



Emergent Research in Social Vision: An Integrated Approach to the Determinants and Consequences of Social Categorization

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Abstract

Social categorization research has historically focused either on understanding how observers utilize visual cues in the face and body to make judgments of others or on understanding the downstream consequences that occur following social categorizations, but rarely both. Recently, however, research has evidenced a marked shift toward an integrated approach. Here, we provide a snapshot of social vision's contributions to the study of social categorization with a goal of illuminating the new and exciting directions afforded by an integrative approach. From this perspective, social categorizations are characterized not only as being informed by visual cues but also as being malleable, probabilistic, and contextualized. Moreover, the process of categorization itself can affect evaluative outcomes directly, independent of categorization. By exploring empirical evidence for this integrated approach to the determinants and consequences of social categorization, we show how the emerging field of social vision has revealed new insights into the nature of social categorization and by extension its implications for evaluations.

Social categorization has long been regarded as an important precursor to interpersonal prejudice. Decades ago, theorists from both psychology and sociology argued not only that perceivers are likely to notice others' social category memberships, but also that doing so is consequential (Allport, 1954; Hughes, 1945). Since these early theoretical insights, research examining the determinants and consequences of social categorization has flourished. The consequences of social categorization are now well documented, due in large part to insights provided by social cognitive psychologists: merely catching a glimpse of another person compels social categorizations that elicit preexisting beliefs and subsequently impact our evaluations of others.

Recently, researchers have begun to probe the perceptual processes that inform social categorizations in the first place, thus augmenting the insights provided by earlier work in social cognition. In doing so, the emergent field of social vision is providing a more expansive understanding of social categorization by testing its perceptual underpinnings and social motivational determinants alongside its interpersonal consequences. This shift to focus more directly on the perceptual underpinnings of social categorization has revealed numerous insights regarding the nature of social categorizations. Here, we describe some of the exciting insights that the social vision approach affords to our understanding of social perception broadly, and social categorization specifically. Our intent is not to provide an exhaustive historical account of social categorization research, but rather to illuminate recent insights into how observers exploit visual information when categorizing others and how this process impinges on social evaluative judgments. First, we provide a brief overview of both the ubiquity and consequences of social categorization. Then we summarize recent findings that characterize social categorizations as being visually cued, malleable, probabilistic, and contextualized. Next we describe new findings from our lab that

showcase how perceptual experiences during the process of categorization can independently impact social evaluations over and above the outcomes of social categorization itself. We end by highlighting important implications of and next steps in this emergent field.

The Pervasive and Consequential Nature of Social Categorizations

Early attempts to understand social categorization focused largely on its consequences. For example, Gordon Allport argued that “the human mind must think with the aid of categories...once formed, categories are the basis for normal prejudice” (Allport, 1954, p. 20). This insight was not unique to Allport. Nearly a decade earlier, sociologist Everett Hughes described the implications of perceiving “master status” characteristics, such as social categories. He argued that these status-linked categories are paramount because they provide a lens through which all other behaviors of a target are perceived and interpreted, noting, “There tends to grow up about a status, in addition to its specifically determining traits, a complex of auxiliary characteristics which come to be expected of its incumbents” (Hughes, 1945, p. 353). Thus, both psychological and sociological scholars theorized that social categorization portends negative consequences by unleashing pernicious associations, or stereotypes, within perceivers that ultimately lead targets of perception to incur significant social costs. These insights foreshadowed the dispiriting empirical findings that emerged as the field of social cognition flourished.

Social cognitive researchers documented many of the consequences of social categorization that had been intimated by Allport and Hughes. Observers, for example, approach social perception with baggage – namely, stereotypes about social groups. Merely perceiving a person’s social category membership can unintentionally elicit these stereotypes in the minds of perceivers (Bargh, 1999). Once activated, knowledge of a stereotype – not necessarily agreement with it – is sufficient to unleash harmful effects ranging from negative evaluative judgments to more overt forms of prejudice and discrimination (Bodenhausen & Macrae, 1998; Brewer, 1988; Devine, 1989; Dovidio, Evans, & Tyler, 1986; Fazio & Dunton, 1997; Gilbert & Hixon, 1991; Grant & Holmes, 1981; Mason, Cloutier, & Macrae, 2006; Sinclair & Kunda, 1999).

One important conclusion drawn from this early work is that social categorizations appear to occur without conscious intent. From passively viewing a group of people interact, observers spontaneously and unintentionally encode the social category memberships (e.g., sex, race, and age) of the individuals involved. This tendency is evidenced when observers make systematic identification errors (see Taylor, Fiske, Etcoff, & Ruderman, 1978). Specifically, in the “Who Said What” paradigm, observers often misattribute a speaker’s statements to another person in the group who falls into the same social category as the original speaker (e.g., Black). Thus, perceivers tend to notice others’ social category memberships even when passively viewing an interaction, and this effect is robust to the duration of exposure (Klauer & Wegener, 1998).

