

Social Categorization From Faces: Evidence From Obvious and Ambiguous Groups

Nicholas O. Rule and Shelbie L. Sutherland

Department of Psychology, University of Toronto

Abstract

People use facial features (e.g., face shape, skin color, eye structure) both in isolation and in combination to identify others as members of a variety of social categories. For some categories (e.g., age, race, and sex), the markers are obvious and people categorize their members almost perfectly. For others, however (e.g., political affiliation, religious following, and sexual orientation), the markers are ambiguous, yet people can still categorize members of these groups with better than chance accuracy and little effort or awareness. Here, we describe how people categorize others into both perceptually obvious and perceptually ambiguous social groups from their faces, discussing potential mechanisms that may underlie categorization accuracy and noting some of the social consequences that result from categorizing other people into groups.

Keywords

categorization, faces, facial features, person perception, social categories

Faces contain many informative cues that people use to infer each other's characteristics, making them arguably the most dominant and fruitful means through which people perceive each other and categorize individuals into groups (Macrae & Quadflieg, 2010). Here, we review how people categorize individuals into various social groups based on their faces and the cognitive systems that support the ability to do so. We begin by describing evidence that people can accurately identify many categories to which individuals belong, both those associated with obvious facial cues¹ (e.g., age, race, and sex²) and those whose cues are more ambiguous (e.g., sexual orientation and religious affiliation). Researchers have often studied perceptually obvious and perceptually ambiguous social categories separately (cf. Remedios, Chasteen, Rule, & Plaks, 2011). The goal of this review is to unite them in order to clarify the similarities in how people accurately categorize others without intention or awareness. Doing so allows us to discuss some of the mechanisms that might potentially underlie social categorization in general and to examine some of the social ramifications that ensue from categorizing others.

race, and sex (the “big three” social categories; Carter, 1944; Zhao & Bentin, 2008). For instance, people can judge individuals' age from their skin color (Fink, Bunsen, Madsen, & D'Emiliano, 2012) and race from their face shape (Hill, Bruce, & Akamatsu, 1995). Furthermore, Hill et al. (1995) reported that people accurately identified a target's race 89% of the time from a three-dimensional rendering of just the shape of the person's face, and George and Hole (2000) found that perceivers could estimate targets' ages almost perfectly—even when viewing upside-down images of their faces. Given that isolated features allow for accurate categorizations, it is unsurprising that people achieve even higher rates of accuracy when viewing whole faces that combine those features (e.g., 99.2% for race judgments from facial portraits; Remedios et al., 2011).

Evidence moreover suggests that perceivers categorize others into social groups unintentionally upon seeing their faces. For example, participants in one study identified the gender associated with a name more quickly if they first saw the face of a person of that gender than if they instead saw the face of a person of the opposite

Categorizing Perceptually Obvious Social Categories

For decades, researchers have demonstrated that people use particular cues to categorize others based on age,

Corresponding Author:

Nicholas O. Rule, Department of Psychology, University of Toronto,
100 St. George St., Toronto, Ontario M5S 3G3, Canada
E-mail: rule@psych.utoronto.ca

gender (Macrae & Martin, 2007). This suggests that participants inadvertently categorized the faces by gender, which implies that seeing faces of different social group members affects distinct cognitive processes (Rule, Macrae, & Ambady, 2009).

Categorizing Perceptually Ambiguous Social Categories

Whereas perceptually obvious markers may facilitate age, race, and sex categorizations, people can also identify social categories with perceptually ambiguous distinctions, albeit to a weaker extent (Macrae & Quadflieg, 2010). For example, some people pride themselves on their “gaydar” (the ability to distinguish gay from straight people) or their ability to identify someone’s political leanings at a glance. Despite the absence of obvious biological markers for such groups, empirical findings suggest that people’s performance in categorizing others as members of perceptually ambiguous groups is significantly better than chance, with an average overall accuracy rate of about 65% (Tskhay & Rule, 2013). Indeed, people can do so even from face images with key features removed (e.g., a face with the eyes and mouth obscured; Rule, Garrett, & Ambady, 2010a). Yet people’s beliefs about their accuracy do not always correspond to how well they perform (Rule, Ambady, Adams, & Macrae, 2008). Rather, individuals often report especially low estimates of their categorization ability (Daros, Ruocco, & Rule, 2016; Rule, Garrett, & Ambady, 2010b), which suggests that they may not be conscious of the extent to which they categorize others.

