013).

Political affiliation, too, can be extracted from the face with above-chance accuracy. For example, Rule and Ambady (2010) had participants view pictures of the faces of self-identified Democrats and Republicans (e.g., men and women who ran as Democratic and Republican candidates for the 2004 and 2006 Senate elections; yearbook photographs of people in College Democrat or College Republican clubs on campus). They found that American Democrats and Republicans could be categorized at zero acquaintance with better-than-chance accuracy based on their faces. Olivola and Todorov (2010) reported similar results in a large sample ($N > 1000$) using candidates from the 2002 and 2004 House of Representatives elections.

How is it that perceivers are able to perceive ostensibly “invisible” identities with above-chance accuracy? Generally speaking, this ability appears to be related to the use of partially accurate facial stereotypes (Prothro & Melikian, 1955). For example, to determine sexual orientation, perceivers appear to use the facial masculinity and femininity of faces; men with more feminine face shapes and skin textures are judged as gay more often than men with more masculine face shapes and skin textures (Freeman, Johnson, Ambady, & Rule, 2010). In this way, sex atypicality appears to be reliably used as a cue to determine sexual orientation (Rieger, Linsenmeier, Gygax, & Bailey, 2008). Rule et al. (2010b) demonstrated that the ability to accurately discriminate between Mormon and non-Mormon faces was due primarily to skin health. Mormons tend to lead healthier lifestyles (e.g., no smoking, no drinking, etc.) than non-Mormons, which participants used as a cue for categorization, allowing for above-chance accuracy. Finally, political affiliation, too, has facial correlates related to social categories. Rule and Ambady (2010), for example, demonstrated that stereotypes related to political groups (Republicans stereotyped as powerful; Democrats stereotyped as warm) can facilitate accuracy in categorizations. Not only are faces of Republicans and Democrats more powerful and warm, respectively, but also faces seen as more powerful are more likely to be categorized as Republicans and faces seen as warmer are more likely to be categorized as Democrats. Taken together, these data indicate that early face perception processes, such as the extraction of warmth and dominance cues from faces, can have important downstream consequences for categorization even for apparently ambiguous or concealable categories.

1.1.2.4 Social Categorization From Bodily Cues

Although a variety of social categories can be extracted with surprising facility from faces, recent research has also demonstrated that basic categories can be extracted from body shape and motion as well (for review, see [Johnson & Iida, 2013](#); [Johnson, Pollick, & McKay, 2010](#)). For example, sex and age categorizations can be made with great accuracy from body shape and body motion. The former is perhaps no surprise given sexual dimorphism in body shapes, but the latter—that men and women move in sex-differentiated ways—is perhaps a more nuanced point. Work by [Johnson and Tassinary \(2005, 2007\)](#); see also [Cutting, 1978](#); [Johnson & Iida, 2013](#)) investigated how body shape and body motion jointly influence sex categorization and judgments about masculinity and femininity. In this work, participants observed computer-animated human bodies that varied both in their sexually dimorphic shape (waist-to-hip ratio) and in their sex-typical body motion. Although participants' male/female binary decisions relied heavily on body shape, judgments of targets' masculinity and femininity relied both on sex-typical body shape and body motion, implicating both form and motion in categorization decisions. A person's age, too, can be accurately extracted from their bodily movements. Point-light displays of youthful and aged walkers are easily categorized by age ([Montepare & Zebrowitz-McArthur, 1998](#)) and lead to stereotype consistent inferences; for example, walkers with youthful gaits are rated as more powerful and happier than walkers with older gaits.

Perhaps more surprisingly, other social categories such as sexual orientation and race can also be extracted accurately from bodily cues and dynamic motions. For example, research ([Johnson, Gill, Reichman, & Tassinary, 2007](#)) demonstrated that combinations of sex-typical bodily shapes and bodily movements are used to make judgments that a target is homosexual. Specifically, a masculine body (i.e., high waist-to-hip ratio) with a sex-atypical gait (i.e., hip sway) was often categorized as a gay man. Analogously, a feminine body (i.e., low waist-to-hip ratio) with a sex-atypical gait (i.e., shoulder swagger) was often categorized as a lesbian. Body shape, too, was used to categorize target women's sexual orientation, with higher WHR women being categorized as gay more often than their low WHR counterparts. There is also recent evidence that race can be extracted from bodily movements. [Lick, Golay, and Johnson \(2014\)](#) found that point-light displays of Whites and Asians walking on a treadmill could be discriminated by race at better than chance accuracy. Much like past research on inferring sex or sexual orientation from faces and bodily motion, these categorization

processes appear to rely on partially accurate group stereotypes about Asians having a more feminine gait than Whites (a “kernel of truth” in stereotypes of bodily motion).

Taken together, although much of the existing research on the perceptual cues of categorization rely on facial cues, recent evidence indicates that our ability to extract important intergroup distinctions can be surprisingly accurate from bodily cues, including body shape, how a body moves through space, and the interaction of these factors.

1.1.2.5 Mutually Constrained Categories: Shared Perceptual Cues Can Influence Categorization

Finally, recent research indicates certain social categories actually share perceptual cues, and the shared nature of these perceptual cues makes these categories mutually constraining—the presence of cues of one category makes the stimulus appear to also have the presence of the other category. For example, two longstanding gender stereotypes are that men express anger more than women (Fabes & Martin, 1991) and that women smile more than men (LaFrance, Hecht, & Paluck, 2003).

Although there have been a variety of explanations for this phenomenon, including social norms (e.g., LaFrance et al., 2003), social role expectations (Brody & Hall, 2000), and power (Hall & Halberstadt, 1994), it appears that this effect is at least partially mediated by sexually dimorphic facial structures (see Adams, Hess, & Kleck, 2015, for a review). The facial features that lead to the perception of facial dominance are more typical for men’s faces than for women’s faces (Becker, Kenrick, Neuberg, Blackwell, & Smith, 2007; Hess, Adams, & Kleck, 2004, 2005). For example, men have a more squared jaw, thicker eyebrows, and more prominent brow ridge than do women, all of which are signals of facial dominance. Conversely, women are more likely to have rounder and more neotonous faces, which are facial signals of warmth (Berry & McArthur, 1986). Importantly, these facial structures that signal dominance and warmth are also the same features central to signaling anger and happiness, respectively.

This bottom-up perceptual overlap between sex-typical facial features and expressions has important consequences for categorization. For example, expressions of anger are detected more easily on men’s than on women’s faces, and conversely, expressions of happiness are detected more easily on women’s than on men’s faces, which is true both for posed expressions of actors and for expressions on computer-generated faces (Becker et al., 2007). Similarly, with images of neutral expression, men are often

miscategorized as angry, whereas women are often miscategorized as happy. In our own work, we have found similar confounding between bottom-up cues of sex and facial expression as well. For example, we have found that faces with babyish features (e.g., large eyes) more efficiently signal submissive expressions such as fear and less efficiently signal dominant expressions such as anger (Sacco & Hugenberg, 2009). More recently, we have extended these effects to the specific sexually dimorphic facial cue of fWHR. Even holding target sex constant, faces with a higher fWHR more efficiently communicated anger and less effectively signaled fear (Deska et al., under review-b).

Research by Zebrowitz, Kikuchi, and Fellous (2010) has demonstrated that race, too, has perceptual overlap with some expressions. In this research, Zebrowitz and colleagues trained a connectionist model to distinguish between facial expressions, and then let the model attempt to distinguish between neutral expressions on White, Black, and Asian faces. Of interest was the type of errors the model made. If the model mistook a particular race of face for a particular expression, this error would be strong evidence of perceptual overlap between a race category and an expression. Zebrowitz and colleagues found that whereas White faces objectively resemble angry expressions more than Black or Korean faces, Black faces objectively resemble happy and surprise expressions more than White faces. This may seem surprising given the American cultural stereotype linking Blacks to aggression, and the multiple empirical demonstrations showing a Black-anger link (e.g., Hugenberg & Bodenhausen, 2003, 2004; Hutchings & Haddock, 2008; Kang & Chasteen, 2009; Kubota & Ito, 2014). However, in light of the power of top-down effects in categorization (see later), it is likely that in spite of the objective similarity of Black faces and happiness, stereotypes of African Americans create the illusion of anger on Black faces, even when it is not present.

Similarly, bottom-up cues of race may also be perceptually confounded with bottom-up cues of sex. Put simply, race is gendered. Johnson, Freeman, and Pauker (2012) demonstrated that sex categorization of faces is facilitated when the race and sex category share phenotypic cues (Asian women; Black men) and inhibited when the race and sex category have incompatible cues (Asian men; Black women). Further, this occurs in part because of the perceptual overlap between different racial groups and sex. In their data, Johnson and colleagues found that Black faces were more masculine according to objective face measurements than Asian or White faces. Similarly, Asian faces were objectively more feminine than Black faces.

Taken together, there is strong and accumulating evidence that the way in which we construe others, even in the earliest stages of person perception, can have powerful consequences for categorization and behavior. Indeed, if intergroup relations begin with categorization, these initial categorization processes are critical in determining who is “us” and who is “them.”

1.2 Perceiving Persons and Groups From the “Top-Down”

To this point, we have focused on bottom-up aspects of person perception—that is, the ways in which we determine a person’s social group memberships from his or her physical features alone. However, a long history of social psychological research points to the role of top-down effects, such as expectancies, motivations, prejudice, and prior knowledge, in influencing our perceptions and judgments of people (Allport, 1954; Brewer, 1988; Fiske & Neuberg, 1990; Kunda & Thagard, 1996). Furthermore, recent evidence suggests that these top-down influences may even shape the early visual processing of faces such that motivation and cognition may interact with bottom-up signals to shape our perceptions of people based on their group membership (Bernstein, Young, Brown, Sacco, & Claypool, 2008; Ofan et al., 2011; Ratner & Amodio, 2013; Van Bavel, Packer, & Cunningham, 2011). In this section we describe research that has challenged pure bottom-up models of face processing to suggest that our social goals and knowledge might also shape how we see people.

1.2.1 Group-Based Influences on Visual Processing

Whereas the top-down effects of intergroup factors on social cognition are well known, scientists have only recently begun to ask whether these factors can also affect our visual perceptions. Mounting evidence supports the idea that social and motivational factors can alter aspects of visual processing such as the size of, or distance to, a target (Balcetis & Dunning, 2006; Bruner & Postman, 1949; Dunning & Balcetis, 2013; Proffitt, Stefanucci, Banton, & Epstein, 2003). Findings such as these have inspired the recent *social vision* movement in person perception (Adams, Ambady, Nakayama, & Shimojo, 2010; Balcetis & Lassiter, 2010; Freeman & Johnson, 2016), along with a new focus on the motivated perception of race (Amodio, 2010). Research in this area investigates whether social and motivational factors can alter the earliest perceptual processes such that it changes the way we actually *see* someone.

There is currently much debate on whether top-down factors such as social identity, motives, or attitudes can influence visual perception per se

(i.e., we actually *see* the stimuli differently), as opposed to cognitions and behaviors that contribute to perceptual *judgments* (i.e., we *judge* the stimuli differently; see Deska, Lloyd, & Hugenberg, 2016; Firestone & Scholl, in press; Xiao, Coppin, & Van Bavel, 2016). Thus, obtaining clear evidence for top-down intergroup effects on visual processing has been a major challenge. Researchers have approached this issue with methods from visual psychophysics and neuroscience to assess low-level components of face processing. These studies have generally addressed two broad questions: do social factors influence the initial configural encoding of a face? And to what extent do social factors affect our perception of facial features and expressions?

There is abundant research demonstrating the own group bias (OGB)—the pervasive effect whereby face recognition is worse for outgroup relative to ingroup members. An early fMRI study by Golby, Gabrieli, Chiao, and Eberhardt (2001) addressed whether the OGB, as observed with White American participants, was associated with differences in low-level face processing, as indicated by activity in the fusiform cortex. Participants viewed a series of Black and White faces and, as in prior research, showed better recognition memory for ingroup White faces than outgroup Black faces. Moreover, participants exhibited stronger activity in the fusiform cortex when viewing White faces than Black faces, suggesting that the OGB may be due, in part, to reduced visual processing of outgroup faces (beyond differences in attention).