Other evidence implies that social categorization begins very early in social perception, due primarily to visual cues in the face and body. Specifically, perceivers begin to differentiate the race of faces as early as 100 ms after visual exposure, with sex differentiation occurring shortly thereafter (Ito & Urland, 2003, 2005). In fact, even subliminal exposure to a visual stimulus is sufficient to elicit categorization (Macrae & Martin, 2006) and change one’s interpersonal behaviors in ways that are congruent with stereotypes for a given category (Bargh, Chen, & Burrows, 1996). While these findings do not probe social categorizations *per se*, they do support the notion that social categories are appreciated very early in the perceptual process, which likely bears on downstream categorizations and their associated behaviors.

Given that the consequences of social categorization are pronounced, it may be reasonable to assume that forestalling their perception might curtail the subsequent activation and application of stereotypes. Although potentially desirable, successful efforts to do so remain scant, with few

published works showing such effects. In one such demonstration using the classic “Who Said What” paradigm, observers were less likely to misattribute utterances to targets of the same race when coalitional alliances were made visually salient through other appearance cues (i.e., shirt color), but they were no less likely to misattribute utterances to targets of the same sex (Kurzban, Tooby, & Cosmides, 2001). In other work using a Garner interference paradigm, spontaneous sex categorizations were less pronounced when observers viewed elderly faces, perhaps because sexually dimorphic facial cues tend to diminish with age (Quinn & Macrae, 2005). Additionally, although memory for faces of racial outgroups tends to be poor relative to memory for faces of racial ingroups, explicit instructions for observers to “individuate” rather than categorize faces substantially improved observers’ recognition of racial outgroups (Hugenberg, Young, Bernstein, & Sacco, 2010). Finally, stereotype activations were reduced among observers who were sufficiently engaged with a taxing cognitive task at the time of visual exposure to another person (Gilbert & Hixon, 1991). That said, “busy” observers were also more likely to apply stereotypes to others if those stereotypes had incidentally become activated. Thus, successful efforts to curtail social categorization and its consequences are poorly represented in the extant literature. The paucity of such demonstrations may reflect a lack of interest in reducing social categorizations, although we find this explanation to be unlikely given a widespread interest in curbing prejudice. Instead, we suspect that these demonstrations are exceptions to the widespread tendency to categorize others into social groups. If Allport (1954) was correct that the human mind *must* think about others with the aid of categorical knowledge, the abundant evidence showcasing observers’ propensity for categorizations may imply that categorical thinking is computationally (and perhaps evolutionarily) advantageous to observers. As such, efforts to eliminate categorization entirely seem misguided and unlikely to be successful.

Put simply, prior work revealed that social categorization is common; it occurs readily and rapidly; and it elicits stereotypes among observers that can lead to harmful interactions with and evaluations of others. Moreover, it is difficult to reduce this tendency to think categorically about others. Thus, social categorization appears to be a fundamental aspect of human cognition.

“Perception” Returns to Social Perception Research

In much of the early social cognitive work, social categorizations were not measured directly. Instead, they were inferred indirectly from measures of their impact (e.g., the activation of stereotypes following visual exposure to faces). Moreover, the perceptual mechanisms undergirding this process were rarely interrogated. Instead, these issues were central foci of cognitive and vision scholars, who tested the perceptual mechanisms that culminate in social categorizations. Many assumed that visual percepts – including social categorizations – represented veridical and unadulterated representations of stimuli, which were therefore unaffected by the effects of higher-level cognitions (Marr, 1982; Shepard, 1984). While initially valuable, this perspective was later replaced by models that explicated how the visual system represents person information in population codes that are distributed across multiple neuronal regions (e.g., Haxby, Hoffman, & Gobbini, 2000).

At the same time, research that incorporated insights from both social psychology and vision science gained traction. To borrow a phrase from Zebrowitz, (2006), who was herself at the forefront of this movement, efforts to understand the perceptual mechanisms that underlie social judgment “found favor” within social psychological research. Attempts to understand how visual percepts may be modulated by social factors took hold within the vision and cognitive sciences. Together, these endeavors allowed a more integrated view of social categorization to emerge, and they fostered innovative cross-disciplinary dialogues and collaborations that have impacted both fields, including prominent publications of edited volumes (Adams, Ambady,

Nakayama, & Shimojo, 2011; Balcetis & Lassiter, 2010), curated special issues (Johnson & Adams, 2013a; Jolij & Simon, 2012), and interdisciplinary conferences (Freeman, Duchaine, & Gobbin, 2014). This burgeoning area, now referred to as *social vision* (Adams et al., 2011; Balcetis & Lassiter, 2010; Johnson & Adams, 2013a, 2013b), is beginning to reveal new insights about how stimulus parameters that originate in the target of perception combine with characteristics that observers bring to the task of social perception to inform social perceptions. Next, we describe some of the insights that this integrative approach has revealed thus far, beginning with a brief acknowledgement of the importance of visual cues in the face and body and then explicating four distinct sets of recent findings.