As with members of obvious groups, people also categorize members of perceptually ambiguous groups with very little effort. For instance, researchers found that participants performed better than chance in categorizing women’s sexual orientation after seeing photographs of their faces for only 40 milliseconds but performed no better than chance when instructed to carefully deliberate about their responses (rather than simply make a snap judgment; Rule, Ambady, & Hallett, 2009). Just as carefully thinking about one’s gait can cause one to stumble, pondering one’s categorizations seems to cause one to make cognitive missteps. People thus appear to categorize others into groups with little effort or awareness regardless of whether the cues distinguishing the members of those groups are apparent or subtle.

The ability to categorize people into perceptually ambiguous groups also extends beyond situations that make the category salient or expressly require categorization. For example, participants in one study were tasked with identifying men’s race and judging their likability from images of their faces. The ratings of likability diverged according to not only the targets’ race but also

their sexual orientation, even though sexual orientation was never mentioned (Remedios et al., 2011). The participants therefore appeared to categorize the targets by sexual orientation (at least implicitly) and to subsequently rate them differently. Categorization therefore occurs not only without intention but also when the category is not necessarily relevant.

Mechanisms Underlying Social Categorization

The underpinnings of social categorization are multifactorial and complex. People’s ability to learn the various perceptual features that best indicate group membership (often without awareness) underlies a large part of their categorization accuracy. Additionally, various motivations further support such categorization, such as the drive to learn valuable information, to use cognitive resources efficiently, and to simplify the world. Individuals also achieve greater accuracy when they have more experience interacting with members of a given category—presumably because they have had more opportunities to learn the facial features relevant for distinguishing the group’s boundaries (i.e., the statistical regularities relating particular facial features to group membership; Brambilla, Riva, & Rule, 2013; Rule et al., 2010a).

People consequently learn the statistical regularities that differentiate members of their own group. For instance, Black perceivers pay greater attention to features that vary more among Black individuals (e.g., hair-style), whereas White perceivers pay greater attention to features that vary more among White individuals (e.g., iris color; Ellis, Deregowski, & Shepherd, 1975; McDonnell, Bornstein, Laub, Mills, & Dodd, 2014). These differences in attention lead to greater discriminability for in-group versus out-group members. People accordingly tend to remember in-group members better than out-group members, which suggests that they categorize others before fully encoding their faces (Hourihan, Fraundorf, & Benjamin, 2013). Perceptual expertise for in-group members does not develop until 6 to 9 months of age (Kelly et al., 2007); thus, very young infants (3-month-olds) do not show race-based differences in face recognition. However, as they gain more experience with members of their in-group, infants begin to specialize in in-group recognition.

The *categorization-individuation model* addresses how categorization and experience interact to explain differences in memory for in-group versus out-group faces (Hugenberg, Young, Bernstein, & Sacco, 2010). It suggests that people first attend to the facial features that differentiate categories and only sometimes subsequently attempt to individuate others, at which point their

experience individuating within a category facilitates their selective attention to the features that best distinguish its members. By attending to these individuating features, people can better identify whether they have previously seen a particular face.

Experience with a group, however, is not the only factor that assists in learning the particular cues that distinguish category members. In one study, for instance, participants randomly assigned to one of two novel groups in a laboratory (the “red” group or the “green” group) remembered in-group members’ faces better than out-group members’ faces, despite equivalent experience with both groups (Bernstein, Young, & Hugenberg, 2007). Merely knowing that a person belongs to one’s own group may therefore encourage attention to memorable facial features. Consistent with this idea, people typically remember the faces of members of a particular group when that group membership is particularly relevant to them (Rule et al., 2010b), such as gay men’s better memory for other gay men (Rule, Ambady, Adams, & Macrae, 2007). Along these lines, Rule, Rosen, Slepian, and Ambady (2011) found that heterosexual women categorized men’s (but not women’s) sexual orientation more accurately when they were more motivated to find a mate (e.g., at peak ovulation, when women have the best chance of conceiving a child).