Subsequent research explored the possibility that group membership affects the configural processing of a face—that is, the initial encoding of an object as a human face. Research by Michel and colleagues (Michel, Corneille, & Rossion, 2007; Michel et al., 2006) borrowed methods from visual psychophysics to test whether configural face processing is impaired for outgroup faces. One method makes use of the *face composite effect*. When the top half of one face is paired with the bottom halves of two different faces, to create novel face stimuli, participants typically perceive the (identical) top halves of each pairing to represent different identities. However, if the top and bottom faces are offset even slightly, the top halves are perceived to be the same person. The explanation for this effect is that when faces are perfectly aligned, the mind processes the face configurally as a whole, and so the top half is perceived in the context of the bottom half. When the faces are offset, configural processing is disrupted. Because the perceiver then relies on featural processing, the separate identities of the top and bottom halves can be distinguished. These researchers found that the split face illusion

occurred more strongly for ingroup White faces than outgroup Asian faces, suggesting a reduced tendency to process Asian outgroup faces configurally. Although these effects have been attributed to the potential motivational effects of intergroup contexts or the differential familiarity with ingroup and outgroup faces, it turns out that both factors play an important role in the differential processing of ingroup and outgroup faces (see [Hugenberg et al., 2010](#), for a review), and both provide initial evidence for top-down effects of group membership on face perception.

1.2.2 Novel Group Effects on Face Encoding Processes

To more directly assess whether group membership can have top-down effects on how we perceive faces, researchers have turned to neuroimaging methods, such as ERP and fMRI, to assess patterns of neural activity associated with early stages of face processing. The N170 component of the ERP, in particular, provides a relatively precise index of early configural face processing. Because the N170 occurs at approximately 170 ms after face onset, it is believed to represent the precise moment when an object is encoded as a human face. Because this effect occurs so quickly, and in the occipitotemporal cortex, it is assumed to represent an implicit and automatic process. Thus, group membership effects on the N170 constitute strong evidence of top-down social category effects in vision.

Early investigations of race effects on ERP responses were promising but produced somewhat mixed results. Whereas some studies observed no differences ([Caldara, Rossion, Bovet, & Hauert, 2004](#); [Caldara et al., 2003](#); [He, Johnson, Dovidio, & McCarthy, 2009](#); [Wiese, Stahl, & Schweinberger, 2009](#)), others observed larger N170 effects for the ingroup ([Ito & Urland, 2005](#)), and still others observed larger effects for the outgroup ([Walker, Silvert, Hewstone, & Nobre, 2008](#)). These inconsistencies appear to be due to differences in the experimental tasks employed across the various studies, which in turn may have led participants to approach the presented faces differently. For example, tasks that involve the categorization of race (or gender) may focus participants on categorical differences (e.g., [Ito & Urland, 2005](#)), whereas memory tasks (e.g., n-back tasks) do not ([Walker et al., 2008](#)). In addition, early N170 studies of race perception used either full color or grayscale pictures that did not control low-level visual factors, such as luminance and contrast, which could also influence N170 responses, especially for White and Black target faces. These issues were dealt with in two ways: by using more rigorously controlled visual stimuli and by examining patterns

of N170 response as a function of theoretically meaningful psychological variables, such as individual differences and situational factors.

In one such example, fMRI research on novel group effects revealed stronger fusiform activity in response to ingroup than outgroup members' faces (Van Bavel et al., 2011), which suggested the possibility that group membership may influence the perceptual processing of faces. In order to more precisely determine whether mere group membership can affect the perceiver's ability to configurally encode a face, we (Ratner & Amodio, 2013) used the classic minimal group paradigm to create novel group identities in the lab (Tajfel, Billig, Bundy, & Flament, 1971). Using this procedure, participants were introduced to a novel social distinction—in this case, a bogus trait called numerical estimation style, whereby some people purportedly overestimate the number of objects in their visual field and others underestimate this number. After completing a test to ostensibly assess their own numerical estimation style, participants completed a task in which their goal was to identify another person's numerical estimation style from facial appearance alone. To “help them out,” the background color in the image indicated the group membership. We were able to do this because the N170 is not sensitive to background color but only to facial configuration. Thus, while viewing faces of college-aged White males during EEG recording, participants indicated whether the person was more likely to be an underestimator or overestimator. Not surprisingly, participants nearly always made judgments consistent with the background color. Importantly, we observed significantly larger N170 amplitudes in response to novel ingroup faces than outgroup faces, indicating that even this very minimal social categorization was sufficient to influence the initial encoding of faces. That is, ingroup faces were perceived as more face-like than outgroup faces in the brain, suggesting that social categories can penetrate the earliest stages of face processing. Moreover, because all face images were of young White males and the group distinction was arbitrary, the effect could not be explained by low-level perceptual features.

If mere group membership alters the perception of faces, how might these differences appear to the perceiver? In an attempt to answer this question, Ratner, Dotsch, Wigboldus, van Knippenberg, and Amodio (2014) used a reverse correlation image classification method to visualize participants' spontaneous mental images of minimal ingroup and outgroup faces. This technique was borrowed from Dotsch, Wigboldus, Langner, and van Knippenberg (2008; see also Mangini & Biederman, 2004), who demonstrated its ability to reveal participants' mental images of a variety of existing

social groups (e.g., African American, Dutch, and Chinese faces). In our study (Ratner et al., 2014), participants were first induced to identify with the novel group of either overestimators or underestimators. Immediately following this induction, participants were instructed to complete a face categorization task in which they were presented with a pair of faces. Half of the participants decided which of the two was an overestimator; the other half decided which was an underestimator. Importantly, these faces were created by superimposing quasi-random visual noise onto a single base face image (see Fig. 4). This noise created subtle distortions that made each face seem slightly different, and the assumption was that participants would choose the face in each pair that more closely matched the image of an overestimator (or underestimator) in their minds.

The selected facial images across 400 trials were averaged into a composite image such that the average noise patterns would reveal an approximation of participants' mental image of either an ingroup or an outgroup face. When these composite images of ingroup and outgroup faces were presented to a new participant sample, naïve to their origin, the ingroup face was judged to appear significantly more attractive, intelligent, and trustworthy than the outgroup face. Moreover, subsequent studies showed that ingroup face images produced more implicit positive attitudes and elicited greater trust behavior relative to outgroup faces. In an additional study, participants classified face pairs according to which appeared more trustworthy, and pixel-by-pixel comparisons revealed that the trustworthy composite face was highly correlated with the ingroup face but not with the outgroup

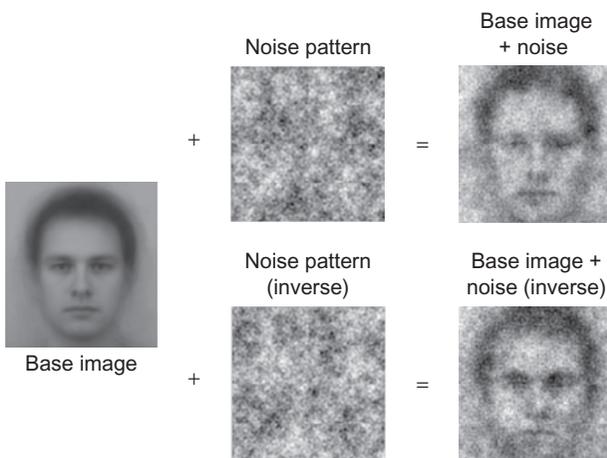


Fig. 4 Stimuli creation in a reverse correlation paradigm.

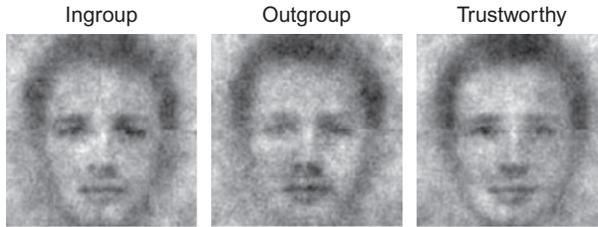


Fig. 5 Face representations rendered by reverse correlations (Ratner et al., 2014).

face (see Fig. 5). Interestingly, these effects were primarily driven by similarity in the eyes rather than the nose or mouth—a finding consistent with evidence that group membership affects attention to the eyes of ingroup vs outgroup members (Kawakami et al., 2014). Although the reverse correlation method cannot provide a direct readout of a person’s perceptual experience, it offers a clue to how, in visual terms, group membership may influence the perception of faces in a top-down fashion.

Whereas the configural processing of ingroup member faces is enhanced in minimal group contexts, interracial contexts are more complex. To the extent that the outgroup is considered a threat, outgroup faces may receive enhanced attention and visual processing. By contrast, to the extent that the outgroup is considered irrelevant or objectified, it may receive reduced attention and visual processing. In order to study differences in the early visual processing of White and Black faces, we (Ofan et al., 2011) created two-tone face stimuli, in which the images were composed of only white and black pixels, and the proportion of black to white pixels was equated across faces stimuli. Using these highly controlled stimuli, we found larger N170 responses to Black faces among White participants with high implicit prejudice (Ofan et al., 2011) when they felt anxious about revealing prejudices to others (Ofan, Rubin, & Amodio, 2014) and when they were induced to experience feelings of high power (Schmid & Amodio, 2016). In each of these cases, early visual encoding of the racial outgroup was enhanced in the context of outgroup threat.

Other research has examined the visual processing of racial outgroup faces in contexts where they may be objectified. Much prior evidence shows that resource scarcity and competition increases prejudice (Butz & Yogeeswaran, 2011; Esses, Jackson, & Armstrong, 1998; King, Knight, & Hebl, 2010; Quillian, 1995; Stephan et al., 2002; Stephan, Renfro, Esses, Stephan, & Martin, 2005; Stephan, Ybarra, & Bachman, 1999) and discrimination (Brewer & Silver, 1978; LeVine & Campbell, 1972;

Sherif & Sherif, 1953; Taylor, Kochhar, & Fry, 2011) toward the outgroup. In a series of studies, we (Krosch & Amodio, 2014, *under review*) tested whether perceptions of scarcity lead White Americans to view Black faces in ways that might somehow justify their worse treatment. In an ERP study, participants completed a resource allocation task, in which they decided how much money to give Black and White recipients. Participants were led to believe that the amount of money available for their allocations was scarce or abundant. We found that scarcity produced a selective delay in the N170 response for Black faces compared with White faces, relative to the control condition—a pattern of impaired configural processing typically observed for inverted faces that suggests a dehumanized perception (Hugenberg et al., 2016; Rossion et al., 2000). Moreover, mediation analysis showed that the degree of this effect predicted the extent to which perceived scarcity caused anti-Black disparities in participants' money allocations. In other words, scarcity induced the dehumanized perception of Blacks, which was in turn related to worse treatment.

We further probed this pattern of visual dehumanization under scarcity in an fMRI study. Using the same experimental task, we (Krosch & Amodio, *under review*) found that scarcity produced a selective decrease in fusiform cortex activity to Black faces but not Whites faces. Moreover, this reduction in fusiform activity was linked to decreased activity in the striatum—a neural structure associated with reward and valuation—which in turn mediated the effect of the fusiform activity on anti-Black money allocations. In other words, the visual dehumanization effect for Black faces under scarcity was associated with decreased reward processing, which then predicted reduced allocations.

In related work, we (Krosch & Amodio, 2014) proposed that perceived resource scarcity may lead people to see Blacks as “Blacker” and more “stereotypical,” which may facilitate the tendency to discriminate. This proposal builds on research showing that Black people with darker skin tone and more stereotypical (e.g., Afrocentric) features are subjected to greater racism (Eberhardt, Dasgupta, & Banaszynski, 2003; Eberhardt et al., 2006; Maddox, 2004), as well as research showing that cues to a biracial person's high or low status influences whether they are categorized as Black or White (Freeman, Penner, Saperstein, Scheutz, & Ambady, 2011). We (Krosch & Amodio, 2014) found that perceived scarcity reduced participants' threshold for deciding that a mixed-race face was Black, as opposed to White. Furthermore, reverse correlation methods revealed that scarcity led participants to visualize Black faces as appearing more stereotypically Black and darker in

skin tone, which in turn predicted lower cash allocations to Black than White recipients. That is, scarcity led people to view Black faces as “Blacker.” Together, these studies reveal that perceived economic scarcity had a top-down influence on visual representations of Black people in a manner that propagated discrimination.