Visual cues inform social categorization

It bears noting that although multiple sensory modalities can (and do) inform social judgments (Freeman, Johnson, Adams, & Ambady, 2012), the visual modality is the most extensively studied. Indeed, visual cues in the face and body reliably influence social judgments, including categorizations. Faces, in particular, have been characterized as one of the most important classes of objects in a human's environment (see e.g., Haxby et al., 2000; Zebrowitz, 2006), and the mechanisms of face perception are increasingly well understood. The importance of faces should not be surprising. Face perception permits an observer to discern whether another person presents benign or dangerous interaction potential (Zebrowitz, Fellous, Mignault, & Andreoletti, 2003), recognize individuals (e.g., Sinha & Poggio, 1996), and categorize them into groups (Macrae, Quinn, Mason, & Quadflieg, 2005). These important tasks are supported by dedicated neural systems (e.g., Haxby et al., 2000; Kanwisher, McDermott, & Chun, 1997).

Body cues also provide meaningful social information about others, at times rivaling or surpassing faces in importance (Aviezer, Trope, & Todorov, 2012; de Gelder, 2006). From observing static morphological cues and dynamic motions, perceivers accurately categorize others according to action (Johansson, 1973, 1977), sex (Cutting, 1978; Cutting, Proffitt, & Kozlowski, 1978; Johnson & Tassinari, 2005; Pollick, Kay, Heim, & Stringer, 2005), emotion state (Atkinson, Dittrich, Gemmell, & Young, 2004; Pollick, Paterson, Bruderlin, & Sanford, 2001), race (Lick, Gill, Golay, & Johnson, 2014), identity (Cutting & Kozlowski, 1977), and even sexual orientation (Johnson, Gill, Reichman, & Tassinari, 2007; Lick, Johnson, & Gill, 2013). Thus, visual cues in the face and body provide a rich foundation of information from which observers can reliably categorize others into groups, and the mechanisms undergirding these perceptual processes are increasingly well documented.

Only recently has research on social perception incorporated the underlying process of social categorizations and the downstream effects of these categorizations into one model. With these insights in mind, the integration of vision science within social psychology and vice versa has enabled important discoveries of the mechanisms by which the visual perception of category-relevant cues impacts social evaluations. Importantly, this route of influence can occur indirectly (i.e., mediated by social categorizations) or directly (i.e., over and above the impact of social categorizations). Social vision research explores both of these potential routes of influence, and the approach has provided new insights regarding the malleable, probabilistic, and contextualized nature of social perceptions.

Social categorization is malleable

One way in which the social vision approach has informed social psychological knowledge of social categorization is by highlighting the high degree of malleability in social categorizations. Research initially characterized social categorizations as cognitive representations of group

membership that occurred in a discrete fashion (see Johnson & Freeman, 2010). This notion remained a prevalent theoretical assumption throughout the early years of social cognition research (see Allport, 1954; Fiske & Taylor, 1991). Indeed, Fiske and Taylor (1991, p. 121) noted, “Once a person is categorized as Black or White, male or female, young or old, the stereotypic content of the schema is likely to apply regardless of how much or how little the person looks like the typical category member.” New insights, however, have revealed that social categorizations and their impacts on stereotyping and evaluations are decidedly more malleable than initially presumed.

First, visual cues to social categories vary in their strength, and this variability differentially impacts social categorizations and their consequences. The extent to which a person’s face contains category-typical features can impact observers’ perception of them as a member of a certain group. For instance, race prototypicality alters low-level visual perception. When physiognomic features imply a Black category, observers judge a face to be objectively darker, even when the actual color of the face is held constant across targets (Levin & Banaji, 2006). Moreover, race phenotypicality determines whether the identities of speakers will be confused in the classic “Who Said What” experimental paradigm: when speakers exhibit highly race prototypical cues, within-group confusion increases, resulting in more errors (Maddox & Gray, 2002). Race phenotypicality also impacts the evaluative outcomes of race perception by modulating the degree of stereotype activation among perceivers. Targets with visible features that are stereotypical for their category tend to face more severe consequences of categorization (Blair, Judd & Chapleau, 2004; Blair, Judd & Fallman, 2004; Blair, Judd, Sadler, & Jenkins, 2002; Maddox, 2004). Similarly, perceivers apply harsher sentences to Black defendants who have highly stereotypic racial appearances (Eberhardt, Davies, Purdie-Vaughns, & Johnson, 2006). Therefore, the prototypicality of a person’s appearance impacts perceivers’ race categorizations and related evaluations.

