



HHS Public Access

Author manuscript

Annu Rev Dev Psychol. Author manuscript; available in PMC 2020 December 01.

Published in final edited form as:

Annu Rev Dev Psychol. 2019 December ; 1: 359–386. doi:10.1146/annurev-devpsych-121318-084824.

The Development of Social Categorization

Marjorie Rhodes¹, Andrew Baron²

¹Department of Psychology, New York University, New York, NY 10003, USA;

²Department of Psychology, University of British Columbia, Vancouver, British Columbia V6T 1Z4, Canada;

Abstract

Social categorization is a universal mechanism for making sense of a vast social world with roots in perceptual, conceptual, and social systems. These systems emerge strikingly early in life and undergo important developmental changes across childhood. The development of social categorization entails identifying which ways of classifying people are culturally meaningful, how these categories might be used to predict, explain, and evaluate the behavior of other people, and how one's own identity relates to these systems of categorization and representation. Social categorization can help children simplify and understand their social environment but has detrimental consequences in the forms of stereotyping, prejudice, and discrimination. Thus, understanding how social categorization develops is a central problem for the cognitive, social, and developmental sciences. This review details the multiple developmental processes that underlie this core psychological capacity.

Keywords

social categorization; social cognitive development; intergroup cognition; conceptual development; categorization

INTRODUCTION

Social interaction is central to human life. Human infants are exquisitely attuned to their social environment; they rapidly develop or are already equipped with representations of goals, intentions, and other mental states, which allow them to make sense of the behavior of the individuals around them (Hamlin et al. 2008, Kuhlmeier et al. 2003, Spelke et al. 1995). Equally important for understanding the social world are representations of groups of individuals. The notion that people are more than individuals, that there are kinds of people, dates at least as far back as Plato's *The Republic* circa 380 BC, which characterizes three types of groups into which a person could be born: the warriors, the workers, and the philosophers (Plato 1943). From the foundational distinction between kin and nonkin, to the division of labor and social roles, and to the structure of social hierarchies more generally, in

marjorie.rhodes@nyu.edu.

DISCLOSURE STATEMENT

The authors are not aware of any affiliations, memberships, funding, or financial holdings that might be perceived as affecting the objectivity of this review.

every circle of human existence throughout history, there appears the practice of categorizing individuals into social groups.

How do these systems of social categorization develop? To successfully navigate the social world, children must learn to reason about the social groupings that are relevant in their communities. To do this, children face several critical learning problems. First, they must rely on perceptual and conceptual learning mechanisms to identify relevant ways of grouping people. Second, they have to figure out what these categories mean. Neither of these are simple feats. The dimensions along which people can be classified, including, race, gender, age, body shape, performance cues, physical and cognitive abilities, nationality, and political ideology, as well as more abstract dimensions, including allegiances, coalitions, and minimal and arbitrary similarities, are highly variable (Astuti et al. 2004). Furthermore, these groupings vary in terms of their levels of cohesion, stability across contexts, what they imply about the properties or behavior of individual group members, and how they shape children's impressions of and behavior toward people who do and do not share memberships with themselves (their in-group members and out-group members). Whereas the particular categories an individual or society might represent vary across culture and human history [for instance, the definition and significance of racial categories have varied throughout history and across contexts (Hirschfeld 1996)], the tendency to represent and reason about social categories is arguably a core component of human psychology (for a review, see Macrae & Bodenhausen 2000). As such, the cognitive processes that support social categorization must be both early emerging and flexibly adaptive.

In this review, we delineate the perceptual and conceptual processes that shape the formation and development of social categories from birth through childhood. Therefore, we highlight what the adult state of social categorization looks like, drawing on social psychological research illustrating the robust conceptual role social category concepts occupy in intergroup cognition. We then review the perceptual building blocks of social category concepts in development starting in infancy and chart their progression into conceptually rich representations in childhood. We use examples from case studies of race and gender to highlight the various perceptual, social, cognitive, and motivation-based processes that shape the development of social categorization and ultimately constrain the development of social category concepts.

SOCIAL CATEGORIZATION IS CENTRAL TO HUMAN COGNITION

Categorization is central to human cognition across all domains of experience. As many cognitive scientists have noted, the capacity for generalization and inductive reasoning is critical for survival, as it allows an individual to reason about something new by drawing on past experiences or knowledge (Ahn et al. 2000, Bloom 1998, Markman 1989, Mervis & Rosch 1981, Murphy 2002, Rosch & Levitin 2002). For example, your past experiences eating red berries will influence your decision to eat a red berry you have just discovered. Your past experiences with other people's dogs will influence your comfort around dogs. Your knowledge of the diehard loyalty of people who attended their alma mater will influence your belief about which college football team the authors of this review show unwavering support for (GO BLUE!).

Adults spontaneously classify people into social categories, and this in turn guides their learning, reasoning, perception, and behavior (Kawakami et al. 2002, Lickel et al. 2000, Turner et al. 1994). For example, adults quickly encode social category information, including race, gender, and age from individual faces (Karnadewi & Lipp 2011). Social categorization also shapes memory; adults have better memory for stereotype-consistent information over stereotype-inconsistent information (Bodenhausen 1988). Furthermore, social categories influence who adults choose as friends (often people with whom they share group membership), as well as their hiring and voting decisions (often hiring members of groups that are consistent with their stereotyped beliefs, for example, men hiring other men for leadership positions). Our representations of social categories even influence perceptions of threat and decisions to shoot a bystander (Correll et al. 2006, Greenwald et al. 2009, Kang et al. 2012, Nock & Banaji 2007, Payne 2006).