Recent research by [Fincher and Tetlock \(2016\)](#) has also demonstrated a top-down link between dehumanization and reduced configural processing in the context of norm violation within a group. Their core hypothesis was that the faces of norm violators—people who broke the social contract—would be processed less configurally than norm followers. To test this hypothesis, these researchers manipulated the extent to which targets were seen as immoral norm violators (e.g., individuals who stole money) or moral actors (e.g., individuals who donated money). They then measured the extent to which the faces of these immoral and moral individuals were processed configurally using multiple measurement paradigms. Across the studies, the authors found that norm violators were processed less configurally than were norm followers. Importantly, this failure to process the faces of norm violators configurally had downstream consequences for social judgment. Processing a face configurally—as we normally process our fellow humans—reduced the drive to punish perpetrators. Just as we ([Krosch & Amodio, under review](#)) found that reduced configural processing of Black faces was related to lower money allocation, [Fincher and Tetlock \(2016\)](#) found that it was easier to punish faces that were processed in perceptually different ways than typical human faces in the context of norm violations.

It is interesting to note that, in our studies, intergroup bias in visual processing is typically related to implicit attitudes and motivations to promote the ingroup’s interests, even in cases where a perceiver may consciously endorse egalitarianism. In the case of intergroup bias ([Krosch & Amodio, 2014](#); [Ratner et al., 2014](#)), it appears that participants’ implicit motivation is to discriminate, and perceptual processes serve to facilitate this motive. In the context of within-group norm violations ([Fincher & Tetlock, 2016](#)), the motivation is to maintain pro-ingroup benefits through punishment ([Mendoza, Lane, & Amodio, 2014](#)). Because visual perception is a largely implicit process, it appears that group-based effects are especially conducive to implicit attitudes and motives ([Dovidio, Gaertner, Kawakami, & Hodson, 2002](#); [Dovidio et al., 1997](#)). Indeed, because attentional preferences are difficult for a perceiver to detect, implicit biases expressed through a visual pathway may be resistant to self-regulation and thus particularly pernicious.

1.2.3 Top-Down Effects on Body Perception

Most research on intergroup perception has focused on the way we process faces. However, group membership and intergroup attitudes may also influence our perception of bodies. For example, researchers have used an effect known as the rubber hand illusion to examine the tendency to feel bodily ownership over limbs that are not our own (Botvinick & Cohen, 1998). To create the rubber hand illusion, a realistic-looking rubber hand is placed on the table in front of a participant, with his/her real hand off to the side and out of sight. Tactile stimulation (e.g., a small paintbrush stroke) is applied to the real and fake hands in synchrony, which typically causes the participant to experience the rubber hand as his/her own. Farmer, Tajadura-Jiménez, and Tsakiris (2012) examined whether the skin color of the rubber hand influenced the experience of body ownership. Indeed, they found that White participants reported a reduced illusion experience when the rubber hand was dark skinned rather than light skinned (i.e., Caucasian). Interestingly, the degree of this effect was stronger for participants with greater implicit anti-Black prejudice (Maister, Sebanz, Knoblich, & Tsakiris, 2013), suggesting a top-down effect on body perception based on racial attitudes. These findings provide additional evidence for the top-down effect of racial group membership on perception. Moreover, they suggest new ideas for prejudice reduction interventions. For example, the experience of being represented by a Black avatar in a virtual reality environment may reduce implicit bias (Peck, Seinfeld, Aglioti, & Slater, 2013).

Recently, we have also explored the relation between stereotypes related to Blacks and aggression and perception of the size of African Americans' bodies (Wilson, Rule, & Hugenberg, under review). Across multiple studies, we found that both White and Black perceivers believe that Black compared to White men are larger (taller, heavier, more muscular), and that this belief distorted judgments of the bodies of Black men. This is true even when Black and White targets are matched for physical size (i.e., actual height and weight) and upper body strength (e.g., max bench press strength). Indeed, even the *same* physical body (color inverted to disguise target race) when paired with a name typical of Blacks is rated as larger and more physically formidable than when paired with a name typical of Whites. Whereas both Whites and Black perceivers rate Black targets as larger, only White perceivers experienced the larger Black male as threatening or potentially harmful. Thus, whereas stereotypes about Blacks' physicality seem to affect body perceptions for both White and Black perceivers, these stereotypes translate into threat differently across perceiver race. Furthermore, this

experienced threat has important downstream consequences. The tendency for Whites to perceive Black male physiques as large and muscular facilitates Whites' justification for the use of force against Black suspects of crimes. When Whites are asked whether using force is necessary to restrain crime suspects, the White participants believe that the Black (relative to White) targets are larger, and that force is more justified to restrain Black (relative to White) targets. Importantly, this size bias for Black targets partially mediated the greater likelihood related to a need for force to detain Black relative to White targets.

1.2.4 Top-Down Influences on Face Categorization and Memory

There is now ample evidence for the influence of perceivers' goals, emotions, and stereotypes on how they categorize faces of ingroup vs outgroup members. Research on race categorization, for example, has examined factors that influence perceivers' classification of a mixed-race face as being of one race or another. Much of this work has examined North American participants' classifications of faces as White or Black. Across studies, there is a general tendency to show a pattern of hypodescent—the policy of assigning multiracial individuals to their lowest status group—such that biracial faces are more likely to be classified as Black than White (Halberstadt, Sherman, & Sherman, 2011; Ho, Roberts, & Gelman, 2015; Ho, Sidanius, Cuddy, & Banaji, 2013; Ho, Sidanius, Levin, & Banaji, 2011; Krosch & Amodio, 2014; Krosch, Berntsen, Amodio, Jost, & Bavel, 2013; Peery & Bodenhausen, 2008). Early work on this effect showed that racial markers, such as hairstyle, influenced the racial categorization of specific facial features (e.g., noses, eyes, and mouths) which then determined their classification (MacLin & Malpass, 2001), and the presentation of a race label along with a biracial face has been shown to influence the racial categorization and subsequent memory of the face (Eberhardt et al., 2003). Contemporary theories have also emphasized the role of attention to outgroup characteristics in this effect such that White participants' strategic attention to outgroup racial markers biased them toward classifying biracial faces as Black more often than White (Halberstadt et al., 2011).

However, recent findings suggest that an individual's prejudices, motivations, and ideologies can influence race categorization beyond purely attentional effects. For example, Ho et al. (2011) demonstrated that hypodescent in race categorization occurs even in the absence of visual cues, such as when participants judged a target individual with two Black and two White grandparents as more likely to be Black than White. This bias is

increased when targets exhibited more hostile expressions and was attenuated when targets show happier expressions—an effect linked to the stereotype of African Americans as hostile—and this effect is associated with an independent measure of the perceivers' implicit prejudice (Hugenberg & Bodenhausen, 2004). Other research has shown that the tendency to categorize biracial faces as Black is enhanced under conditions of economic scarcity (Krosch & Amodio, 2014; Rodeheffer, Hill, & Lord, 2012) and associated with stronger right-wing ideology and social dominance orientation (Ho et al., 2013; Krosch et al., 2013). These patterns have been established by examining the simple frequencies of biracial face classifications, as well as with methods for assessing perceptual thresholds (e.g., assessments of point of subjective equality) adapted from visual psychophysics (Krosch & Amodio, 2014; Krosch et al., 2013).

Top-down effects on the processing of race are also evident in the previously mentioned OGB, in which there is better recognition of ingroup than outgroup faces. Originally studied in the context of racial ingroup and outgroup members (Meissner & Brigham, 2001; Sporer, 2001), this bias has been observed for a variety of group identities, including religion (Rule et al., 2010b), sexual orientation (Rule et al., 2007), political affiliation (Ray, Way, & Hamilton, 2010), social class (Shriver, Young, Hugenberg, Bernstein, & Lanter, 2008), and even seemingly arbitrary group memberships such as university affiliation and personality types (Bernstein, Young, & Hugenberg, 2007; Van Bavel & Cunningham, 2012). Much of the interest in this phenomenon stems from its potential effects in cross-race errors in eyewitness identifications, which account for a disproportionately high number of wrongful convictions (Scheck, Neufeld, & Dwyer, 2000; Wilson, See, Bernstein, Hugenberg, & Chartier, 2014).

Whereas early research hypothesized that these intergroup effects may be due to prejudice, more recent metaanalytic data indicate that prejudice does not fully account for the OGB (Meissner & Brigham, 2001). Instead, in the categorization–individuation model, we have proposed that the OGB is caused by reduced *motivation to individuate* the faces of outgroup members (Hugenberg et al., 2010; see also Hugenberg, Miller, & Claypool, 2007; Hugenberg, Wilson, See, & Young, 2013; Pauker et al., 2009; Van Bavel, Swencionis, O'Connor, & Cunningham, 2012). Indeed, in many intergroup situations, seeing outgroups as relatively homogeneous entities are a commonplace default method of processing social targets (Ostrom & Sedikides, 1992). However, ingroup memberships can serve as a cue for who is self-relevant and worthy of attention and processing

(Correll & Park, 2005). Unless someone has a motivation to move beyond the simple perceptual cues of outgroup faces, these faces are unlikely to receive extensive processing (Ratner & Amodio, 2013).

Importantly, some of our recent work has demonstrated just how this ingroup/outgroup distinction can translate into differential perception of homogeneity. Put simply, the eyes have it. Specifically, Kawakami et al. (2014) found across four studies that perceivers differentially attend to the eyes of ingroup and outgroup members based on racial categories (Whites attend more to the eyes of White faces than Black faces), as well as arbitrary categories (targets believed to share personality types). Importantly, this tendency to favor ingroup eyes when encoding faces has consequences: when spontaneous attention to the eyes was manipulated, greater attention reduced OGB effects and increased willingness to interact with outgroup members (Kawakami et al., 2014; Kawakami, Williams, et al., under review).

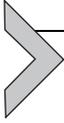
Considering the OGB as the confluence of individuation experience and individuation motivation provides an important window into how intergroup motives can exacerbate or reduce the OGB. In the most straightforward way, the OGB can be eliminated when perceivers are informed about the existence of the OGB and instructed to attend to features that differentiate category members (Hugenberg et al., 2007; Rhodes, Locke, Ewing, & Evangelista, 2009; Young, Bernstein, & Hugenberg, 2010). This motivation to individuate can also come from reward structures in the task or environment itself: paying participants for superior face memory (Kawakami et al., 2014) or rewarding participants with points (at least under some conditions) can also generate sufficient individuation motivation to attenuate the OGB (DeLozier & Rhodes, 2015).

This motivation can also arise from changing the apparent category affiliation of the targets. For example, a number of recent studies have demonstrated that even when the same faces are categorized as ingroup or outgroup members, face memory is influenced according to category (Bernstein et al., 2007; MacLin & Malpass, 2001; Pauker et al., 2009; Young & Hugenberg, 2012). An increased motivation to individuate outgroup faces can also come from the relationship between the self and the outgroup members. For example, perceived interpersonal similarity can reduce the OGB, as can status and power. For example, our research has demonstrated a linear effect in which Black targets that were ostensibly more similar to participants based on a personality test were subsequently better recognized than less similar targets (Kawakami, Williams, et al., under review). Furthermore, Shriver

and Hugenberg (2010) found that racial outgroup members who were in a high status role (e.g., doctor, CEO) or were engaged in behaviors that signified power (e.g., physical threat, demonstrating wealth) were remembered as well as ingroup members. However, low status or low power outgroup members were quite poorly recognized. Similarly, when perceivers were outcome dependent on outgroup members or when they believed that an interaction with outgroup members may be impending, the OGB was eliminated (Baldwin, Keefer, Gravelin, & Biernat, 2013). These findings are consistent with evidence for enhanced neural encoding of Black relative to White faces when participants were induced to worry about appearing prejudiced (Ofan et al., 2014).