Second, social categorizations themselves are prone to biases based upon motivational factors among perceivers. In general, perceivers appear to adopt a “better safe than sorry” heuristic for a range of social judgments (Johnson, Blumstein, Fowler, & Haselton, 2013). This tendency extends to social categorizations, making some categories more readily perceived and some categorizations more likely to occur than others. For instance, because cues to anger alert perceivers to potential harm from a target, observers are especially adept at detecting angry body motions of others, even when they are heavily masked (Chouchourelou, Matsuka, Harber, & Shiffrar, 2006). Likewise, visual cues to anger bias perceptions of other social categories, making both male (Johnson, McKay, & Pollick, 2011) and Black (Miller, Maner, & Becker, 2010) categorizations more likely. One reason for these biases is that the categories male and Black are both stereotypically associated with a potential for harm (e.g., men are stereotyped as aggressive, and Black individuals are stereotyped as violent). Thus, when confronted with an ambiguous social target, observers err on the side of caution, differentially favoring one type of potential error (false positive) over others (miss). Consequently, social categorizations are biased in a manner that optimizes one’s ability to proactively engage in self-protection.

A perceiver’s level of intergroup prejudice also impacts how visual stimuli are interpreted. Among perceivers who are high in racial prejudice, anger is readily perceived on Black faces, but not White faces (Hugenberg & Bodenhausen, 2004). Likewise, high levels of racial prejudice compel observers to categorize racially ambiguous hostile faces as Black rather than White. Racial prejudice is also associated with the perceived emotional intensity of faces that depict ambiguous race cues. In one study, perceivers judged the intensity of anger depicted on racially ambiguous faces to be stronger when they also categorized the face as Black rather than White (Hutchings & Haddock, 2008). Thus, visual cues do not always veridically inform social categorizations; attitudinal differences among perceivers impact the likelihood of some social categorizations and alter the perceived emotional intensity of others based upon the same visible features.

Moreover, social categorizations are prone to change along with information that is provided to observers. Race-ambiguous faces, for example, tend to be categorized differently depending on the accompanying hairstyle. For example, when racially ambiguous faces are paired with a stereotypically Black hairstyle, they tend to be categorized as Black (MacLin & Malpass, 2001, 2003). In other work, the race label that accompanies a race-ambiguous face leads observers to process it as either a same-race or other-race target (Pauker & Ambady, 2009; Pauker et al., 2009), enhancing face recognition when the target is perceived as a racial ingroup member.

Finally, these categorization processes modulate other social perceptual outcomes. Face recognition, for example, is highly accurate for targets who fall within a perceiver's social category, but poor for targets who do not, a tendency known as the *own-race bias* or *cross-race effect* (Meissner & Brigham, 2001). This occurs because perceivers devote more attentional resources toward others of the same race, relative to others of different races (Chance & Goldstein, 1981; Goldinger, He, & Papesh, 2009; see also Hugenberg et al., 2010).

Collectively, these findings illustrate a high level of malleability in social categorizations. Specifically, they highlight that categories are differentially activated depending on the prototypicality of a target's visible features and a perceiver's attitudes. Furthermore, when social category labels disambiguate a target's race, visual processing and memory follow suit. Visible cues in the face and body make stereotypes about certain groups relevant, and coupled with a perceiver's motivations, they increase the likelihood of a given categorization occurring.

Social categorization is probabilistic

Another way in which a social vision approach has informed psychological knowledge of social categorization is by highlighting its dynamic and probabilistic nature. Early models of face perception proposed that visual perception occurs in a sequential fashion, first accomplishing low-level feature detection and later engaging in representational processes. Consequently, feed-forward models of face perception have greatly informed emerging theoretical understandings of social categorization. Bruce and Young (1986), for example, characterized face perception in a sequential manner in which static facial cues are perceived and then subsequently interrogated by higher-level cognitions that separately and non-interactively evaluate cues to identity and dynamic expressions. This influential model led to the widespread assumption that perceivers attend to and assess various sources of social information independently. This notion, however, is inconsistent with evidence that the perception of one social category dimension tends to interfere with the perception of other dimensions (Graham & LaBar, 2007; Johnson, Freeman & Pauker, 2012; Quinn & Macrae, 2005). Mounting evidence suggests that social categorization is probabilistic, not merely in the sense of whether or not a social category will be perceived (e.g., Taylor et al., 1978), but also in terms of the dynamic unfolding of social categorization as a person is being perceived.