To further underscore the psychological importance of social group representations in daily life, consider the case of stereotypes about intellectual ability. The persistent underrepresentation of women in STEM fields including mathematics, engineering, and computer science is well-documented. Strikingly, this noted underrepresentation can be partially attributed to cultural stereotypes associating math more with men than women (Nosek et al. 2009, NSF 2017, OECD 2015). Pointing to a causal connection between gender stereotypes on the one hand and engagement with STEM on the other, seemingly innocuous reminders of gender stereotypes may lead women to underperform on math assessments (Ambady et al. 2004, Beilock et al. 2007, Danaher & Crandall 2008, Miller et al. 2015, Nguyen & Ryan 2008, Schmader & Johns 2003, Spencer et al. 1999, Stricker & Ward 2004, Walton & Spencer 2009). The effect of stereotypes on performance is also well-documented in the case of race (Aronson et al. 1999; Spencer et al. 1999; Steele & Aronson 1995, 1998, 2000; Walton & Cohen 2003).

Given how strongly social categorization shapes many aspects of daily life, it is critical to understand the mechanisms by which representations of social category concepts are acquired across development as well as how the structure, format, and content of these representations may change from infancy through childhood. Doing so helps to elucidate how these concepts support intergroup evaluations, constrain patterns of induction, and shape behavior. The following charts this development.

FOUNDATIONS: PERCEPTUAL, CONCEPTUAL, AND SOCIAL PROCESSES

Adult systems of social categorization originate in basic perceptual, conceptual, and social processes observable in infancy and early childhood. In this section, we outline these foundations, describing what we know about (a) the perceptual processes that underlie how infants parse the social world, (b) the nature of early conceptual representations of social groupings, and (c) the basic social processes that underlie and reflect early categorization behavior. In subsequent sections, we discuss how these perceptual, conceptual, and social processes give rise to development and change in representations of social categories across childhood.

Perceptual Foundations

In all domains of experience, categorization begins with noticing and attending to criteria that are relevant for category identification (Quinn 2011). For instance, to begin to classify particular animals as birds, it is useful to notice the presence of a beak or feathers. Simply noticing this difference does not yet indicate categorization—a person can notice and pay attention to whether an animal has a beak, and maybe even look longer at animals with beaks because the beaks are interesting to look at, without using the presence or absence of a beak to classify individual animals into meaningful and distinct categories. But certainly, paying attention to whether an animal has a beak, in this example, is a step toward the development of categorization. Thus, a basic question to ask about the perceptual foundations of social categorization is when, and by what mechanisms, do infants begin to notice the differences between people that correspond to conventional social divisions in their community.

Early visual attention to later markers of social categories.—When infants begin to notice and attend to differences between people that correspond to conventional markers of social categories has most often been studied in cases of race and gender. Whereas newborn babies do not appear to notice race, by three months of age infants begin to focus on dimensions of human variation that correspond to conventional race categories (Kelly et al. 2005, Liu et al. 2015), provided they experience a visual world that is relatively homogeneous with respect to race. For instance, Bar-Haim et al. (2006) found that three-month-old White babies in Israel looked longer at White faces, Black babies in Ethiopia looked longer at Black faces, and the looking behavior of Black babies in Israel (who commonly see both White and Black faces) was not differentiated by race (see also Kelly et al. 2007). Infants' noticing of gender also illustrates the role of familiarity in shaping these early processes; for example, infants often look longer at female faces [particularly when these faces are also of their own race (Quinn et al. 2008)] within the first few months of life, but the tendency to do so varies by the gender of the infant's primary caregiver (Quinn et al. 2002; see also Liu et al. 2015). Infants' tendency to look longer at faces of one race than another does not necessarily indicate racial categorization; infants may look longer simply because they notice a perceptual difference between people without necessarily treating these perceptual features as markers of different categories (Ellis et al. 2017, Liu et al. 2011, Quinn et al. 2016).

Categorization.—Once infants notice differences based on race, gender, or other features that correspond to markers of conventional social categories, the next step is to ask when (and again, by what mechanisms) they begin to categorize based on these criteria—whether they form categories that include members of the same category and exclude others. Generally, infants begin to categorize human faces into subordinate types by approximately six months of age—for instance, six-month-olds form discrete categories of attractive and unattractive faces (Ramsey et al. 2004). Around this age, infants also begin to categorize faces by emotional expressions (Kotsoni et al. 2001), and they categorize people according to conventional gender categories between seven and ten months of age. For example, Leinbach & Fagot (1993) found that nine-month-old infants who were habituated to female

faces subsequently recovered attention when presented with new male faces (but not new female faces), suggesting that they categorized the faces into distinct gender categories.

Habituation paradigms indicate that infants also begin to categorize by race at approximately six months of age, with important developmental changes across the first year of life. For example, by approximately six months old, infants begin to form a distinct category of own-race faces (at least when they are in the racial majority in their environment), but do not yet form distinct categories of faces of other racial backgrounds (Anzures et al. 2010). Infants then begin to form categories of less familiar race faces at approximately nine months old, and perhaps begin to categorize into distinct own- and other-race face categories (sometimes lumping all other-race faces into one group) at approximately 12 months of age (Quinn et al. 2016; see also Balas & Quinn 2015).