Perhaps most provocatively, the presence or absence of the OGB can be dictated entirely by the relationship between the ingroup and the outgroup. For example, Van Bavel and Cunningham (2012) demonstrated that the structure of the intergroup context can determine whether an OGB occurs. In their research, participants' roles were manipulated within groups. Here, participants were randomly assigned to mixed-race groups (the "Moons" and the "Suns"), but were told either that they were "soldiers" who would "remain loyal to the Moons [Suns]" and that their goal would be "to serve the needs of" the ingroup or that they were "spies" who would "remain loyal to the Moons [Suns]" but that their goal would be to "infiltrate" the outgroup. Whereas "soldiers" showed the typical OGB, "spies" showed strong recognition for both the ingroup and outgroup faces. In other words, in a situation structured to make outgroup members functionally interchangeable (soldiers), an OGB was observed, but where one's role demanded individuation of both the ingroup and the outgroup members (spies), the OGB was eliminated. Put simply, when the intergroup context makes outgroup members less relevant, we fail to individuate them, but when the intergroup context makes outgroup members self-relevant, individuation can occur.

Taken together, although the exact relation between individuation experience and individuation motivation is still a matter of some debate (Hugenberg et al., 2013), it is clear that OGBs are driven to a great extent by intergroup motives. Merely categorizing targets as ingroup and outgroup members is sufficient to generate OGBs, recategorizing former outgroup members as ingroup members is sufficient to eliminate OGBs, and being motivated to overcome outgroup homogeneity can overcome OGBs. Top-down intergroup motives play a powerful role in who we remember and who we forget.



2. PERSONS CONSTRUED

Once person construal has stabilized, the categorization of a target individual into a social group has a host of downstream consequences. These consequences include the activation of corresponding knowledge structures related to identification, stereotypes, and attitudes/affect. The importance of these associations to intergroup relations is undeniable (Dovidio, Gaertner, et al., 2002; Dovidio, Kawakami, et al., 2002; Dovidio et al., 1997; Greenwald, Smith, Sriram, Bar-Anan, & Nosek, 2009). Once activated, these processes have implications for a range of social judgments, including emotion identification, empathy for others, and a variety of behaviors. Given the potential for these processes to influence intergroup interactions without our intention, research has also examined mechanisms involved in the control and potential reduction of this category-based knowledge.

2.1 Activation of Category-Based Knowledge

Once a person is construed as a member of a particular social group, that person is imbued with a wealth of category-based information. This information includes associations with the self (identification), group characteristics (stereotypes), and evaluations (prejudice). For example, if a person is initially categorized as Asian, White perceivers may be unlikely to activate associations with the self, and likely to activate schemas related to Asian stereotypes such as being terrible drivers, cheap, and math smart, as well as overall negative evaluations of both the person and of Asians in general. Although these three types of associations are typically considered to be distinct and studied in isolation, research has recently started to investigate the relations between these constructs.

2.1.1 *Implicit Identification: Associations Between the Self and Social Categories*

How we conceive of the self determines how we understand, perceive, and interact with our social environment (Kihlstrom & Cantor, 1984; Markus & Kunda, 1986). The self is especially important in our relationships with outgroup members. Although we typically think of identification as associations between the self and a particular ingroup (Luhtanen & Crocker, 1992), identifying with groups of which we are not members has important implications for intergroup relations (Allport, 1954; Shteynberg & Galinsky, 2011; Turner, Hogg, Oakes, Reicher, & Wetherell, 1987; Walton, Cohen,

Cwir, & Spencer, 2012). One of the most basic forms of bias is to perceive outgroup members as essentially or deeply different from the self. Whether we believe that members of other groups have different physical or personality characteristics, different cultural practices, different goals or values, or whether we simply do not associate outgroups with the self, this lack of correspondence between “us” and “them” can have important consequences: disidentification can induce negative attitudes, promote destructive intergroup behaviors, and decrease support for interventions that can reduce discrimination.

We (Phills, Kawakami, Tabi, Nadolny, & Inzlicht, 2011) have found that, in general, people consider themselves distinct from outgroup categories and typically do not associate the self with a variety of outgroups. For example, in a series of experiments, we utilized two types of Implicit Association Tests (IATs, Greenwald et al., 2002; Greenwald & Farnham, 2000) and a psychophysiological measure of brain activation to assess outgroup identification. In the first study, an IAT measure of self-associations with White and Black faces revealed that non-Black participants implicitly associated the self more strongly with Whites than Blacks. A second study extended this effect to show that non-Black participants more strongly associated self-descriptive traits with White compared with Black faces.

In an additional experiment, we (Phills, Kawakami, et al., 2011) measured the extent to which participants perceived themselves to be distinct from Blacks by measuring electrophysiological brain activity during an oddball task. In this paradigm, participants were presented with a series of photographs, with the majority of images related to the self. Within this context, participants were also presented with oddball stimuli consisting of photographs different from the self (i.e., Blacks or Whites). While participants were categorizing each image as “me” or “not me,” the amplitude of a stimulus-locked ERP component, the P300, was monitored. As expected, based on previous research (Ito & Urland, 2003), non-Black participants responded to Blacks as psychologically more different from the self than Whites by exhibiting a larger P300 response to Black than White faces in the context of self-categorizations.

In fMRI research by Mitchell, Macrae, and Banaji (2006), participants made judgments about the self, political ingroup members, and political outgroup members while their brain activity was recorded. The authors found that judgments of ingroup members and the self activated a similar region in the ventral mPFC, whereas judgments of outgroup members activated a

different, more dorsal area of the mPFC. This finding suggests that, at least in part, different regions of the brain may be used for processing ingroup and outgroup members. Thus, “I” and “we” may be fundamentally different than “them,” even very early in the processing stream.

2.1.2 Implicit Stereotypes: Associations Between Specific Characteristics and Social Categories

Stereotypes are characteristics that we associate with people in a social category (Amodio, 2014a; Fiske, 1998). These characteristics include personality traits (e.g., fun, unassertive) and physical features (e.g., dark skin, long hair), as well as beliefs about behaviors (e.g., bad drivers, slow), emotions (e.g., happy, fearful), and life circumstances (e.g., poor, well educated). These characteristics may be positive, negative, or neutral (Esses, Haddock, & Zanna, 1993). An abundance of research has demonstrated that exposure to a category representation, whether it be an actual ingroup or outgroup member, a photograph, or a category label, is sufficient to activate associated conceptual characteristics (Blair, 2002; Blair & Banaji, 1996; Kawakami & Dovidio, 2001; Macrae, Bodenhausen, & Milne, 1995). For example, in her seminal research, Devine (1989) demonstrated that when participants were subliminally primed with characteristics and labels related to Blacks, they spontaneously activated the concept of aggression and evaluated an unrelated target as more hostile. Likewise, we have found evidence for the spontaneous activation of stereotypes associated with a variety of categories including Blacks, the elderly, women, and skinheads (Kawakami, Dion, & Dovidio, 1998; Kawakami & Dovidio, 2001; Kawakami, Dovidio, Moll, Hermsen, & Russin, 2000; Kawakami, Young, & Dovidio, 2002). These studies and others have used multiple methods to measure implicit stereotypes, as well as implicit prejudice, including the pronunciation task, Stroop task, person categorization task, (primed) LDTs, IAT, Extrinsic Affective Simon Task (EAST), sequential priming task, evaluative priming task, and the affect misattribution procedure (Amodio & Devine, 2006; Amodio & Hamilton, 2012; Donders, Correll, & Wittenbrink, 2008; Fazio, Sanbonmatsu, Powell, & Kardes, 1986; Greenwald & Banaji, 1995; Greenwald et al., 2002; Payne & Lundberg, 2014; Rudman, Ashmore, & Gary, 2001; Wittenbrink, Judd, & Park, 2001).

Stereotypes are assumed to be represented in memory, though traditional models of stereotyping have not distinguished the specific forms of memory underlying stereotypes or their implications for judgment and behavior. To better understand how intergroup biases function and influence behavior,

we have proposed a memory systems model, whereby different aspects of intergroup processes are supported by different systems of learning and memory, such as semantic, instrumental, and Pavlovian associations, among others (Amodio, 2008; Amodio & Devine, 2006, 2008; Amodio et al., 2003). According to this model, stereotypes are rooted in mechanisms of semantic memory and selection that are underpinned in the brain by the temporal lobe and PFC, respectively. By linking stereotypes to this more specific memory process, researchers can apply findings from the memory literature to derive more precise predictions for how stereotypes are formed, expressed, and potentially changed (Amodio & Ratner, 2011). For example, whereas affective associations are learned quickly and are difficult to extinguish, semantic associations may be learned and unlearned through a process of repeated pairings and nonpairings. Moreover, as compared with affective associations, semantic associations are more likely to be expressed in trait impressions, goal representations, and goal-directed behaviors, and are also more likely to emerge in verbal responses (Amodio & Devine, 2006; Amodio & Mendoza, 2010; Amodio & Ratner, 2011).

More recently, fMRI studies of social stereotypes have also begun to illuminate the key neural substrates (Amodio, 2014a). For example, the anterior temporal lobe (ATL; i.e., the temporal poles) has been shown to represent knowledge about people and social groups (Olson, McCoy, Klobusicky, & Ross, 2013). The dorsal part of the ATL, which is implicated more specifically in the representation of social objects (i.e., people), is densely interconnected with the regions of the mPFC that are associated with trait judgment and impression formation. This suggests that social information represented in the ATL is selected into the mPFC to support the process of social cognition.

Not surprisingly, the ATL is consistently implicated in studies of stereotype representation. In one fMRI study we (Gilbert, Swencionis, & Amodio, 2012) used multivoxel pattern analysis (MVPA) to examine neural activity representing judgments of Black and White individuals on the basis of stereotypic traits or evaluations. Results showed that both forms of person judgment were represented in the left ATL, and that these neural representations correlated with behavioral measures of implicit racial stereotypes and implicit racial attitudes, respectively. That is, the ATL supported independent conceptual representations of Black stereotypes and evaluations that are uniquely related to behavioral expressions of stereotypes and attitudes. Other research has shown that judgments concerning stereotypes of human targets recruited greater activity in the ATL than category judgments of inanimate objects (Contreras, Banaji, & Mitchell, 2012). Finally, it has been

shown that disruption of ATL activity by transcranial magnetic stimulation attenuates the application of implicit gender stereotypes (Gallate, Wong, Ellwood, Chi, & Snyder, 2011), providing converging evidence for the important role of this region in representing stereotype knowledge.

The integration of stereotype knowledge into online person impression is believed to involve the activation of stored stereotypes, drawn from the ATL, into the mPFC, where it is also combined with working memory processes supported by the lateral PFC (Amodio, 2014a). Researchers are just beginning to understand the neural substrates of stereotyping, but it is already clear that stereotyping depends on multiple mechanisms operating in a coordinated network and not a single underlying process.

2.1.3 Implicit Prejudice: Associations Between Evaluations and Social Categories

Whereas stereotypes are considered to be the cognitive component of intergroup processes, prejudice (group attitude) is the evaluative component. Specifically, an intergroup attitude may comprise a general positive or negative association with a social category, as well as one's affective responses to the category and its members. Although attitudes are considered to be central in social psychology (Briñol & Petty, 2012), this statement is particularly true in intergroup contexts, given that our evaluations of ingroups and outgroups predict a variety of important downstream consequences (Allport, 1954; Dovidio, Gaertner, & Kawakami, 2003; Kawakami, 2014).

Whereas evaluative associations related to outgroups tend to be negative (Dovidio et al., 1997; Dunham, 2011; Gabriel, Kawakami, Bartak, Kang, & Mann, 2010; Greenwald, McGhee, & Schwartz, 1998; Kawakami, Phillips, Steele, & Dovidio, 2007), this is not always the case; in some instances, people may be more positive toward an outgroup than the ingroup. For example, implicit prejudice toward the elderly is typically negative and does not vary as a function of age of respondent (Levy & Banaji, 2002). Both younger (e.g., 18 years) and older (e.g., 70 years) adults tend to associate negative compared to positive concepts more with the elderly on an IAT. Similarly, both men and women tend to like women better than men (Eagly & Mladinic, 1994), and some Black Americans show more negative implicit prejudice toward Blacks than Whites (Ashburn-Nardo, Knowles, & Monteith, 2003; Mandalaywala, Amodio, & Rhodes, under review).