Indeed, evidence now suggests that social categorization involves a gradual and dynamic accrual of category-specific information from diverse sensory cues (see Freeman & Ambady, 2011; Freeman et al., 2012; Hehman, Ingbretsen, & Freeman, 2014). In the first study documenting such effects, Freeman, Ambady, Rule, and Johnson (2008) recorded the hand motions of research participants as they used a computer mouse to categorize faces according to their sex. Although ultimate sex category judgments were overwhelmingly accurate, participants' hand motions nevertheless revealed that the degree of gendered facial cues determined participants' trajectory en route to their judgment. Faces exhibiting gender-typical features compelled a direct trajectory to the correct sex category, evidencing little competition from

the competing alternative. However, faces exhibiting gender-atypical features compelled a curved trajectory before reaching the correct sex category, revealing a partial and parallel consideration of the alternative. Similar effects have been obtained for judgments of race (Freeman, Pauker, Apfelbaum, & Ambady, 2010) and stereotype application (Freeman & Ambady, 2009). Collectively, these findings showcase the probabilistic nature of social categorizations. Although it culminates in a discrete and often accurate judgment, the unfolding of social categorization remains a dynamic process in which available sensory information accrues over time (Freeman & Ambady, 2011).

These insights revealed that observers' representations of social categories are probabilistic and that they fluctuate dynamically as a function of visual cues present in the target of perception. Based on these observations, it may also be the case that social evaluations are similarly linked to the perceptual process as it unfolds, a possibility to which we return below.

Social categorization is contextualized

The next way in which a social vision approach has informed social psychological knowledge of social categorization is by showcasing how multiple social identities perceptually influence one another. Targets of social perception naturally fall into multiple social categories simultaneously (e.g., both Black and female), yet classic investigations tended to focus on the perception of a single-category dimension while controlling for other category dimensions either experimentally or statistically. In a notable exception to this general tendency, Stroessner (1996) tested the efficiency of sex and race categorizations when social identities intersect. He found that non-dominant identities (e.g., Black) facilitated single-category judgments (e.g., race), particularly for judgments of men. Dual non-dominant identities (e.g., Black woman) facilitated combinatorial judgments in which both categories were identified simultaneously (see also Zárate & Smith, 1990). In spite of these insights, a vast majority of theoretical and empirical work continued to focus exclusively on perceptions of a single-category dimension. Consequently, any interdependence in social perceptions tended to be obscured by methodological constraints. This is no longer the case. Recent studies provide empirical tests of combinatorial social perception. This work has offered key insights into the inextricable tethering of seemingly orthogonal categories in social perceptions.

Our recent work has found that the perception of one category of information tends to bias the perception of other categories, producing what we refer to as *intersectional biases* in perception because they occur at the intersection of multiple social identities. For example, race biased the perception of an orthogonal social category – sex – impacting the probability and efficiency of sex categorizations (Johnson, Freeman, et al., 2012). Specifically, participants made sex categorizations of androgynous faces that varied in race typicality. As faces changed from Black to White to Asian, female categorizations became increasingly likely. Similar effects were obtained for judgments of targets that were not androgynous. Male categorizations were also more efficient for Black than for White or Asian faces. The opposite was true, however, for female categorizations: they were more efficient for Asian than for White or Black faces. Overall, these findings suggest that race cues bias sex category judgments and their latency.

Similar effects have emerged for other social categorizations and for body perceptions. For instance, gendered facial cues bias race categorizations in a similar fashion to the results described above (Carpinella, Chen, Hamilton, & Johnson, 2014). In a recent series of studies, participants categorized the race of faces that varied in gender typicality. Black categorizations were more likely and were rendered more readily for masculine relative to feminine targets; the opposite was true for White categorizations. Furthermore, in the domain of body perception, we have

documented similarly bidirectional impacts for race and sex categorizations – gendered body movements bias race categorizations based upon point-light defined gait patterns (Lick, Gill, et al., 2014). Analogous effects occur for sex, race, and emotion judgments of faces (Becker, Kenrick, Neuberg, Blackwell, & Smith, 2007; Hess, Adams, Grammer, & Kleck, 2009; Kang & Chasteen, 2009) and bodies (Johnson et al., 2011). For example, anger is more readily perceived in men than women.

Top-down routes of influence. Importantly, these intersectional biases occur in part due to stereotypes that perceivers harbor (Johnson & Carpinella, 2012; Johnson, Freeman et al., 2012). Shared stereotypes allow the perception of one cue to influence the perception of another cue because of associations that are common to two distinct categories of information. For instance, we found that the categories Black and male and the categories Asian and female share stereotype content (e.g., aggressive and communal, respectively). These overlaps facilitated sex categorization efficiency when the relevant race and sex stereotypes associated with a target specified accordant information (e.g., Black men and Asian women), but they impaired categorization efficiency when relevant race and sex stereotypes specified discordant information (e.g., Asian men and Black women). In other work, we found that observers' tendency to judge point-light displays of angry body motions to be men, but sad body motions to be women, occurred because of stereotypic assumptions (Johnson et al., 2011). Therefore, perceivers bring existing knowledge structures to bear on social categorizations as they unfold, thus modulating the efficiency of judgments.