Implications of perceptual foundations.—In sum, infants begin to parse the world of human faces into perceptual categories that correspond to important conventional social categories across the first year of life—first noticing these differences, then gradually developing tendencies to classify faces based on these criteria. These processes appear driven by familiarity-based mechanisms, and thus are highly dependent on infants' environments (including the racial and ethnic diversity of their family and community and the genders of their caregivers), as well as on structural factors such as cues to competition and cooperation in their social environment (Ferera et al. 2018). One perceptual consequence of these developing categories appears to be loss of ability to individuate people who are classified together as members of a less familiar group. For instance, the other-race effect—wherein people are better at recognizing individuals of their own than of other racial backgrounds—emerges across infancy (Kelly et al. 2007), in an environment-dependent manner (Anzures et al. 2013). To illustrate, White infants in relatively homogeneous environments can differentiate individuals regardless of racial background at three months old, but by nine months old they can do so only for faces of their own race (Kelly et al. 2007), unless they are provided targeted experiences with diverse faces via books and media (Liu et al. 2015).

Beyond impeding individuation, whether these early perceptual categories have other psychological and social consequences, and how they relate to the conceptually rich representations held by older children and adults, remains unclear. On the perceptual-social linkage account (Lee et al. 2017), these basic perceptual processes directly give rise to racial biases. For instance, Lee et al. (2017) suggest that greater perceptual exposure to own-race faces, accompanied by mostly positive experiences (e.g., positive facial expressions), leads to implicit racial bias. Yet, how broadly these effects extend (for example, if perceptual experience alone can also influence more explicit or behavioral forms of prejudice) remains unknown. Also, there is a considerable time lag between when these perceptual processes begin to operate in infancy and the emergence of clear-cut racial bias in attitudes, beliefs, or behavior (Kinzler & Spelke 2011, Mandalaywala et al. 2018), pointing to the importance of additional developmental processes—beyond early visual biases—in shaping the development of more mature (and problematic) forms of social bias.

Conceptual Foundations

The previous section examined how infants begin to parse the world of human faces using criteria that correspond to conventional social categories. Now we address a distinct question: What is the nature of early conceptual representations of social groupings? As introduced above, categories serve as critical cognitive economizers, allowing people to draw inferences about individuals that they have never before encountered (Quinn 2011, Rips 1975). But what types of inferences are licensed by particular categories? A general claim that categories license predictions about similarity is too unspecified; there are countless ways that people are similar to and different from one another, and not all are related to category membership (Murphy 2002, Murphy & Medin 1985). In early conceptual development, children rely on abstract, intuitive theories about the structure of particular domains to guide category-based inferences in systematic ways [for example, they expect members of the same animal species to share biological properties and members of the same artifact category to share functional ones (Gopnik & Wellman 2012, Wellman & Gelman 1998)]. From this perspective, we can begin to probe the nature of children's theories of the social world by testing the types of inferences that they view as licensed by social groupings.

Categories constrain social interaction.—An early emerging component of children's abstract beliefs about the structure of the social world appears to be an intuition that group members hold special obligations to one another (Rhodes 2013a). For example, by at least the second year of life, infants expect group members to help one another. To illustrate, Jin & Baillargeon (2017) familiarized 17-month-old infants with two novel groups marked by labels and perceptual features. They then presented scenes in which a member of each group needed help accomplishing a goal, and a member of one of the groups was capable of providing the necessary help. Infants looked longer (in this case, indicating a violation of their expectations) when the agent chose to help a member of the other group rather than a member of the agent's own, indicating that infants have an abstract expectation that group members support one another more than people from other groups. Pun and colleagues (A. Pun, A.S. Birch & A.S. Baron, manuscript under review) extended this work to infants as young as nine months of age, demonstrating that they also expect agents to help the in-group even when that help comes in the form of harming the out-group (e.g., pushing down an out-group member so someone from the in-group can accomplish their goal). Consistent with these findings, 16-month-old infants expect group members to harm rather than help characters who have previously harmed members of their own group (Rhodes et al. 2015). Furthermore, one- and two-year-old children expect agents to preferentially share resources with their own group members [when fair distributions are not possible (Bian et al. 2018)] and to refrain from helping characters who have previously harmed the agents' group members (Ting et al. 2019).

Thus, basic expectations that group members cooperate and help one another more than members of other groups appear to comprise an early emerging component of how children understand the social world and, as noted above, is a central feature of adults' intergroup cognition. Studies examining how slightly older children reason about novel social groups with which they have had no previous experience or knowledge and are not members themselves provide further evidence for this expectation. By age three, children expect

characters from minimal, novel (often made-up) social groups to harm members of other groups rather than members of the characters' own group (Rhodes 2012). They also view it as more morally objectionable for an agent to harm a member of the agent's own group (Rhodes & Chalik 2013) and appeal directly to category membership to explain why a person would harm a member of another group and help one of their own (Chalik & Rhodes 2015, Rhodes 2014). Furthermore, children of this age also expect members of groups to come to each other's aid during intergroup conflict (Chalik & Rhodes 2014). This basic expectation that group members support one another in times of conflict could also contribute to why infants expect larger groups to prevail during intergroup conflict (Pun et al. 2016) and are surprised when an in-group member supports an out-group member during an episode of intergroup conflict (A. Pun, A.S. Birch & A.S. Baron, manuscript under review).