As with stereotyping, prejudice refers to a complex set of processes linked to multiple neural structures. Early research on the neural basis of prejudice focused on the amygdala, a small structure located bilaterally in the medial

temporal lobes (Amodio et al., 2003; Hart et al., 2000; Phelps et al., 2000). The amygdala receives direct (or nearly direct) input from every sensory organ, which allows it to respond very rapidly to both learned threats and rewards (Holland & Gallagher, 1999; LeDoux, 2000). For this reason, it was initially believed to be the neural substrate of implicit prejudice. However, evidence for the amygdala's role in prejudice has been mixed, with fewer positive results than null findings in neuroimaging studies of race (Amodio, 2014a). Nevertheless, it is likely that the amygdala plays a role in the acquisition and expression of learned social threats (Amodio, 2014a; Olsson, Ebert, Banaji, & Phelps, 2005).

Importantly, although the amygdala supports basic threat and reward processing, it cannot process conceptual information such as stereotypes. This distinction provided an important early clue that different cognitive mechanisms underlie implicit stereotyping and prejudice. Based on our theorizing (Amodio & Devine, 2008; Amodio et al., 2003), we (Amodio & Hamilton, 2012) found that anxiety about appearing prejudiced selectively amplified the expression of implicit attitudes but not stereotypes. In other research, we (Amodio & Devine, 2006) found that individual differences in participants' implicit racial attitudes and implicit stereotype associations were largely independent and predicted unique outcomes. Implicit attitudes uniquely predicted self-reported affective responses to Blacks and participants' seating distance from a Black study partner, whereas implicit stereotyping uniquely predicted trait impressions of a Black person and participants' expectations of a Black partner's academic test performance.

More recent neuroscience models of prejudice identify the role of the striatum in supporting ingroup favoritism and approach-related intergroup responses (Stanley, Sokol-Hessner, Banaji, & Phelps, 2011), the insula in visceral emotional reactions to both ingroup and outgroup members (Cikara, Botvinick, & Fiske, 2011), and the orbital cortex for representing the integration of inputs from these regions into an evaluative representation that drives decisions (Gilbert et al., 2012). Finally, although these areas support more affective forms of prejudice, cognitive components of attitudes (e.g., associations with positive or negative concepts), and explicit beliefs about social groups further contribute to many expressions of prejudice.

2.1.4 Relations Between Implicit Identification, Stereotyping, and Prejudice

Most people typically assume that identification, stereotyping, and prejudice are related. Specifically, one might predicate that the more you identify with an outgroup, the less you would associate negative characteristics with its

members (e.g., hostile, lazy, untrustworthy), and the more you would like them (Allport, 1954). However, empirical evidence in support of these relations has been mixed. In particular, as noted earlier, the relation between stereotyping and prejudice has been found to be of only moderate strength. For example, when examining both implicit and explicit indices of prejudice and stereotyping, Dovidio, Brigham, Johnson, and Gaertner (1996) found a correlation of $r=0.25$. When only focusing on indices of implicit stereotyping and prejudice, this relation did not strengthen, $r=0.19$. More recently, using IATs that more directly dissociated valence associations from stereotype concepts, the correlation between implicit prejudice and stereotyping was even weaker, $r=0.06$ (Amodio & Devine, 2006)—a pattern consistent with the idea that these two implicit intergroup processes are rooted in different underlying cognitive and neural systems (Amodio et al., 2003; Amodio & Ratner, 2011).

In contrast, there is some evidence for a causal link between self-outgroup associations and stereotyping and prejudice, respectively. With regard to the relation between identification and implicit prejudice, for example, perspective-taking strategies, such as imagining a day in the life of a target individual (Galinsky & Moskowitz, 2000; Galinsky, Ku, & Wang, 2005) or imagining the victim's feelings while watching a series of incidents of racial discrimination, have been found to increase self-other overlap and also decrease negative outgroup attitudes. Likewise, increasing self-outgroup overlap with practice in associating the self with a group that included Blacks can reduce implicit prejudice (Woodcock & Monteith, 2013).

Recent research related to training in approaching outgroup members has also provided evidence for a close link between self-outgroup associations and implicit prejudice. Using multiple methods of approaching social categories and several ways of measuring outgroup identification, we (Phills, Kawakami, et al., 2011; Phills, Santelli, Kawakami, Struthers, & Higgins, 2011) provided converging evidence that training in approaching social categories can increase self-outgroup associations. Specifically, training participants either to move a joystick toward or away from themselves in reference to a particular category, such as Blacks or Whites (Kawakami, Phills, et al., 2007), or to move circles representing the self and a target category closer together or farther apart (Aron, Aron, & Smollan, 1992), resulted in reduced bias in self-outgroup associations on an IAT and in brain activity. Furthermore, we found that increased associations between the self and Blacks, in turn, lowered implicit prejudice. These findings suggest that one reason why approach orientations increase positive attitudes is because they foster identification with the target.

With regard to the link between identification and implicit stereotyping, the evidence for a causal relation is mixed. Whereas research on perspective taking indicates that increasing self–other overlap can also reduce outgroup stereotyping (Galinsky & Moskowitz, 2000; Galinsky et al., 2005), research on the conditioning of self–outgroup links does not (Woodcock & Monteith, 2013).

Although research, as noted earlier, has found evidence for the impact of changes in outgroup identification on prejudice, other work has examined whether this relation is bidirectional by investigating the impact of prejudice on outgroup identification (Phills, Kawakami, Krusemark, & Nyguen, *under review*). Previous theorizing provides some justification for the possibility that intergroup attitudes may cause identification (Cialdini & Richardson, 1980; Kelley & Thibaut, 1978). In particular, because we believe that simply connecting ourselves with favorable ingroups will make us look more favorable (Cialdini et al., 1976; Snyder, Lassegard, & Ford, 1986), we may try to associate with high status or valued others. One way to improve self–outgroup associations, therefore, may be to use evaluative conditioning to increase the positivity of outgroups.

In two studies, we (Phills et al., *under review*) found that after training in associating positive concepts with Blacks, non-Black participants showed less negative implicit attitudes toward Blacks. Although this basic evaluative conditioning effect on racial attitudes is well established (Lai et al., 2014; Olson & Fazio, 2006), we also found that evaluative conditioning increased the strength of associations between the self and Blacks. Furthermore, mediation analyses provided consistent evidence for a close causal link between changes in implicit prejudice and changes in outgroup identification.

Together, these findings are consistent with the balanced identity theory (BIT; Cvencek, Greenwald, & Meltzoff, 2012; Greenwald et al., 2002), which purports a causal relation between attitudes and identification. Much like classic consistency theories in social psychology (Festinger, 1957; Gawronski & Strack, 2012), this model proposes that identities, attitudes, and self-esteem coordinate to maintain affective–cognitive consistency and that the interrelations among these constructs constrain each other. In particular, the BIT suggests that an association between two concepts should strengthen when both concepts are associated with the same third concept. Because we typically maintain strong associations between the self and good (self-esteem; Bosson, Swann, & Pennebaker, 2000; Zhang & Chan, 2009), increasing associations between a stigmatized outgroup (e.g., Blacks) and good (attitudes), such as in the Phills et al. research

(under review), should and does increase associations between the outgroup and the self (identities). Likewise, increasing associations between stigmatized outgroups and the self, such as in the [Phills, Kawakami, et al. research \(2011\)](#), should and does increase associations between the stigmatized outgroup and good (attitudes). Together, these findings provide evidence for a causal, bidirectional link between implicit group identification and attitudes.

In summary, a broad literature implicates the spontaneous activation of category-based knowledge once a person is construed as a member of a social group. Furthermore, these activations have been shown to have wide-ranging implications for how we respond to outgroups. In the next section, we will explore some of these downstream consequences.

2.2 Downstream Consequences of the Activation of Category-Based Knowledge

Importantly, implicit identification, stereotypes, and prejudice can influence variety of downstream consequences, including our ability to identify emotions on outgroup faces, the extent to which we care when outgroup members are treated unfairly or are in pain, and our support for government policies to improve the situation of minorities. These constructs also impact a variety of behaviors, from basic fight/flight responses and the shooter bias, to the willingness to interact with outgroup members and a host of other forms of discrimination.

2.2.1 Emotion Identification

To avoid discordance and to facilitate communication, the quick and precise identification of emotional expressions is crucial in both interpersonal ([Adolphs, 2002](#); [Baron-Cohen, Wheelwright, & Jolliffe, 1997](#); [Haxby et al., 2001](#); [Keltner & Haidt, 1999](#)) and intergroup contexts ([Dovidio et al., 2003](#); [Mackie & Smith, 2002](#); [Stephan & Stephan, 1985](#)). However, research has demonstrated that people are better at recognizing emotional expressions on ingroup faces relative to outgroup faces ([Izard, 1971](#)). For example, in a metaanalysis of 97 studies, [Elfenbein and Ambady \(2002\)](#) found that although cross-cultural emotion recognition was better than chance guessing, accuracy was significantly diminished when individuals were from different ethnic groups. Theorists suggest that because cultures may differ in the use of cues, and that members of one culture are less familiar with the emotional dialects and processing styles of cultures different from their own, people are less accurate in emotion recognition across societies

(Elfenbein, Beaupre, Levesque, & Hess, 2007; Matsumoto, 1989; Matsumoto, Ollide, & Willingham, 2009).

Studies conducted within a single culture, however, have also demonstrated an outgroup disadvantage in emotion identification. For example, multiple studies have found that White American perceivers see anger lingering longer and appearing earlier on Black relative to White faces and misread neutral facial expressions of Blacks as conveying anger (Hugenberg, 2005; Hugenberg & Bodenhausen, 2003; Hutchings & Haddock, 2008; Kang & Chasteen, 2009), in spite of the objective greater similarity of White than Black faces to anger (Zebrowitz et al., 2010). Recent research in this context suggests that emotion identification errors may be driven in part by outgroup stereotypes (Bijlstra, Holland, Dotsch, Hugenberg, & Wigboldus, 2014; Hugenberg & Bodenhausen, 2003). Because African Americans are often stereotyped as hostile and aggressive relative to Whites (Devine, 1989), these stereotypes may influence the interpretation of facial expressions. For instance, White perceivers tend to interpret ambiguous facial expressions on Black male faces as angrier than matched White faces (Hugenberg & Bodenhausen, 2003; Hutchings & Haddock, 2008; Kang & Chasteen, 2009), and Black faces with anger expressions more strongly activate Black stereotypes than faces with happy expressions (Kubota & Ito, 2014).

It is notable, however, that the ingroup emotion identification advantage has even been found using a minimal group paradigm (Ratner et al., 2014; Young & Hugenberg, 2010). These findings indicate that biases in emotion identification and a readiness to perceive positive ingroup expressions may be due to distinct processing of outgroup relative to ingroup faces (e.g., less configural processing). Because minimal groups by definition are not strongly associated with cultural differences or group stereotypes, these findings suggest that additional factors may be at play in biases in emotion identification. In accordance with this possibility, we found that participants higher in implicit prejudice were more likely to see hostile faces as African American (Hugenberg & Bodenhausen, 2004). Remarkably, Dunham (2011) demonstrated similar effects using experimentally constructed ingroup vs outgroup contexts. Minimal outgroup faces were seen as expressing more hostility than ingroup faces. Put simply, “they” appear to be angry, even in the absence of stereotypes related to aggression or intergroup conflict.