Bottom-up route of influence. Intersectional biases also occur because visible cues to social identities are coextensive in targets of perception (Johnson & Carpinella, 2012; Johnson, Freeman et al., 2012). Common visual cues allow the perception of one cue to influence the perception of other cues because of visual information that is diagnostic to two distinct categories of information. This type of overlap also contributes to categorization biases that facilitate or impair categorizations when sex and race intersect (Carpinella et al., 2014; Johnson, Freeman et al., 2012). Specifically, gender and race cuing features in the face overlap such that cues specifying the category Black are, on average, more masculine than cues that specify the categories of White or Asian (Johnson et al., 2012). The opposite is also true: as cues to masculinity increase, cues to the categories Asian and White decrease, but cues to the category Black increase (Carpinella et al., 2014). Similar overlaps exist between sex/race and emotion expressions, as well (Becker et al., 2007; Hess et al., 2009; Zebrowitz, Kikuchi, & Fellous, 2010; Zebrowitz et al., 2003).

Social vision research from our own lab and from others has recently begun to investigate how perceptual cues from multiple social identities combine to influence how we categorize others' social identities. Both top-down and bottom-up perceptual routes influence our combinatorial social judgments. Therefore, visual context or the presence of multiple, intersecting social categories shapes the way in which the social categorization process unfolds.

Direct and Indirect Pathways Linking Categorization to Evaluation

A final way in which a social vision approach has informed social psychological knowledge of social categorization is by showing how, in some circumstances, evaluative social judgments occur independent of social categorizations. Instead, perceiving visual cues to social categories sometimes impacts evaluations directly. Initial evidence suggested that visual cues might directly impact social evaluations because stereotype activations occurred in the absence of categorizations. For instance, facial cues activate stereotypes in working memory even prior to explicit

categorizations (Blair, Judd & Chapleau, 2004; Blair, Judd & Fallman, 2004; Blair et al., 2002). In other cases, repeated exposure to facial cues altered evaluations of those cues (e.g., skin tone; Livingston, 2001; Livingston & Brewer, 2002). In our own recent and ongoing work, we also found evidence that social categorization is sufficient, but not always the sole contributor, to arouse biases in social evaluations through perceived cue congruence, perceptual fluency, and perceived normativity.

Bias from incongruent cues. Gendered perceptions appear to undergird many forms of evaluative judgments for diverse social categories. Indeed, some have argued that gender is the underpinning of all social evaluations (Williams, 1984), so it is perhaps unsurprising that gendered cues in the face and body exert a strong influence on evaluative social judgments, sometimes separately from explicit sex categorizations.

Sex categorizations rely heavily on gendered cues (i.e., masculine and feminine) in the body (Johnson & Tassinari, 2005) and face (Freeman et al., 2008). Although these categorizations tend to be overwhelmingly accurate, they are nevertheless biased at times by other gender-linked information, including vulnerability, emotion, and race categories (Johnson, Iida & Tassinari, 2012; Johnson et al., 2011; Lick, Johnson, & Gill, 2013; Miller et al., 2010).

Importantly, perceptions of gender-typicality determine more than just sex category judgments – they also determine the favorability of a target's social evaluations. In one set of studies, we found that gendered body motions determined the perceived attractiveness of men and women (Johnson & Tassinari, 2007). When bodies were judged to be men, participants evaluated them as more attractive when they walked in a masculine manner relative to a feminine manner. The opposite was true for judgments of women. Thus, we argued that the compatibility of the basic social perceptions of sex (i.e., male/female) and gender (i.e., masculinity/femininity) and the cues that informed these judgments carried evaluative consequences.

Since our initial work tested the evaluative implications of sex and gender compatibility, we have found that the compatibility between sex and gender cues underlies other social evaluations that invoke status-linked categories. For both faces and bodies, we found that the compatibility of sex and gender cues determined sexual orientation categorizations (Freeman, Johnson, Ambady & Rule, 2010; Johnson et al., 2007). When cues were low in compatibility (e.g., feminine men or masculine women), participants tended to categorize targets as gay/lesbian. In contrast, when cues were high in compatibility (e.g., masculine men or feminine women), participants tended to categorize targets as straight. Moreover, because race categories are phenotypically and stereotypically related to gender perceptions (Johnson, Iida, et al. 2012), sexual orientation judgments and their accuracy also varied systematically as a function of race. Observers were more accurate in discerning the sexual orientation of Asian women and Black men because departures from gendered assumptions were particularly salient (Johnson & Ghavami, 2011).