Categories as markers of conventional behaviors.—Young children also view social categories as determining how people ought to behave beyond interpersonal obligations to support and protect one another. For example, four-year-olds expect members of the same social group to be beholden to the same social norms; they will not generalize the property of “liking to dance before bedtime” from one category member to another, but will generalize the property of “is *supposed* to dance before bedtime” across members of the same kind (Kalish 2012, Kalish & Lawson 2008). Children also use information about shared social norms (e.g., regarding clothes and foods) to identify category members (Foster-Hanson & Rhodes 2019b, Kalish & Lawson 2008), think there is something wrong with individual category members who do not follow the norms of their group (Roberts et al. 2017), and track agreement to take on category norms as a marker of group membership (Foster-Hanson & Rhodes 2019b, Noyes & Dunham 2017). Even infants appear to generalize behavioral norms across members of social categories (Lieberman et al. 2014, 2017, 2018; Powell & Spelke 2018; Smith & Scott 2017).

Origins of conceptual foundations.—Infants' and young children's representations of social categories as constraining how people ought to behave raise a key theoretical question: From where do these expectations arise? Many theoretical perspectives suggest that a tendency to expect social groupings to mark patterns of cooperation and competition is a core, built-in, mechanism for navigating the social world. Some perspectives describe this as part of a moral core—that concepts like group loyalty or an ethic of community are built into humans' moral predispositions, presumably because morality evolved as a mechanism for regulating behavior across large groups of unrelated individuals whose survival depended on group-based cooperation (Graham et al. 2011, Rai & Fiske 2011, Shweder et al. 1987). Related ideas include proposals that humans have built-in capacities for tracking allegiance patterns because of the importance of using such patterns to predict behavior (and figuring out whom to trust) in contexts where relying on members of one's group was critical to human survival and reproduction (Kurzban et al. 2001, Pietraszewski et al. 2014). From this perspective, children learn to attend to social categories they encounter in their environment (e.g., race, religion, ethnicity) to the extent that they serve as cues to these allegiance patterns (Cosmides et al. 2003, Ferera et al. 2018), with the exception of some particular social divisions (e.g., based on linguistic cues) to which infants might be predisposed to

attend because they served as reliable markers of such social allegiances throughout the course of human evolution (Kinzler et al. 2010, Spelke & Kinzler 2007).

An alternate possibility, however, is that infants' and young children's expectations that social categories constrain how people ought to behave reflect more general tendencies to treat categories as marking normative structure. For instance, children's early-developing representations in the biological domain also reflect tendencies to expect categories to constrain how group members are supposed to behave—that cheetahs should run fast, as an illustration, and that there is something wrong with one that does not (Foster-Hanson et al. 2018, Foster-Hanson & Rhodes 2019a, Haward et al. 2018). Thus, from this perspective, children's beliefs that group members are supposed to support one another, that animals are supposed to display their characteristic properties, and that artifacts should do their intended functions all reflect a general belief that categories determine what their members are supposed to do, combined with learning mechanisms that interact with domain-specific input. On this account, in the social domain, children's general expectation that categories determine how their members are supposed to behave interacts with social input (that things such as interpersonal behavior, clothing style, and food choices have prescriptive weight) to shape the development of children's beliefs that these things define and are governed by category memberships (see, for example, Chalik & Dunham 2018). Regardless of how they develop, children's early theories of the structure of the social world—as they emerge or develop by age three—already constrain a range of behavioral, cognitive, and attitudinal phenomena in early childhood and across development, as we discuss in subsequent sections.

Social Foundations

In addition to the perceptual and conceptual processes that underlie social categorization, social-motivational processes are also central to this developing system. In particular, children are motivated to discover their own category memberships, to identify people who are “like them” (Meltzoff & Moore 1977), and to both discover and create the features that are associated with their own groups. According to social identity theory (Nesdale & Flesser 2001, Tajfel et al. 1979), social categories are unique in that people can identify with members of these groups; from this perspective, this process of self-identification actually fosters social categorization. Indeed, a rich tradition of research involving the minimal group paradigm (Sherif et al. 1961, Tajfel 1981, Tajfel et al. 1979) suggests that an own-group positivity bias emerges in response to any dimension of similarity shared between two individuals even in the absence of any sort of competitive or cooperative primes. For example, when adolescent boys were placed into two separate novel groups during a summer camp, researchers discovered that they soon began to form a distinct concept of group identity self-reinforced by generating a name (label) for their group, as well as by establishing group norms for clothing and behavior. Moreover, they sought ways to distinguish their newly formed social group from the other group by creating opportunities for intergroup competition and conflict. In other work, merely categorizing a person as either an in-group member or an out-group member automatically invites social evaluation and inductive reasoning, including the overextension of positive properties to in-group members and of negative properties to out-group members (Dunham 2018, Nesdale & Flesser 2001,

Patterson & Bigler 2006). Moreover, an in-group positivity bias emerges in the absence of any knowledge about one's group, or expectations of future interaction with group members, further suggesting that mere identification with a social group causally shapes the formation of intergroup evaluations.

Indeed, among preschool- and primary school-aged children, random assignment to a novel group of children is sufficient to activate social motivations to play more with in-group members, to trust in-group members more, to share more with in-group members, and to evaluate in-group members more favorably (for a review, see Dunham 2018). Additionally, children's own identification with their social group leads to selective memory for the prosocial and antisocial behaviors performed by in-group and out-group members, in a manner that reinforces a stronger positive evaluation of the in-group (Baron & Dunham 2015, Dunham 2018).