Beyond attending to particular facial features, people might seek to identify individuals’ category memberships because category generalizations help them learn about both the individuals in a category and the properties of the category itself (e.g., Stern, West, & Rule, 2015). That is, a high-order cognitive tendency to seek useful category-wide information may promote categorization. Further, people might categorize others into personally relevant groups more accurately because doing so provides opportunities to acquire information that is valuable to them (Yamauchi, Love, & Markman, 2002).

Individuals also categorize others to organize new information more efficiently. Indeed, people have a general bias to use their cognitive resources frugally, which they routinely apply to categorical reasoning (Bargh, 1999). The magnitude of this disposition may vary between individuals. For instance, people with a stronger need for structure and certainty tend to organize social information into fewer categories with simpler internal structures (Neuberg & Newsom, 1993). They thus prefer stereotypical individuals who fit into their social representations over counter-stereotypical individuals who defy their expectations about the world (Stern et al., 2015). People with a strong need for order may therefore experience discomfort in the absence of clear social categories because it challenges their ability to predict the world around them, leading them to create and enforce categorical boundaries.

Consequences of Social Categorization

Social categorization meaningfully affects how people interact with one another. The categories to which people believe a face belongs affect how they perceive it, how well they remember it, and the personal characteristics they associate with it. For instance, MacLin and Malpass (2001) found that people perceived a face as having a darker complexion if nonfacial cues suggested that the face was Black as opposed to Hispanic. Further, if an individual has facial features stereotypic of a group (whether or not that person is a member), people will make inferences about the individual based on stereotypes about that group. For instance, people will infer that a man has an interest in basketball and a tendency to get into fights based on the Afrocentricity of his features, regardless of his actual race (Blair, Judd, Sadler, & Jenkins, 2002). Thus, people use the same facial features to stereotype and form prejudiced beliefs about others as they do to categorize them. Importantly, the group to which perceivers believe an individual belongs affects their attention to and encoding of that individual, as evidenced by Hispanic participants’ differing memory strength for the same face depending on whether they believed it to represent a Black or a Hispanic man (MacLin & Malpass, 2001; see also Hourihan et al., 2013).

In addition to perception and encoding, categorization affects behavioral inferences in meaningful contexts, such as hiring decisions and court verdicts. For example, after viewing photographs of gay and straight men’s faces, people rated the men as better suited for professions that matched stereotypes about their respective groups, even though sexual orientation was never mentioned (Rule, Bjornsdottir, Tskhay, & Ambady, 2016). Additionally, because of pervasive stereotypes that construe African Americans as dangerous, judges and juries deliver more severe criminal sentences to individuals with more Afrocentric facial features (Blair, Judd, & Chapleau, 2004).

Categorization affects people’s inferences not only about attributes of individuals but also about properties of their social categories (Gelman, Collman, & Maccoby, 1986). For instance, an uncle observing his nephew smiling while doing math homework may infer that boys like math. Such generalizations from an individual to his or her category enable learning beyond the information given. People tend to do more than make inferences about the group members’ attributes when this information reaches the category level (e.g., inferring that an unfamiliar boy also likes math)—they also draw conclusions regarding how these traits came about (e.g., boys like math because they have a natural aptitude for numbers; Cimpian & Markman, 2011). Thus, they often come to believe that an “essence” shared by all category members causes these properties (e.g., Haslam, Rothschild, &

Ernst, 2000). Indeed, essentialism leads people to assume that category properties are inherent and to believe that stereotypic attributes are fixed and stable (e.g., Prentice & Miller, 2007). Although the myriad ways in which this manifests extend beyond the scope of this review, the literatures on stereotyping and prejudice provide manifold examples of the impact of essentialist thinking on social categorization (see Dovidio, Hewstone, Glick, & Esses, 2010, for a review).