Recent research by Friesen et al. (under review) suggests a general process by which prejudice may impact accuracy in emotion identification:

reduced attention to outgroup eyes. Specifically, these researchers found that White participants distinguished less between true and false smiles on Black compared to White faces. Furthermore, they tested the importance of a deficit in attention to the eyes of Black faces in this process in three ways (see Fig. 6). First, because the only difference in the facial stimuli in targets displaying true and false smiles was the Duchenne markers related to the eyes, differential emotion identification on Black and White faces by participants was most likely related to attention to this feature. Second, the results

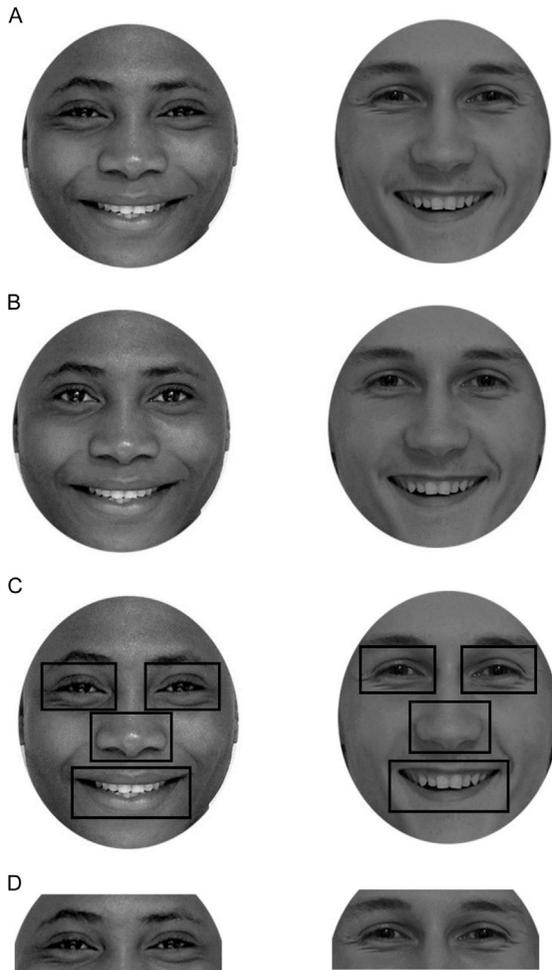


Fig. 6 Sample stimuli showing Duchenne smiles (A), non-Duchenne smiles (B), areas of interest (eyes, nose, mouth) marked for measuring eye-tracking gaze (C), and presentation of eyes only (D).

demonstrated that participants spent less time attending to the eyes of Black than White targets and that attention to the eyes predicted the ability to differentiate between emotions. Finally, when participants were presented with only the eyes of Black and White targets and therefore forced to focus on this feature, they demonstrated no difference in their ability to distinguish between Duchenne and non-Duchenne smiles between these races.

Together these findings provide strong evidence for intergroup bias in the identification of a variety of emotions. They also highlight the role of multiple categories, prejudice, and stereotypes in this process.

2.2.2 Caring About Outgroups

It is perhaps not surprising that the activation of category-based knowledge can influence whether we care about the circumstances of outgroup members. For example, an implicit measure of Black identification (i.e., a self-other overlap) among White perceivers predicted support for government aid to Blacks and affirmative action policies that improve the situation of minorities (Craemer, Shaw, Edwards, & Jefferson, 2013), and implicit prejudice has been modestly related to support for affirmative action in corporate and educational settings (Hardin & Banaji, 2013; Lai et al., 2016).

Although endorsing these types of social policies is one way to demonstrate that you care about outgroups, recent research has also examined participants' responses to perceiving outgroup racism. Kawakami, Dunn, Karmali, and Dovidio (2009) suggest that one reason why racism may be so prevalent is because people are indifferent when witnessing derogatory comments against members of categories to which they do not belong and do not socially reject racists. In our experiments, participants either experienced a White confederate making a racist comment about a Black confederate or imagined themselves in this situation. The results demonstrated that anticipated affective responses were more negative for people who imagined themselves in the situation than people who actually observed the racism. Furthermore, when asked to choose either the Black or White confederate for a partner task, those who imagined themselves in the situation overwhelmingly predicted that they would avoid the White racist (choosing him only 20% of the time), whereas people who actually experienced the racist situation chose the White racist approximately 70% of the time. Surprisingly, experiencers' affect ratings and partner choice after hearing a racist comment did not differ from a condition in which there was no racist comment. Follow-up research (Karmali, Kawakami, & Page-Gould, *under review*) showed that after witnessing racism, people displayed a

physiological profile indicative of an orienting response (decreased heart rate and increased skin conductance) rather than a stress response and demonstrated less cognitive impairment on a Stroop task than people who imagined this situation. Further research demonstrated that differential responding when directly observing compared to imagining racism was related to negative perceptions of the Black target and not the White racist (Karmali, Kawakami, & Shim, under review).

We (Kawakami et al., 2009) propose that although people draw on their conscious explicit attitudes, which are typically more egalitarian, when imagining their responses to racism, their more negative implicit attitudes and stereotypes shape their complacency when faced with a racist act (Dovidio et al., 2009; Dunn & Ashton-James, 2008). In line with recent research (McConnell, Dunn, Austin, & Rawn, 2011), we speculate that implicit category-based knowledge determines the extent to which people overestimate how much they care about outgroup racism and other negative outcomes for outgroup members.

Recent research has demonstrated that people may not only be less empathic when bad things happen to outgroup members (Hein, Silani, Preuschoff, Batson, & Singer, 2010; Xu, Zuo, Wang, & Han, 2009), but that they may actually experience pleasure in response to outgroup members' misfortunes (i.e., schadenfreude; see Cikara et al., 2011; Cikara & Fiske, 2011, 2013; Hoffman, Trawalter, Axt, & Oliver, 2016; Zaki & Cikara, 2015). Specifically, this research has demonstrated that people feel pleasure in response to outgroup adversities and pain in response to outgroup triumphs (i.e., gluckschmerz). Furthermore, this pattern of schadenfreude and gluckschmerz was attenuated when outgroup members were portrayed as less distinct from ingroup members based on a set of prior questions, thereby suggesting that increasing outgroup identification can increase empathy (Cikara, Bruneau, Van Bavel, & Saxe, 2014). In other words, the more you perceive outgroup members as similar to the self, the more you care about their welfare.

2.2.3 Intergroup Behaviors

Although there is a dearth of research investigating interpersonal behavior in social psychology (Baumeister, Vohs, & Funder, 2007), and particularly in an intergroup context (Fiske, 1998), behavior toward outgroup members is considered to be perhaps the most critical component of intergroup relations (Allport, 1954; Dovidio, Gaertner, et al., 2002). Not surprisingly, given the importance of the attitude-behavior link to our field, the majority of

research examining the downstream consequences of the activation of category-based knowledge has been in the area of prejudice and discrimination, whereas very few studies have investigated the link between identification or stereotyping and behavior.

Research has demonstrated that in interracial interactions, implicit prejudice predicts nonverbal friendliness (Dovidio et al., 1997; Fazio, Jackson, Dunton, & Williams, 1995), visual eye contact and blinking (Dovidio, Gaertner, et al., 2002; Dovidio, Kawakami, et al., 2002), speaking time, speech errors, and hesitations (McConnell & Leibold, 2001), and interpersonal distance (Amodio & Devine, 2006). Implicit prejudice has also been found to predict voting behavior (Knowles, Lowery, & Schaumberg, 2010). For example, negative attitudes toward Blacks on an IAT predicted intentions to vote for McCain over Obama in the 2008 presidential election (Greenwald, Poehlman, Uhlmann, & Banaji, 2009; Greenwald, Smith, et al., 2009). Implicit prejudice has also predicted hiring preferences (Agerstrom & Rooth, 2011; Rooth, 2010) and a willingness to work with a Black or White partner (Ashburn-Nardo et al., 2003).

It is important to note that the vast majority of this evidence has been correlational. Recent research, however, has demonstrated that interventions targeting outgroup attitudes can influence both implicit prejudice and overt behaviors, such as outgroup immediacy behaviors associated with closeness and forming social bonds (Word, Zanna, & Cooper, 1974). For example, our research (Kawakami, Dovidio, & van Kamp, 2007; Kawakami, Phills, et al., 2007) has demonstrated that training in approaching Blacks reduced the relative preference for Whites on an IAT and increased positive body orientations to a Black interaction partner.

Although these experiments show that the same strategy can be effective in improving intergroup attitudes and behavior, these attitudinal and behavioral biases were not measured in the same experiment. However, when we (Mann & Kawakami, 2012) have examined the influence of an intervention on both implicit attitudes and discriminatory behaviors within a single study, we found no relations between these two types of processes. Instead, we found that feedback that participants were progressing toward the goal to be egalitarian actually resulted in a disengagement from the focal goal of egalitarianism, and it ironically *increased* both biased racial associations on an IAT and increased seating distance from a Black student. Further, these attitudinal and behavioral responses were not correlated. More research on the causal

relation between intergroup attitudes and behaviors is clearly necessary to better understand these connections (Lai, Hoffman, & Nosek, 2013).

Research by Rudman and Ashmore (2007) on the relation between implicit stereotyping and behavior, alternatively, is interesting for two reasons. First, these studies focused on self-reports by Whites on overt hostility toward outgroup targets and on economic discrimination (i.e., decisions to fund student ethnic organizations). Second, they compared the ability of implicit stereotypes to predict such behaviors independent of implicit attitudes (cf. Amodio & Devine, 2006). These findings demonstrated that implicit stereotypes predicted overtly hostile and discriminatory intergroup behaviors. Research has also demonstrated that implicit stereotyping, as indexed by a stereotypic explanatory bias (SEB), can predict the use of biased questions during a job interview (Sekaquaptewa, Espinoza, Thompson, Vargas, & von Hippel, 2003). Specifically, in a separate task, the SEB—the extent to which White participants provided an explanation for stereotypic inconsistent behaviors for Blacks (e.g., got a job at Microsoft; refused to dance) relative to stereotypic consistent behavior (e.g., easily made the team; blasted loud music in his car)—predicted the number of stereotypic questions they chose to ask when interviewing a Black but not White confederate. However, a recent metaanalysis (Greenwald, Poehlman, et al., 2009) shows only a moderate relation between implicit attitudes/stereotypes and racially discriminatory behavior (Blacks and Whites, $r=0.24$) and an even weaker relation between implicit attitudes/stereotypes and behavior toward other social categories (i.e., ethnicity, age, weight, $r=0.20$; sexual orientation, $r=0.18$).

Identification with outgroups relative to ingroups has been associated with a variety of responses, including support for pro-Black government policies and the criterion to shoot Blacks in the Payne (2001) weapons task (Craemer et al., 2013; Kenworthy, Barden, Diamond, & del Carmen, 2011; Woodcock & Monteith, 2013). Notably, Galinsky and colleagues (Galinsky et al., 2005; Galinsky, Wang, & Ku, 2008) found that perspective taking, which typically increases self-outgroup overlap, leads to synchronizing behavior with target groups. For example, this research has shown that when taking the perspective of an elderly man, participants were more likely, than in nonperspective taking control conditions, to act cooperatively on a prisoner's dilemma game, in line with the stereotype of the elderly as kind and generous. Likewise, when taking the perspective of a Black man, participants were less likely, than in nonperspective taking control conditions,

to act cooperatively, in line with the stereotype of Blacks as aggressive and competitive.

Together this research provides evidence for the important implications that the activation of category-based knowledge can have in determining how we respond to social category members. In particular, research has demonstrated that implicit outgroup identification, stereotyping, and prejudice impact our ability to decode outgroup emotions, as well as our empathy for and responses to the misfortunes of outgroup members. Although research suggests that these associations can also influence behavior, further studies investigating actions in an intergroup context are clearly necessary.

2.3 Strategies to Reduce the Activation of Category-Based Knowledge and Biased Behavior

For many people, implicit prejudice contradicts explicitly held egalitarian attitudes, beliefs, and values. For others with explicit prejudices, the public expression of prejudice may incur social sanctions. In both of these cases, people are often motivated to control their expressions of bias. Recent research has examined a variety of strategies to regulate intergroup responses.

In contrast to earlier theorizing and research that focused largely on the Contact Hypothesis (Allport, 1954; Dovidio et al., 2003; Pettigrew & Tropp, 2006) or the affiliated Jigsaw classroom (Aronson, Blaney, Stephan, Rosenfeld, & Sikes, 1977; Aronson & Bridgeman, 1979) as a means of reducing bias, in recent years a number of creative alternative approaches have been advanced. Although research has demonstrated a positive impact of traditional conceptualizations of contact on implicit prejudice (Aberson, Porter, & Gaffney, 2008; Dasgupta & Rivera, 2008; Shook & Fazio, 2008; Tam, Hewstone, Harwood, Voci, & Kenworthy, 2006; Turner, Hewstone, & Voci, 2007), new interventions have extended this theorizing by examining a broad array of intergroup interaction contexts.