The roots of these social motivations to identify, affiliate with, and positively evaluate social groups appear to begin forming within the first year of life; infants prefer agents who are similar to them, including those who reveal themselves to have similar preferences (Mahajan & Wynn 2012) and those who speak their own language (Kinzler et al. 2007; see also Meltzoff 2007). Furthermore, Pun et al. (2017b) found that infants expect individuals who speak their language to behave prosocially, which may help explain observations that infants will choose to affiliate with, accept resources from, and imitate familiar but not unfamiliar individuals (because familiar individuals in these studies often belong to the same language group as the infant).

Taken together, these findings suggest that group membership functions as a schema, organizing knowledge about the self to promote and/or maintain an own-group positivity bias. Across domains, schemas function to organize knowledge, guide attention, and reinforce belief systems central to the schema (Bem 1981, Carter & Levy 1988, Garcia & Piaget 1989, Martin et al. 1995). In sum, throughout childhood, the very practice of social categorization is in part shaped by social motivations, including the desire to identify individuals as either in- or out-group members and early sensitivity to intergroup dynamics.

WHAT DEVELOPS?

Adult representations of social categories are variable across individuals, cultures, and historical time (Astuti et al. 2004, Hirschfeld 1996). At their most problematic, adult concepts of race, for example, can include the erroneous beliefs that race is a stable, objective marker of fundamentally distinct social kinds, that something deep and intrinsic differs between people from different racial groups that not only makes them different in apparently obvious ways, but also fundamentally constrains who they are and can become (Hirschfeld 1996, Rhodes & Mandalaywala 2017). These beliefs can even include intuitions that group differences (including those that involve, for example, access to resources, social power, and wealth) are the product of these essential differences [and thus reflect the way the world is supposed to be (Mandalaywala et al. 2017)]. These views of race (which are at the core of racist ideologies) are inaccurate and highly problematic and, although they are widespread and persistent among adults, are a far cry from the representational and

perceptual foundations observed in infancy and early childhood. For instance, toddlers and young children use social categories to make a limited range of inferences (e.g., about who will be friends with one another, who will share with, help, or harm one another), but often do not use these categories to predict individual properties, such as who will be good at a particular game or like to do an activity. How do children get from the limited representations they hold of these groups in early childhood to an adult perspective of thinking that some groups are fundamentally and inherently superior across a wide range of dimensions? We next discuss what is known about the developmental trajectory of elements of these beliefs—again mainly using race as a case study—as well as the mechanisms that underlie development and change.

Markers of Social Categories

A first step in the development of more adult-like social category representations is the tendency to systematically categorize people in particular ways across contexts. As mentioned above, people can be classified in countless ways across cultures and historical time—for example, by gender, race, ethnicity, religion, economic status, hair color, height, political orientation, sports teams, and classroom groups. Thus, systems of social categorization, perhaps more so than in other conceptual domains, need to be flexible and adaptable. The tendency to reliably categorize people in manners that correspond to culture-specific conventional groupings often shows a surprisingly long developmental trajectory. For example, the belief that race marks an objective way of dividing up the social world develops between ages seven and ten, in a manner that varies by the diversity of children's community and the political ideology of their parents. Similarly variable and protracted developmental trajectories for viewing particular categories as marking objective and stable ways of classifying people have also been found for categories based on religion, economic status, and other social divisions (Deeb et al. 2011, Diesendruck et al. 2013, Diesendruck & Haber 2009). Thus, although children attend to race-relevant information from infancy onward, and show some race-related attitudes and categorization behavior in structured experimental tasks by the preschool years, their spontaneous encoding of race (Weisman et al. 2015) and the development of the belief that race marks particularly informative ways of classifying people (instead of one possibility among many) show lengthy and variable developmental trajectories.

Children use a variety of contextual cues to identify relevant social categories in their environment, including proportional group size, segregation and other forms of functional use, patterns of intragroup cooperation and intergroup conflict (Ferera et al. 2018, Liberman et al. 2017, Rhodes & Brickman 2011), and labeling (Bigler & Liben 2007). Language plays a particularly powerful role in these processes (Baron et al. 2014; Diesendruck & Deblinger-Tangi 2014; Gelman et al. 2004; Gelman & Roberts 2017; Rhodes et al. 2012, 2018; Roberts & Gelman 2017; Segall et al. 2015; Waxman 2010). Across conceptual domains, children treat labels as “invitations to form categories” (Waxman & Markow 1995) and thus assume that individuals share an important category membership when they are marked with the same label. Indeed, children pay more attention to social categories (Rhodes et al. 2018, Roberts & Gelman 2017), expect social categories to be informative about their individual members (Waxman 2010), and show stronger category-related biases in their attitudes and

behaviors (Baron et al. 2014) when they are marked with labels than otherwise. Thus, one cultural cue that children use to identify meaningful categories in their environment across childhood involves tracking which noun labels refer to different groupings of people (Diesendruck & Deblinger-Tangi 2014, Waxman 2010).