Thus, the compatibility of sex and gender cues compelled attractiveness judgments and sexual orientation categorizations. We wondered whether this common underpinning of sexual orientation categorizations and evaluative judgments might help to explain antigay bias. That is, we wondered whether some instantiations of antigay bias reflect a general dislike for the gender atypicality that perceivers use to categorize others as lesbian/gay, rather than stigma associated with minority sexual orientations *per se*. We tested this possibility in a series of recent studies in which participants assessed the gender typicality and sexual orientation of men's and women's faces, as well as provided evaluative judgments of each target across a range of social domains (attractiveness, likeability, etc.; Lick & Johnson, 2014). Sexual minority categorizations indeed predicted negatively biased social evaluations, especially for women. However, biased social

evaluations were driven by targets' gender-atypical appearance over and above the effect of sexual minority categorizations. For example, women categorized as lesbians tended to be gender-atypical, and gender-atypical women were perceived as unattractive, which predicted harsh interpersonal evaluations. In fact, one study revealed that information about a target's sexual orientation provided no additional explanatory power for prejudiced evaluations over and above the effects of gender typicality (Lick & Johnson, 2014; Study 3).

This approach afforded a nuanced understanding of the social cognitive origins of antigay bias. Although we do not dispute the fact that some forms of prejudice are the result of animus directed at particular groups, these findings showcase an alternative path in which social categorization is not the sole factor underlying bias.

Bias from perceptual fluency. In a related line of work that further probed the implications of categorization processes, we have found that the ease with which perceivers achieve categorizations (i.e., their fluency) also impacts social evaluations. Because faces vary in the gender typicality of their visual cues, perceivers process the sex of some faces with greater ease than other faces (Freeman et al., 2008). We reasoned that the experience of perceptual fluency during social categorization would influence evaluative social judgments in much the same way that fluency impacts more general evaluations (Alter & Oppenheimer, 2009; Winkielman, Halberstadt, Fazendeiro, & Catty, 2006). Given that gender typicality determines both the fluency of sex categorizations and the outcome of sexual orientation judgments, we tested the possibility that antigay biases may stem, in part, from disfluent processing of gendered cues.

We tested this possibility in a series of studies in which we assessed the fluency with which participants rendered gender and sexual orientation judgments of novel targets (Lick & Johnson, 2013). Overall, disfluent processing corresponded to less favorable evaluations, and this effect was particularly pronounced for judgments of straight targets. In fact, fluency statistically mediated the association between categorization (gay/straight) and prejudiced evaluations. This suggests that the *process* by which perceivers achieve sexual orientation categorizations, not only the outcome of the categorization itself, bears on social evaluations (for a review, see Lick & Johnson, 2014). Collectively, these findings highlight a perceptual origin for bias that is independent of the outcome of sexual orientation categorizations themselves.

Bias from perceptual normativity. Finally, because targets that are perceived to be prototypical are processed fluently and fluency predicts favorable social evaluations, we reasoned that repeated visual exposure to specific constellations of visual cues might compel favorable evaluative judgments simply by making those cues appear normative. Indeed, classic research on impression formation revealed that perceivers prefer prototypical category exemplars with which they have more experience to non-prototypical exemplars with which they have less experience (Kahneman & Miller, 1986; Posner & Keele, 1968). In fact, merely increasing exposure to a stimulus reliably increases preferences for that stimulus (Zajonc, 1968). We reasoned that similar processes might occur for socially relevant evaluations, such that targets displaying features with which perceivers have recent perceptual experience would be evaluated more favorably.

Our hypothesis is supported by recent work on face aftereffects, which has highlighted the malleability of perceived facial norms. In general, this work revealed that prolonged visual exposure to faces with distorted features (e.g., caricatured noses) makes those features appear normative (Rhodes, Jeffery, Clifford, & Leopold, 2007). When perceivers encounter subsequent faces that share the previously adapted feature, they tend to evaluate them favorably. That is, visual adaptation results in more favorable evaluations of faces that share characteristics with the adapting stimuli (Anzures, Mondloch, & Lackner, 2009; Leopold & Bondar, 2005; Rhodes, Jeffery, Watson, Clifford, & Nakayama, 2003).

We borrowed the face aftereffects paradigm to test whether brief visual exposure to gendered facial cues altered perceived norms for men's and women's faces, with subsequent impacts on social evaluations. Across a series of studies (Lick & Johnson, 2014), we found that 3 minutes of visual exposure to masculine facial features made masculine faces of both sexes appear more normative, whereas 3 minutes of visual exposure to feminine facial features made feminine faces of both sexes appear more normative. These shifts in perceived norms reliably altered social evaluations related to gendered facial features. In particular, adaptation to masculine features led to more favorable evaluations of masculine relative to feminine faces; adaptation to feminine features led to more favorable evaluations of feminine relative to masculine faces. Thus, perceptual experiences alter perceived norms for gendered facial features, with subsequent impacts on social evaluations of targets that exhibit those features.

Visual exposure does not only affect social evaluations of faces; we have obtained similar effects for visual exposure to bodies (Lick, Hunger, Tomiyama & Johnson, 2014). At baseline, perceivers expressed robust prejudice against fat targets relative to thin targets. Three minutes of exposure to thin bodies lowered the threshold for fat categorizations (i.e., made perceivers more likely to categorize a thin body as fat) and resulted in even stronger biases against fat targets. However, three minutes of exposure to fat bodies heightened the threshold for fat categorizations and reliably mitigated biases against fat targets. Therefore, similar to the effects for faces, perceptual experience altered categorizations and social evaluations related to body size.