Conclusion

People use facial features to effectively identify others as members of various categories. This ability to categorize individuals is noteworthy, given the variety of categories to which people can assign others and the ease with which they seem to do so accurately. Whereas some of these categories have obvious perceptual markers (e.g., sex), assigning membership to others relies on very subtle cues (e.g., political affiliation). Although people's categorization of others into these groups varies in its accuracy, performance often exceeds chance accuracy and requires little effort or awareness. Multiple factors likely underlie people's performance, including their level of experience with the relevant group (Brambilla et al., 2013) and their motivation to attend to group members (Bernstein et al., 2007; Rule et al., 2011). Moreover, people's tendency to categorize others leads them not only to extrapolate information about individuals to groups but also to apply stereotypes about groups to individuals. Thus, identifying the mechanisms that support the categorization of others into both perceptually obvious and perceptually ambiguous social groups provides critical insight into how people interact and make inferences about one another.

Recommended Reading

Alaei, R., & Rule, N. O. (2016). Accuracy of perceiving social attributes. In J. A. Hall, M. Schmid Mast, & T. V. West (Eds.), *The social psychology of perceiving others accurately* (pp. 125–142). Cambridge, UK: Cambridge University Press. doi:10.1017/cbo9781316181959.006. A review and discussion of people's accuracy in identifying others' social categories (as well as others' social attributes—e.g., professional success).

Dovidio, J. F., Hewstone, M., Glick, P., & Esses, V. M. (2010). (See References). An introductory chapter to a handbook on prejudice, stereotyping, and discrimination that provides a thorough review of past and emerging trends in both theory and findings, as well as informative references to more detailed chapters that follow.

Macrae, C. N., & Quadflieg, S. (2010). (See References). A detailed review of people's use of the face (and more) when perceiving others that includes a cognitive-neuroscience perspective, implications for social psychology, and a description of cognitive mechanisms that underlie person perception.

Tskhay, K. O., & Rule, N. O. (2013). (See References). A meta-analysis and review of studies on people's accuracy in identifying members of perceptually ambiguous groups (e.g., political affiliation, religious following, and sexual orientation) using a variety of cues, including facial features.

Acknowledgments

This work was supported in part by grants from the Social Sciences and Humanities Research Council of Canada and the Natural Sciences and Engineering Research Council of Canada to Nicholas O. Rule.

Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

Notes

1. Although social categories typically deemed "obvious" are sometimes actually quite difficult to discern (e.g., Freeman, Ambady, Rule, & Johnson, 2008), this appellation represents a modal distinction that contrasts with social groups whose boundaries are far more ambiguous.
2. Though age, race, and sex may actually span continua, people typically conceptualize and perceive them as discrete categories (see Fiske & Neuberg, 1990; Tskhay & Rule, 2015).

References

- Bargh, J. A. (1999). The cognitive monster: The case against the controllability of automatic stereotype effects. In S. Chaiken & Y. Trope (Eds.), *Dual-process theories in social psychology* (pp. 361–382). New York, NY: Guilford Press.
- Bernstein, M. J., Young, S. G., & Hugenberg, K. (2007). The cross-category effect: Mere social categorization is sufficient to elicit an own-group bias in face recognition. *Psychological Science, 18*, 706–712. doi:128.100.69.190
- Blair, I. V., Judd, C. M., & Chapleau, K. M. (2004). The influence of Afrocentric facial features in criminal sentencing. *Psychological Science, 15*, 674–679. doi:10.1111/j.0956-7976.2004.00739.x
- Blair, I. V., Judd, C. M., Sadler, M. S., & Jenkins, C. (2002). The role of Afrocentric features in person perception: Judging by features and categories. *Journal of Personality and Social Psychology, 83*, 5–25. doi:10.1037/0022-3514.83.1.5
- Brambilla, M., Riva, P., & Rule, N. O. (2013). Familiarity increases the accuracy of categorizing male sexual orientation. *Personality and Individual Differences, 55*, 193–195. doi:10.1016/j.paid.2013.02.023
- Carter, W. A. (1944). Nicknames and minority groups. *Phylon, 5*, 241–245. doi:10.2307/271306
- Cimpian, A., & Markman, E. M. (2011). The generic/nongeneric distinction influences how children interpret new information about social others. *Child Development, 82*, 471–492. doi:10.1111/j.1467-8624.2010.01525.x
- Daros, A. R., Ruocco, A. C., & Rule, N. O. (2016). Identifying mental disorder from the faces of women with borderline personality disorder. *Journal of Nonverbal Behavior, 40*, 255–281. doi:10.1007/s10919-016-0237-9