Stability

A basic component of adults' representations of the social world is the idea that some social category memberships are a stable component of a person's identity. Adults often develop these beliefs about gender, race, ethnicity, sexual orientation, and religious categories (Haslam et al. 2000). Stability beliefs are one component of why adults might treat particular categories as informative—whereas category memberships that change across contexts might hold relatively limited predictive power, those that are expected to remain stable are likely to be more fundamental to identity and to more strongly constrain what someone is like across a wide range of dimensions (Kohlberg 1966, Ruble et al. 2004). Beliefs in the stability of particular identity categories (e.g., gender, race, ethnicity, religion) also show somewhat protracted developmental trajectories (e.g., Diesendruck & Haber 2009; Martin & Ruble 2010; Roberts & Gelman 2016, 2017). For example, although Hirschfeld (1995a) found that children begin to view race as stable between ages three to four, subsequent research has revealed these beliefs to be fairly fragile. White five-year-old children, for instance, thought that both emotional expression (Roberts & Gelman 2016) and language (Kinzler & Dautel 2012) were more stable than skin color over the course of an individual's lifespan. However, children from racial minority groups developed beliefs about racial stability at an earlier age (Kinzler & Dautel 2012). Thus, children's beliefs about which social categories are stable over time are acquired slowly across development in response to children's own environment and experiences (Deeb et al. 2011, Diesendruck & Haber 2009).

Homogeneity

The tendency to expect categories to be homogeneous—for members to be similar to each other in known and yet-to-be-discovered ways—is one of the most basic consequences of categorization, and one of the most straightforward consequences of social categorization to observe in early childhood. For example, by preschool age, children expect people of the same gender to share physical and behavioral properties even if they look different from one another (Gelman et al. 1986; see also, Diesendruck & HaLevi 2006, Heyman & Gelman 2000b). Yet, the properties that children expect group members to share, which categories they view as homogeneous, and what they think accounts for these similarities all undergo important changes across development (Kalish 2012, Segall et al. 2015, Shilo et al. 2018).

One process by which children develop the belief that certain socially relevant categories (e.g., race in the United States, religion in Northern Ireland, ethnicity in Israel) reflect groups of people that are fundamentally similar to each other and different from others is by tracking property clusters in their environment (Gelman 2003). For example, if children learn a series of regularities that relate to being a girl (e.g., that girls wear dresses, have long hair, and play with dolls), they might form an overhypothesis about the structure of the category (that girls in general have a lot in common with one another) and thus assume that

girls will also share new properties that they have not yet discovered (Gopnik & Wellman 2012, Xu & Kushnir 2013). Importantly, children can track both property regularities that they observe themselves and those they hear expressed through language (e.g., through generic claims about categories, such as a speaker saying that, “girls wear pink” or “girls wear dresses”). In this way, children might form the general beliefs that a particular category (in this case, girls) is homogeneous and inductively informative simply from hearing other people describe the category in a way that implies that it has this structure, even if they do not observe any category-based regularities themselves (Foster-Hanson et al. 2019, Rhodes et al. 2012). Indeed, hearing adults make generic claims about categories via language fosters the development of children’s beliefs that those categories mark fundamental similarities among category members and differences between groups (Gelman & Roberts 2017).

Intrinsic Causes

A particularly problematic component of adults’ representations of race and other social categories is the idea that category members are deeply similar to each other because of something intrinsic to the category. For example, this view can give rise to the problematic beliefs that differences across groups in things such as math achievement, employment in prestigious fields, political leadership, or caretaking responsibilities are caused by something inherent to the group. This view of categories is central to essentialist intuitions about category structure, wherein people view some categories as “carving nature at its joint” and thus as reflecting stable, objective, and intrinsically determined similarities across group members and differences between groups (Gelman 2003).

Hirschfeld (1995b) argued that children view the similarities marked by race and other salient, culturally meaningful social categories as stemming from intrinsic causes by age three or four. In his experiments, children of these ages predicted that adopted children would match their birth parents with respect to skin color (in “switched-at-birth” experimental paradigms commonly used to study children’s beliefs about intrinsic causes; Gelman & Wellman 1991, Taylor 1996, Taylor et al. 2009, Waxman et al. 2007). Yet, subsequent research has found that children reason solely about skin color as a physical property in these paradigms; that is, they view skin color as heritable much like they view hair color, eye color, or other internal biological properties as heritable (Rhodes 2013b). But they do not necessarily view skin color as marking an important social identity category; indeed, in these paradigms, children judged social properties (e.g., intelligence, personality, athleticism, and musicality) as primarily socially acquired (Mandalaywala et al. 2019). Consistent with these findings, young children often do not use physical features associated with race (e.g., skin color) to predict people’s preferences, skills, or abilities (Shutts et al. 2013)—unless the importance of this feature is explicitly cued during the experimental task (Waxman 2010). The view that something intrinsic to being a member of a racial group causes both category membership and associated social and psychological properties, as with views about racial stability, shows a lengthy and variable developmental trajectory, again, patterns that have been replicated cross-culturally for other social divisions (Deeb et al. 2011, Diesendruck & HaLevi 2006, Segall et al. 2015, Smyth et al. 2017; for a review, see Rhodes & Mandalaywala 2017).