As depicted in Fig. 1, these interventions aim to increase self-outgroup overlap, change characteristics associated with a target group, and/or decrease negative outgroup evaluations. In accordance with the primary expectations related to Contact Theory, theorists propose that increased experience with outgroups will change the activation of category-based knowledge by enhancing identification with the outgroup, thereby reducing stereotyping and prejudice toward category members. For example, exposure to counterstereotypic or positive outgroup exemplars (Brauer, Er-rafy, Kawakami, & Phills, 2012; Dasgupta & Greenwald, 2001a), learning to associate new characteristics or evaluations with outgroup members (Kawakami

et al., 2000; Olson & Fazio, 2006; Phills et al., under review), approaching outgroup members (Kawakami, Dovidio, et al., 2007; Kawakami, Phills, et al., 2007; Kawakami, Steele, Cifa, Phills, & Dovidio, 2008; Page-Gould, Mendoza-Denton, Allegre, & Sij, 2010; Page-Gould, Mendoza-Denton, & Tropp, 2008; Phills, Kawakami, et al., 2011; Phills, Santelli, et al., 2011), perceiving similarity between outgroup members and the self (Kawakami, Williams, et al., under review; Walton & Cohen, 2007), and perceiving outgroup members in a new and positive context (Rudman et al., 2001; Wittenbrink et al., 2001) are all closely tied to the main tenants of Contact Theory. In this section, we will describe research related to these and other interventions and their capacity to reduce various forms of intergroup bias.

2.3.1 Increasing Implicit Identification

Integrating outgroups into the ingroup has been demonstrated to reduce biases against outgroup members. Although research on the Common Ingroup Identity Model (Gaertner & Dovidio, 2000) has shown that perceptions of overlapping social identities (i.e., ingroup–outgroup associations) can decrease favoritism toward the ingroup, increasing implicit outgroup identification (i.e., self–outgroup associations) has also been shown to be important to intergroup relations (Greenwald et al., 2002). Researchers have therefore examined several ways to increase self–outgroup overlap, which include perspective taking (Galinsky et al., 2005), feeling socially accepted by the outgroup (Kunstman, Plant, Zielaskowski, & LaCosse, 2013), and building associations between the self and a group comprised of outgroup members (Woodcock & Monteith, 2013).

One strategy that we have used to directly target self–outgroup associations is approach training (Phills, Kawakami, et al., 2011; Phills, Santelli, et al., 2011). Because the intent of approach training is to bring the outgroup closer to the self, it is expected to increase psychological closeness between the self and the target category (Lieberman, Trope, & Stephan, 2007; Nussinson, Seibt, Hafner, & Strack, 2010). Other strategies such as evaluative conditioning, however, may also change outgroup identification but through a less direct route. In particular, we (Phills et al., under review) found that practice in associating positive concepts with Blacks reduced implicit prejudice, which in turn increased implicit self–Black associations. Importantly, our results indicate that prejudice in this case had an intervening variable effect (Pek & Hoyle, 2016) in that evaluative conditioning did not directly impact outgroup identification but only reduced this bias through racial attitudes.

A related phenomenon in intergroup behavior is social tuning or self-synchronization—the extent to which people modify their behaviors and other aspects of the self to fit their social environment (Chartrand, Maddux, & Lakin, 2005; Gabriel et al., 2010). Just like research on mimicry has demonstrated that people match the physical gestures (Bernieri, 1988; Chartrand & Bargh, 1999) and vocal rhythms (Cappella & Panalp, 1981) of interaction partners, experiments have shown that people also sometimes synchronize themselves to outgroup social categories (Kawakami, Dovidio, & Dijksterhuis, 2003; Kawakami et al., 2002; Lowery, Hardin, & Sinclair, 2001; Sinclair, Lowery, Hardin, & Colangelo, 2005).

Specifically, recent research suggests that factors that induce a focus on interconnectedness can influence synchronization to outgroup categories (Kawakami et al., 2012). For example, when participants were exposed to stimuli related to interdependent self-construals, they associated themselves more with their social environment, in this case, Blacks. Because this type of social tuning is strongly implicated in smoothing interactions and creating strong social bonds, it is particularly relevant in intergroup contexts, which are often fraught with misunderstandings and misperceptions (Dovidio, Gaertner, et al., 2002; Dovidio, Kawakami, et al., 2002; Holoien, Bergsieker, Shelton, & Alegre, 2015; Vorauer, 2005; Vorauer & Sakamoto, 2006). One potentially fruitful avenue for future research, therefore, is to investigate whether interventions that strengthen self-outgroup associations also increase social tuning and thereby facilitate coordinated intergroup interactions.

2.3.2 Changing Implicit Stereotypes

Although some interventions that increase implicit identification also decrease implicit stereotypes (e.g., perspective taking, Blair, 2002; Galinsky et al., 2005, 2008), others do not (e.g., conditioning self-other overlap, Woodcock & Monteith, 2013). One method directly targeting implicit stereotyping is extensive practice in negating stereotypic concepts and associating nonstereotypic concepts. This strategy has proven to be successful in decreasing the activation of stereotypes (Kawakami et al., 2000), the application of stereotypes (Kawakami, Dovidio, et al., 2007), and discrimination in hiring decisions (Kawakami, Dovidio, & van Kamp, 2005) related to a range of social categories, including Blacks, women, and skinheads.

Follow-up studies demonstrated that if participants were solely required to affirm counterstereotypes vs negate typical cultural associations, only the former strategy in which they responded positively to counterstereotypes

was effective in reducing implicit stereotyping (Gawronski, Deutsch, Mbirkou, Seibt, & Strack, 2008). It is unclear in this latter research, however, whether completing both types of responses simultaneously as in the initial experiments (Kawakami et al., 2000, 2005; Kawakami, Dovidio, et al., 2007; Kawakami, Phills, et al., 2007) is even more powerful, as suggested by current models of bias reduction (Devine & Monteith, 1993), than solely affirming counterstereotypes.

Being exposed to counterstereotypic exemplars can also decrease implicit stereotyping. In particular, contact with female leaders or women and Blacks in high status positions can decrease typical group associations. For example, research has shown that both presenting women with information about female leaders in a lab setting and preexisting differences in exposure to female professors in naturally occurring environments decreased gender stereotypes (Dasgupta & Asgari, 2004). Likewise, research has demonstrated that students enrolled in a 14-week prejudice and conflict seminar that was taught by a Black professor demonstrated decreased implicit stereotyping and prejudice over time (Rudman et al., 2001). Importantly, a control group enrolled in a research methods course taught by a White professor did not show a similar reduction.

2.3.3 Decreasing Implicit Prejudice

Because understanding attitudes is considered essential to understanding social change and modifying behaviors (Briñol & Petty, 2012), the vast majority of research on strategies to reduce intergroup bias has focused on prejudice (Paluk & Green, 2009). Although it is beyond the scope of this chapter to adequately describe all types of interventions targeting implicit prejudice, this section will highlight a few distinct strategies that are representative of current research in the field, including evaluative conditioning, exposure to positive outgroup exemplars and positive characteristics, progress on egalitarian goals, and social context.

Importantly, some of the strategies that have been effective in reducing other types of bias, such as outgroup stereotypes, are also effective in improving outgroup attitudes. For example, as already mentioned, exposure to counterstereotypic exemplars (Dasgupta & Asgari, 2004; Dasgupta & Greenwald, 2001a, 2001b; Rudman et al., 2001) and training in approaching social categories can increase positive evaluative associations with the outgroup. Interestingly, approaching a specific intergroup orientation can also influence group attitudes. For example, we (Phills, Santelli, Kawakami, Struthers, & Higgins, 2011) found that an

approach strategy in which participants were instructed to respond “yes to equality” was more effective in subsequently reducing implicit prejudice on an IAT when placed within the context of positive images related to racial harmony (e.g., Dr. Martin Luther King, interracial friends, families, and couples) than when imbedded in negative racial images (e.g., the Ku Klux Klan, burning crosses, and lynchings). Alternatively, an avoidance strategy in which participants were instructed to respond “no to prejudice” was more effective in reducing implicit prejudice when placed in the context of negative rather than positive racial images. Similarly, an alternative approach strategy in which participants were instructed to “be egalitarian” was more successful in subsequently reducing implicit prejudice when associated with a promotion than prevention prime. In contrast, an avoidance strategy in which participants were instructed to “not be prejudiced” was more effective when associated with a prevention than promotion prime. Together, these results suggest that matching approach and avoidance strategies to the contextual valence of the context and to regulatory focus orientations may impact whether this strategy is effective in reducing bias (Cesario, Grant, & Higgins, 2004).

One of the most direct routes to changing implicit attitudes is evaluative conditioning (Hofmann, De Houwer, Perugini, Baeyens, & Crombez, 2010). In an intergroup context, evaluative conditioning has been shown to reduce implicit prejudice (French, Franz, Phelan, & Blaine, 2013; Olson & Fazio, 2006; Phills et al., under review), and if such methods are used over an extended period (e.g., 12 weeks); they can create effective long-term reductions (Devine, Forscher, Austin, & Cox, 2012).

On an applied level, recent research suggests that advertising campaigns associating outgroup category members with only positive characteristics may not be as effective in reducing negative implicit attitudes as advertisements that present both positive and negative characteristics (Brauer et al., 2012). Specifically, in this research, we created posters in collaboration with an advertising firm that paired some images of Arab men and women with positive traits (e.g., sociable) and some members with negative traits (e.g., stingy). In line with previous theorizing that suggests that the portrayal of outgroups as variable and heterogeneous can reduce negative attitudes (Brauer & Er-rafy, 2011; Ryan, Judd, & Park, 1996), we found that posters that associated a mix of valenced traits with an outgroup were more effective in decreasing prejudice than posters that associated only positive traits. Furthermore, think-aloud data suggest that one reason for this strategy’s success

is that the mixed message is more acceptable to respondents and results in less resistance to the communication.

Not surprisingly, research has shown that contexts are also important to the activation of negative or positive group-based evaluations. Specifically, there is evidence that non-Blacks' implicit racial attitudes vary depending on the valence of the context (Wittenbrink et al., 2001). When target outgroup members were presented in a positive environment (e.g., church), participants demonstrated lower implicit prejudice than when they were presented in a negative environment (e.g., street corner). Further, research has found that in a prison setting, Black targets dressed as lawyers rather than prisoners reduced implicit prejudice (Barden, Maddux, Petty, & Brewer, 2004). Thus, the social roles implied by a specific context and features of the target can attenuate negative outgroup attitudes.

Research has also demonstrated that perceptions of and affective reactions to intergroup situations can influence implicit prejudice. In contrast to previous studies, however, we (Mann & Kawakami, 2012) investigated whether such interventions increase rather than decrease negative racial attitudes. In particular, based on recent theorizing related to social goals, we examined whether perceived progress on the goal to be egalitarian would lead participants to disengage from this goal. As described earlier, we found that when motivated to be egalitarian, participants showed greater racial bias on an implicit measure of prejudice and sat farther away from Blacks after receiving feedback that they were becoming more positive toward Blacks on a (bogus) psychophysiological index of bias than when they received feedback that they were becoming less positive or when they received no feedback. Like making progress on dieting or study goals (Fishbach, Dhar, & Zhang, 2006; Fishbach & Zhang, 2008), advancing on the goal to be egalitarian can lead people to disengage from the focal goal which can result in behaviors inconsistent with that goal (e.g., eating a piece of cake, going to a movie, or distancing yourself from outgroup members).