- Dovidio, J. F., Hewstone, M., Glick, P., & Esses, V. M. (2010). Prejudice, stereotyping and discrimination: Theoretical and empirical overview. In J. F. Dovidio, M. Hewstone, P. Glick, & V. M. Esses (Eds.), *The SAGE handbook of prejudice, stereotyping and discrimination* (pp. 3–28). London, England: Sage. doi:10.4135/9781446200919.n1
- Ellis, H. D., Deregowski, J. B., & Shepherd, J. W. (1975). Descriptions of White and Black faces by White and Black subjects. *International Journal of Psychology*, *10*, 119–123. doi:10.1080/00207597508247325
- Fink, B., Bunse, L., Matts, P. J., & D'Emiliano, D. (2012). Visible skin colouration predicts male facial age, health, and attractiveness. *International Journal of Cosmetic Science*, *34*, 307–310. doi:10.1111/j.1468-2494.2012.00724.x
- Fiske, S. T., & Neuberg, S. T. (1990). A continuum of impression formation, from category-based to individuating processes: Influences of information and motivation on attention and interpretation. *Advances in Experimental Social Psychology*, *23*, 1–74. doi:10.1016/s0065-2601(08)60317-2
- Freeman, J. B., Ambady, N., Rule, N. O., & Johnson, K. L. (2008). Will a category cue attract you? Motor output reveals dynamic competition across person construal. *Journal of Experimental Psychology: General*, *137*, 673–690. doi:10.1037/a0013875
- Gelman, S. A., Collman, P., & Maccoby, E. E. (1986). Inferring properties from categories versus inferring categories from properties: The case of gender. *Child Development*, *57*, 396–404. doi:128.100.69.190
- George, P. A., & Hole, G. J. (2000). The role of spatial and surface cues in the age-processing of unfamiliar faces. *Visual Cognition*, *7*, 485–509. doi:10.1080/135062800394621
- Haslam, N., Rothschild, L., & Ernst, D. (2000). Essentialist beliefs about social categories. *British Journal of Social Psychology*, *39*, 113–127. doi:10.1348/014466600164363
- Hill, H., Bruce, V., & Akamatsu, S. (1995). Perceiving the sex and race of faces: The role of shape and colour. *Proceedings: Biological Sciences*, *261*, 367–373. doi:128.100.69.190
- Hourihan, K. L., Fraundorf, S. H., & Benjamin, A. S. (2013). Same faces, different labels: Generating the cross-race effect in face memory with social category information. *Memory & Cognition*, *41*, 1021–1031. doi:10.3758/s13421-013-0316-7
- Hugenberg, K., Young, S. G., Bernstein, M. J., & Sacco, D. F. (2010). The categorization-individuation model: An integrative account of the other-race recognition deficit. *Psychological Review*, *117*, 1168–1187. doi:10.1037/a0020463
- Kelly, D. J., Quinn, P. C., Slater, A. M., Lee, K., Ge, L., & Pascalis, O. (2007). The other-race effect develops during infancy. *Psychological Science*, *18*, 1084–1089. doi:10.1111/j.1467-9280.2007.02029.x
- MacLin, O. H., & Malpass, R. S. (2001). Racial categorization of faces: The ambiguous race face effect. *Psychology, Public Policy, and Law*, *1*, 98–118. doi:10.1037//1076-8971.7.1.98
- Macrae, C. N., & Martin, D. (2007). A boy primed Sue: Feature-based processing and person construal. *European Journal of Social Psychology*, *37*, 793–805. doi:10.1002/ejsp.406
- Macrae, C. N., & Quadflieg, S. (2010). Perceiving people. In S. T. Fiske, D. T. Gilbert, & G. Lindzey (Eds.), *Handbook of social psychology* (Vol. 1, pp. 428–463). Hoboken, NJ: John Wiley. doi:10.1002/9780470561119.socpsy001012
- McDonnell, G. P., Bornstein, B. H., Laub, C. E., Mills, M., & Dodd, M. D. (2014). Perceptual processes in the cross-race effect: Evidence from eyetracking. *Basic and Applied Social Psychology*, *36*, 478–493. doi:10.1080/01973533.2014.958227