Beliefs that category-based regularities stem from intrinsic causes—which can be particularly pernicious in the social domain [by indicating that differences in achievement and social power, for example, reflect the inherent potential of each group (Hussak & Cimpian 2015, Leslie et al. 2015)]—can (as with homogeneity beliefs) be understood as arising from the basic processes that underlie how children make sense of their environment. For example, as children notice category-wide similarities (such as that girls tend to like similar colors, toys, etc.), a basic tendency to assume inherent causes for category features (Cimpian & Salomon 2014, Schulz & Sommerville 2006) can lead children to infer the presence of some internal causal power (that there is something inherent to girls that makes them like pink and dolls). Of course, if extrinsic causes are made salient (e.g., children are told that girls only play with dolls because adults tend to buy them), this process can be over-ridden (Vasilyeva et al. 2018). But in the absence of explicit external causal information, children (and adults) tend to default to assuming an intrinsic cause (Cimpian & Steinberg 2014, Hussak & Cimpian 2018). Again, the process of overhypothesis formation (wherein children assume that some intrinsic cause explains why girls play with dolls, why they like pink, why they wear dresses, etc.) can then lead children to infer that there is some deep causally powerful mechanism (the category essence) that explains all of these (and those yet-to-be discovered) regularities. As for homogeneity, these processes can be triggered solely by linguistic descriptions of category regularities (Gelman et al. 2010, Rhodes et al. 2012, Segall et al. 2015), as well as from children’s direct observations.

Whereas beliefs that certain categories are stable, homogeneous, and explained by intrinsic mechanisms might relate to one another, and all reflect components of essentialist thinking, these beliefs are often dissociable from one another (Gelman et al. 2007, Haslam 2000, Noyes & Keil 2019, Rhodes & Mandalaywala 2017). To illustrate, children could observe a regularity of a class of students wearing pink shirts on the playground, but understand that this is due to a rule that students wear the color of their classroom when they go outside, in which case children might view the category as homogeneous with respect to clothing color but not view this regularity as having an inherent cause (Vasilyeva et al. 2018). Categories in the social world—perhaps more so than categories in other domains (e.g., of animal species)—are highly variable. For instance, categories and behavioral regularities that are highly salient in one context (e.g., at school) might be not at all relevant in another (at home). Thus, particularly in the social domain, various components of essentialist beliefs are likely to develop in a piecemeal fashion, and in a manner that is highly responsive to children’s experiences, including children’s own group memberships (Kinzler & Dautel 2012, Mandalaywala et al. 2019), the diversity of their environments (Deeb et al. 2011, Smyth et al. 2017), the beliefs and attitudes of their parents (Rhodes et al. 2012, Segall et al. 2015), etc.

Category-Based Status Hierarchies

Another key component of adult representations of the social world includes expectations about status hierarchies. For a variety of complex historical, political, and social-psychological factors, social group memberships and social status are intertwined with one another across cultures. Basic conceptual capacities for representing status hierarchies emerge in the first year of life. For instance, infants use cues based on physical size, group

size, and control over resources to predict who will win dominance contests (Gazes et al. 2017, Mascaro & Csibra 2012, Pun et al. 2016, Thomsen et al. 2011). Infants also expect status to generalize across members of a group and can reason transitively about status across individuals in a chain (Pun et al. 2017a). Preschool-aged children use many of these same cues to predict dominance in more explicit, language-based tasks—expecting people who are bigger, or have control over resources or decision-making power, to be more likely to “be the boss” or “in charge” (Gülgöz & Gelman 2017, Terrizzi et al. 2019), and even prefer to learn from more dominant people.

By approximately four years old, children begin to recognize the status hierarchies among social groups that structure their local social environment. For instance, both White and Black four-year-olds in the United States and South Africa are more likely to think that more White families than Black families live in nice houses and own expensive possessions (Olson et al. 2012, Shutts 2015, Shutts et al. 2016; see also, Mandalaywala et al. 2019). These findings generally hold across children from diverse racial and economic backgrounds, suggesting that children’s responses reflect an abstract awareness of societal messages about status, rather than simpler forms of in-group bias (Shutts 2015). Also consistent with this conclusion, across ages three to seven, children of both genders begin to rank boys as higher than girls when determining who gets to make decisions for other people (Mandalaywala et al. 2019). Similarly, on measures of implicit racial bias, children as young as age five seem to internalize the relative social status of their in-group with respect to other categories of race (Baron 2015, Baron & Banaji 2009).

Whether children think that such status differences reflect something intrinsic to the categories or more extrinsic or structural factors is likely to moderate whether beliefs about race-based status hierarchies either contribute to or help mitigate the development of racial prejudice (Hussak & Cimpian 2015, Mandalaywala et al. 2017, Tworek & Cimpian 2016). Young children do indeed sometimes represent status hierarchies between groups as stemming from intrinsic causes (Hussak & Cimpian 2015), but whether and when they do so for race, and other social categories they encounter as correlated with status in their daily lives, along with what shapes the development of these beliefs, are critical areas for future study.

Group Dynamics

In addition to status-related beliefs, children also develop beliefs about group dynamics over the course of early childhood (Rutland et al. 2010). As reviewed above, infants’ early representations of social groups already include a component about group dynamics (Bian et al. 2018, Jin & Baillargeon 2017, Powell & Spelke 2018, Pun et al. 2016). From these foundations, children develop more complex ideas over the rest of childhood. These include, for instance, more nuanced appreciation of the contexts in which members of a group provide support for one another (Chalik & Rhodes 2018, Rutland et al. 2010), an explicit appreciation of the importance of group loyalty (Misch et al. 2016, 2018), more elaborate understanding of group-specific norms (Cooley & Killen 2015), an understanding of a sense of collective responsibility that group members feel for one another’s actions (Over et al. 2016), and a broadening scope of which types of behaviors are constrained by group-based

norms and obligations (Hitti & Killen 2015). With all of these developing understandings, children come to use group members to explain, predict, and evaluate social behaviors in a broader range of circumstances.