Implications and Future Directions

These recent findings shed new light on how the perception of visual cues to social categories impacts social evaluations. Specifically, visual cues appear to impact social evaluations both indirectly, mediated through social categorizations, and directly as a function of perceptual experiences.

First, visual cues inform social categorizations, which are sufficient to activate stereotypes and compromise evaluations. Researchers have demonstrated that social categorizations of targets' identities compel social evaluative judgments. Research from our lab, in particular, has documented two routes by which cues to social categories bias social evaluations. First, the top-down route or the stereotype knowledge that perceivers bring to an interaction drives how they perceive others' social identities. Second, the bottom-up route indicates that visual cues such as the race phenotypicality or gender typicality of a target's appearance bias the social categorization of that target's social identities.

Second, perceptual experiences impact social evaluations directly, at times irrespective of the impacts of social categorizations. We show that a sizable portion of the variance in some evaluative judgments stems from the *mechanics* of categorization itself. For example, the ease with which perceivers are able to appreciate a target's social category membership predicts their overall liking of that target: fluent processing is associated with favorable evaluations, whereas disfluent processing is associated with negative evaluations. Moreover, recent perceptual experiences also guide evaluative judgments, such that simple visual exposure leads to greater liking of social targets. These findings reveal that the very processes giving rise to social categorizations – and not only the categorizations themselves – impinge on social evaluations.

These insights are important, not only for understanding the determinants of social biases but also for targeting interventions that may overcome them. Indeed, future research can build upon our recent insights by developing novel techniques to increase fluency and perceptual exposure to stigmatized groups. For example, simple media interventions that expose perceivers to fatter bodies, sexual minorities, and diverse racial groups may cause those groups to appear more normative and subsequently be processed more fluently, decreasing prejudice against them. Of

course, conclusions about the long-term behavioral effects of these sorts of interventions await systematic research. Still, we believe they represent a logical and potentially fruitful extension of basic research in the burgeoning area of social vision.

Conclusions

We have provided a snapshot of various approaches to the study of social categorization with a goal of illuminating the new and exciting directions afforded by an approach that integrates both the visual processes that underlie social categorizations and the downstream consequences that stem from them. From this perspective, social categorizations are characterized not only as being consequential and informed by visual cues but also as malleable, probabilistic, and contextualized. These considerations permitted recent discoveries about how the process of categorization itself affects evaluative outcomes directly.

Short Biographies

Kerri L. Johnson, PhD is an Associate Professor in the Departments of Communication Studies and Psychology at UCLA. Broadly construed, her research tests how observers exploit cues in the face and body to form impressions of others. In her most recent work, she has discovered how the perception of one social category can be irrevocably influenced by either the factors that originate within the perceiver (e.g., existing stereotypes) or the factors that originate within the target of perception (e.g., other social category memberships). Situated in the emergent field of *Social Vision*, Kerri's research sheds light on the processes of social perception that at times promote accuracy in judgments but at other times exhibit meaningful and consequential biases. This work appears in interdisciplinary outlets including *Proceedings of the National Academy of Sciences, USA*, *Proceedings of the Royal Society, B*, *The Journal of Experimental Psychology: General*, *Psychological Science*, and many others.

David Lick received his BA at the University of Virginia and is currently a doctoral student at the University of California, Los Angeles. His research focuses on the dynamics and consequences of social categorization. In particular, his recent work illuminated how the process of social categorization arouses prejudice against individuals perceived as belonging to stigmatized groups. Additional studies highlighted the long-term implications of these categorization processes and resultant biases in terms of physical health outcomes for stigmatized individuals. This work has appeared in diverse psychology journals (e.g., *Perspectives on Psychological Science*, *Social Cognition*, *Journal of Experimental Social Psychology*, and *Journal of Experimental Psychology: General*). David is grateful for numerous grants and fellowships that have made his research possible, including a National Science Foundation Graduate Research Fellowship.

Colleen Carpinella's research is located at the intersection of psychology, cognitive science, and political science; she has authored or co-authored papers in these areas for *Social Cognition*, *Journal of Experimental Social Psychology*, and *Frontiers in Perception Science*. Her research combines social cognition and intergroup relations in the study of politician impression formation and political attitudes. Specific research interests include the influence of racial attitudes on voting behavior, gendered appearance and political party affiliation, gender stereotypes and candidate evaluations, and intersectional biases in social perception. She is the recipient of a National Science Foundation Graduate Research Fellowship. She holds a BA in Psychology and Public Policy Studies from Hobart and William Smith Colleges and a PhD in Psychology from UCLA and is currently a postdoctoral fellow at the University of Hawai'i at Mānoa.

Notes

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