- Neuberg, S. L., & Newsom, J. T. (1993). Personal need for structure: Individual differences in the desire for simple structure. *Journal of Personality and Social Psychology*, *65*, 113–131. doi:10.1037//0022-3514.65.1.113
- Prentice, D. A., & Miller, D. T. (2007). Psychological essentialism of human categories. *Current Directions in Psychological Science*, *16*, 202–206. doi:10.1111/j.1467-8721.2007.00504.x
- Remedios, J. D., Chasteen, A. L., Rule, N. O., & Plaks, J. E. (2011). Impressions at the intersection of ambiguous and obvious social categories: Does gay + Black = likable? *Journal of Experimental Social Psychology*, *47*, 1312–1315. doi:10.1016/j.jesp.2011.05.015
- Rule, N. O., Ambady, N., Adams, R. B., Jr., & Macrae, C. N. (2007). Us and them: Memory advantages in perceptually ambiguous groups. *Psychonomic Bulletin & Review*, *14*, 687–692. doi:10.3758/bf03196822
- Rule, N. O., Ambady, N., Adams, R. B., Jr., & Macrae, C. N. (2008). Accuracy and awareness in the perception and categorization of male sexual orientation. *Journal of Personality and Social Psychology*, *95*, 1019–1028. doi:10.1037/a0013194
- Rule, N. O., Ambady, N., & Hallett, K. C. (2009). Female sexual orientation is perceived accurately, rapidly, and automatically from the face and its features. *Journal of Experimental Social Psychology*, *45*, 1245–1251. doi:10.1016/j.jesp.2009.07.010
- Rule, N. O., Bjornsdottir, T., Tskhay, K. O., & Ambady, N. (2016). Subtle perceptions of male sexual orientation influence occupational opportunities. *Journal of Applied Psychology*. Advance online publication. doi:10.1037/apl0000148
- Rule, N. O., Garrett, J. V., & Ambady, N. (2010a). On the perception of religious group membership from faces. *PLoS ONE*, *5*(12), e14241. doi:10.1371/journal.pone.0014241
- Rule, N. O., Garrett, J. V., & Ambady, N. (2010b). Places and faces: Geographic environmental influences the ingroup memory advantage. *Journal of Personality and Social Psychology*, *98*, 343–355. doi:10.1037/a0018589
- Rule, N. O., Macrae, C. N., & Ambady, N. (2009). Ambiguous group membership is extracted automatically from faces. *Psychological Science*, *20*, 441–443. doi:10.1111/j.1467-9280.2009.02314.x
- Rule, N. O., Rosen, K. S., Slepian, M. L., & Ambady, N. (2011). Mating interest improves women's accuracy in judging male sexual orientation. *Psychological Science*, *22*, 881–886. doi:10.1177/0956797611412394
- Stern, C., West, T. V., & Rule, N. O. (2015). Conservatives negatively evaluate counterstereotypical people to maintain a sense of certainty. *Proceedings of the National Academy of Sciences, USA*, *112*, 15337–15342. doi:10.1073/pnas.1517662112
- Tskhay, K. O., & Rule, N. O. (2013). Accuracy in categorizing perceptually ambiguous groups: A review and meta-analysis. *Personality and Social Psychology Review*, *17*, 72–86. doi:10.1177/1088868312461308

- Tskhay, K. O., & Rule, N. O. (2015). Semantic information influences race categorization from faces. *Personality and Social Psychology Bulletin, 41*, 769–778. doi:10.1177/0146167215579053
- Yamauchi, T., Love, B. C., & Markman, A. B. (2002). Learning non-linearly separable categories by inference and classification. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 28*, 585–593. doi:10.1037/0278-7393.28.3.585
- Zhao, L., & Bentin, S. (2008). Own- and other-race categorization of faces by race, gender, and age. *Psychonomic Bulletin & Review, 15*, 1093–1099. doi:10.3758/PBR.15.6.1093