Recent work on the impact of colorblindness on subsequent racial attitudes provides further evidence that initially acting in seemingly non-prejudiced ways may increase rather than decrease subsequent bias (Kawakami, Karmali, et al., under review). In particular, research indicates that because of current social norms, people are often wary of acknowledging race, especially in an ambiguous situation (Apfelbaum et al., 2008; Norton et al., 2006). However, not mentioning race or acknowledging negativity in an interracial context can have adverse consequences. Specifically, if participants believe that acting in colorblind ways is related to

imposed societal norms or mandatory goals such as in our previous research (Mann & Kawakami, 2012), these behaviors may lead to disengagement and less effort to be nonprejudiced. However, if the same actions are perceived as commitment toward a goal, colorblindness may lead to a sustained interest in the goal and complementary actions. This theorizing suggests that the implications of initially acting in nonbiased ways may be different depending on the reasons for why people avoided the use of race or performed other seemingly egalitarian actions.

To test these hypotheses, participants were presented with a novel Ambiguous Photograph Task in which they were instructed to describe a photograph that depicted a Black and White man bumping in a crowded stairwell. We found across three studies, as expected, that when describing this ambiguous interracial interaction in which race was not obviously relevant, a large majority of participants did not mention race, or acknowledge any potential negativity in this situation (over 80%). More importantly, we found that after demonstrating colorblindness (not mentioning race), people high but not low in implicit prejudice responded with more bias. Notably, this difference was not found in a control condition in which participants were not given the opportunity to act in nonprejudiced ways (i.e., no opportunity to demonstrate colorblindness). Because people high in implicit prejudice conceptualize their avoidance of racial labels as behavior imposed by society, we expected and found that they subsequently showed higher levels of bias than people low in implicit prejudice, who presumably do not use racial labels because of a sincere desire to live up to personal egalitarian standards.

2.3.4 The Short- and Long-Term Efficacy of Strategies Targeting Implicit Bias

Our review provides exciting new evidence for the potential of some strategies to reduce implicit bias. In two innovative projects, Lai and colleagues (2014, 2016) compared the relative efficacy of a number of interventions in improving negative outgroup attitudes. In particular, in the first project (2014), researchers were invited to enter a contest to test the impact of a proposed intervention to reduce implicit preferences on an IAT. The criteria required that the strategy was amenable to being run on the Project Implicit website and that participants were able to complete the intervention in 5 min or less. Of the 17 strategies examined, 8 led to reductions in implicit prejudice. The successful approaches from the most effective to the least effective in terms of meta-analytic effect sizes were related to

exposure to positive or counterstereotypic outgroup category members, priming multiculturalism, evaluative conditioning, and implementation intentions. Interventions that were not effective were related to perspective taking, appeals to egalitarian values, imagining interracial contact, and emotion induction.

In a second, highly powered project (Lai et al., 2016), the same eight strategies found to be successful in the first project were once again tested for their capacity to reduce implicit prejudice both immediately and over time. In particular, participants were presented with a pretest IAT, the intervention, an immediate posttest IAT, and a follow-up IAT approximately 2 days later. Although all strategies were once more found to be effective in decreasing intergroup bias immediately after the intervention, none of them showed a significant effect after the 2-day delay.

Although together these findings provide important information on the relative efficacy of recent interventions aimed at reducing intergroup bias, it should be noted that these effects are preliminary and related to a specific testing environment and set of interventions. In particular, most of the interventions and data collection across these projects occurred online, a methodological choice that could have important implications. In accordance with a recent examination of experimental studies using online samples (Zhou & Fishbach, 2016), the attrition rate (from those who began the study but did not complete it) in the first project was approximately 30% and may have varied according to experimental conditions, which can bias results. Also, it is possible that intergroup interventions may be less impactful online compared to in lab. For example, Phills et al. (under review) found that a similar manipulation related to evaluative conditioning was more effective in reducing implicit prejudice when participants completed the study in the laboratory compared to online.

Second, all studies in the two projects focused on one type of bias, implicit prejudice, and used (for the most part) the same measure of this construct, the IAT. It is therefore not clear if other approaches related to ameliorating other types of bias such as implicit stereotyping and identification are effective or durable, and if similar effects are found with other measures of implicit prejudice. Furthermore, the experimental design in which the same IAT was presented at the pretest, posttest, and the follow-up may have reduced the impact of the interventions over time.

Third, with regard to the interventions, although a variety of methods were sampled, these projects had specific criteria for inclusion—the strategy had to be amenable to an online manipulation and had to be very short in

duration (5 min or less). The effect of longer interventions or more complex manipulations, such as many of those described in this chapter, was not examined. For example, experiments related to implicit stereotyping training can have a duration of approximately 1 h (Kawakami et al., 2000) and contexts can include elaborate cover stories (Kawakami et al., 2009; Mann & Kawakami, 2012) or more specialized equipment (Kawakami et al., 2014). Furthermore, all interventions in these projects were presented only once. Research suggests that including multiple sessions related to a particular strategy over an extended period can dramatically increase its impact and its efficacy over time (Devine et al., 2012). So although recent results suggest that many short and simple interventions may have limited value in reducing implicit prejudice over time, more involved techniques have the potential to have lasting consequences.

A further important avenue of investigation is related to a more general approach to behavioral control and cues that trigger self-regulation processes (Amodio & Devine, 2010; Monteith, 1993). Rather than targeting the direct reduction of associations, an alternative strategy focuses on blocking the expression of bias in behavior. This approach describes an “override” or “replacement” model of control that has the potential to be more enduring. Devine’s (1989) initial tests of this model suggested that whereas both high- and low-prejudiced individuals exhibited a similar degree of implicit stereotype accessibility, low-prejudiced participants actively inhibited the expression of stereotypes in behavior. Devine argued that although this form of control may not immediately change one’s mental associations, repeated exertions of control could eventually lead to changes in these associations (Devine, Plant, Amodio, Harmon-Jones, & Vance, 2002).

Early research on the behavioral control of bias assumed a relatively deliberative strategy. In particular, Monteith (1993; Devine & Monteith, 1993) proposed a self-regulatory model of prejudice control whereby one’s feeling of guilt, caused by an unintended prejudiced response, initiates plans for egalitarian future responses, and increases vigilance for cues to engage an egalitarian response. This model has been supported in multiple behavioral and psychophysiological studies (Amodio, Devine, & Harmon-Jones, 2007; Monteith, 1993; Monteith, Ashburn-Nardo, Voils, & Czopp, 2002) and has been shown to effectively reduce the expression of bias in future behaviors.

In an effort to understand how the cognitive control of bias may operate very rapidly in a single unfolding response, we (Amodio, Devine, & Harmon-Jones, 2008; Amodio et al., 2004) tested a model influenced by

theories in cognitive neuroscience (Botvinick, Braver, Barch, Carter, & Cohen, 2001). This model addressed how a biased tendency is rapidly detected within the brain during the course of a single response, and how top-down control is then recruited to guide behavior toward an intended response. In the brain, the dorsal ACC is sensitive to conflict between a goal representation (e.g., to classify stimuli accurately, as in a Stroop or sequential race priming task) and a motor tendency toward an alternative, unintended response. In the case of intergroup bias, the unwanted tendency may be driven by the activation of implicit stereotypes or prejudices. As this conflict is detected, the ACC recruits regions of the PFC to exert top-down control over behavior to promote the intended response.

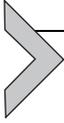
Using ERPs, we (Amodio et al., 2004) demonstrated the role of the ACC in the control of implicit bias on the weapons identification task. On stereotype-incongruent trials—that is, trials that required control—stronger ACC activity was observed within approximately 350 ms of the target stimulus. Furthermore, participants' ACC response to such trials predicted their degree of stereotype control in behavior. Similar patterns of ACC activity have been shown using the Shooter Task (Correll, Urland, & Ito, 2006), stereotype priming (Bartholow, Dickter, & Sestir, 2006), and the evaluative race IAT (Beer et al., 2008). The role of detection processes has also been supported by multinomial modeling (Gonsalkorale, Sherman, Allen, Klauer, & Amodio, 2011; Sherman et al., 2008). Together, this work reveals that the control process involves two different components—detection of bias and implementation of intended behavior—and that the detection of bias can occur rapidly and without deliberation.

This model of prejudice control has helped to explain how we reduce expressions of implicit bias in behavior, as well as individual differences in people's ability to exert control. For example, individuals with equally positive explicit attitudes toward Blacks can vary widely in their ability to control implicit bias (Devine et al., 2002; Payne, 2005), and we (Amodio et al., 2008) found that this variability is due to differences in their ACC-related sensitivity to bias activation. Given other research suggesting that a different region of the frontal cortex—the mPFC/rostral ACC—is important for understanding external social cues (Amodio & Frith, 2006), this model also helps explain why people sensitive to external social pressures are especially prone to control failures (Amodio, Kubota, Harmon-Jones, & Devine, 2006) and why intergroup social anxiety can impair control (Amodio, 2009). This approach has even been extended to examine

differences in regulatory ability associated with political ideology (Amodio, Jost, Master, & Yee, 2007) and social power (Schmid, Kleiman, & Amodio, 2015).

Our prejudice control model is consistent with bias reduction strategies that target the behavioral expression of advantage. For example, an implementation intention strategy links a specific situational cue to a specific action plan such that when the cue is encountered, the action can be implemented in behavior rapidly and without deliberation (Gollwitzer, 1993). This kind of strategy has been shown to be effective in a range of self-control contexts (Gollwitzer & Sheeran, 2006). In the context of implicit racial bias, we (Mendoza, Gollwitzer, & Amodio, 2010), for example, found that the use of implementation intentions for responding to the Shooter Task (e.g., *if I see a Black person, then I will ignore his race* in Study 1 or *if I see a gun, then I will shoot; if I see an object, then I will not shoot* in Study 2) completely eliminated racial bias in shooting behavior. Importantly, it did so by increasing participants' accuracy in shoot decisions, thereby blocking the expression of bias in behavior. Similar results were observed by Stewart and Payne (2008), although their strategy manipulation and interpretation focused on altering a mental association (between Black and dangerous) rather than a behavioral response. EEG research by Amodio (2010) demonstrated the role of PFC activity in producing a controlled response on the weapons task, further supporting the idea that once the need for control is detected, the PFC can guide the implementation of intended behavior effectively, rapidly, and with little deliberation.

Thus, although some brief interventions have proven to be effective immediately but not over time in changing implicit biases (e.g., Lai et al., 2016), other more sustained interventions may be more durable (Allport, 1954; Devine et al., 2012; Kawakami et al., 2000). Furthermore, strategies that focus on control and motivational factors may also be important to reducing bias in the long term. Notably, even interventions designed to eliminate associations in a specific context may be valuable tools for improving intergroup relations. For example, if the negative influence of social categorization processes can be reduced in an upcoming job-hiring situation, this short-term targeted intervention can have long-term and impactful consequences. Thus, despite initial claims that implicit biases are inevitable, these findings suggest that social categorization processes need not always have negative implications for outgroup members and that interventions can lead to momentary and potentially long-term improvements in intergroup relations (Devine et al., 2002).



3. CONCLUSIONS

The way we see and categorize another person can have profound implications for our social interactions and intergroup relations. In this chapter, we focused on two broad aspects of intergroup social cognition: how we perceive and categorize people according to their social categories, and how these categories then influence the way we judge them and interact. This growing body of work reveals that social perception operates through both bottom-up and top-down processes. That is, a broad range of visual cues from the face and body shape the way we initially perceive a person and bias the way in which we categorize them and form impressions. At the same time, a host of top-down effects, driven by our goals, expectancies, attitudes, and contextual cues, shape these bottom-up processes. The wealth of evidence for these bottom-up and top-down person perception processes reveals that ingroup advantages are not merely a product of categorization, but they also shape the categorization process itself.

Once we categorize a person as a member of a social group, a broad set of influences—prejudices, stereotypes, and associations with the self—further shape the manner in which we respond to outgroup members. In the current framework, we bring together a diverse array of theoretical approaches and methodologies from a variety of fields to describe the many ways in which category-based processes can lead to bias, as well as the strategies that may be used to reduce these processes and their negative impact. Considered as a whole, our framework offers a comprehensive account of the perceptual and categorical processes that drive intergroup social cognition and relations, combining research from social psychology, neuroscience, and visual psychophysics. Although the interplay of bottom-up and top-down processes and their joint expressions in social behavior are extremely complex, efforts to understand them in an integrative, multidisciplinary, theoretical framework promises to advance our knowledge of social cognition while informing intervention strategies aimed at reducing bias in society.

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