CONSEQUENCES OF SOCIAL CATEGORIZATION

Evaluative Preferences

Children's emerging and developing representations of social categories also serve to organize the social world by guiding intergroup evaluations in young children (Baron et al. 2014, Diesendruck & HaLevi 2006, Rothbart & Taylor 1992, Shutts 2015, Shutts et al. 2016). Within the first year of life, infants begin to construct representations of ecologically relevant social categories such as gender, race, and language (in many cultures), perhaps initially based on an abstract notion of familiar/unfamiliar and to exhibit an evaluative preference for the familiar group (Baron 2015, Kinzler et al. 2007, Meltzoff 2007, Pun et al. 2017b, Ramsey et al. 2004, Shutts et al. 2016, Xiao et al. 2018). For instance, infants are more likely to accept a toy from a member of a familiar group and even are faster to habituate to members of the familiar group paired with positive affective stimuli (e.g., smiling faces, friendly music) compared to when those individuals are paired with negative affective stimuli.

In addition to an evaluative preference for individuals from familiar social groups, research within the minimal group paradigm suggests that children form both implicit and explicit social group evaluations almost immediately following identification with a group (Baron & Dunham 2015, Bigler et al. 1997, Dunham 2018, Dunham et al. 2011, Spielman 2000). Such findings, when coupled with recent evidence that even young infants exhibit a preference for individuals who exhibit similar preferences as themselves (Hamlin et al. 2013, Mahajan & Wynn 2012), suggest that at least for the social categories with which people identify, positive evaluations of those groups may form automatically (Dunham 2018). That is, even though a plethora of factors shape the magnitude and direction of intergroup evaluations across the lifespan, the initial evaluation of groups may be triggered automatically from processes involved in social categorization itself (also see Bargh & Chartrand 1999).

Children also form intergroup evaluations based on abstract representations of social groups, including perceptions of social dominance and social status (e.g., wealth cues). For example, young children appear to prefer higher status social groups, and may even come to expect that inequality between groups will occur and thus is acceptable (Enright et al. 2017, Horwitz et al. 2014, Mascaro & Csibra 2012, Pun et al. 2016, Shutts et al. 2016, Starmans et al. 2017, Thomsen et al. 2011). Taken together, these findings reviewed here suggest that young children readily, if not automatically, form evaluations of social categories that are predicted over abstract dimensions of group identity (e.g., such as like me in-group/out-group) as well as the perceived social standing of the group (Dunham et al. 2013).

Representations of group identity and group status also interact in the development of social group attitudes. Concerning the development of implicit (often considered automatic, unconscious, and difficult to control) race attitudes, although most theories had argued that they form over a protracted period of development (Devine 1989, Greenwald & Banaji 1995,

Rudman 2004, Rudman et al. 2007), implicit racial bias emerges surprisingly early in development, with striking stability across age (e.g., Baron 2015; Baron & Banaji 2006, 2009; Dunham et al. 2006, 2007, 2013, 2014; Newheiser & Olson 2012; Raabe & Beelmann 2011; Rutland et al. 2005; Setoh et al. 2017; Steele et al. 2018; Williams & Steele 2017). Indeed, by age three, children from diverse social groups exhibit implicit preferences based on race at levels that are often (but not always) statistically indistinguishable from adults, and these biases appear to be at least initially driven by in-group favoritism as well as a preference for high-status racial groups (Baron 2015; Buttleman & Böhm 2014; Dunham et al. 2006, 2007, 2008, 2013, 2019; Gibson et al. 2017; Newheiser et al. 2014; Qian et al. 2016; Steele et al. 2018; Williams & Steele 2017).

Similarly, more explicit measures of bias reveal the emergence of race attitudes between the ages of three and four. In contrast to what is typically observed with implicit measures, these explicit attitudes (positive attitudes toward the in-group and negative attitudes toward the out-group) often peak at approximately age seven before subsequently declining (on average) across the school-aged years, often leading to more egalitarian attitudes in later adolescence/early adulthood. Although not the focus of this review, it is worth noting that the decline in explicit race bias reported across adolescence does not suggest a parallel decline in hostility or prejudice toward racial out-groups. Indeed, as many social psychologists have noted, one of the primary limitations of explicit measures of intergroup cognition is that they can be influenced by social desirability concerns, and among many cultures it is considered inappropriate to express negativity toward others based on race (Devine 1989, Greenwald & Banaji 1995). Consistent with implicit measures, young children's initial explicit intergroup evaluations often entail positive attitudes toward their in-group without corresponding negative attitudes toward their out-group, which may not emerge until sometime between ages six and seven (Aboud 1988, 2003; Buttleman & Böhm 2014; McGlothlin et al. 2005; McGlothlin & Killen 2006). Thus, positivity toward the in-group and negativity toward the out-group may rely on different developmental processes (for a similar discussion, see Pun et al. 2017b).

Behavioral Consequences

Social categories have a broad range of social and behavioral consequences. Although a full review of these consequences and their underlying mechanisms is beyond the scope of this review, here we briefly illustrate their pervasive effects by considering how stereotypes shape patterns of achievement. Children hold gender stereotypes about math beginning in early childhood, and the activation of these stereotypes can have important consequences for behavior (Cvencek et al. 2011, 2014). For example, gender stereotypes about math (viewing math as more associated with boys than girls) predict lower math self-concept and math achievement in elementary school-aged girls (Cvencek et al. 2015). Furthermore, as early as age six, young boys are more likely than girls to believe that members of their gender are brilliant, and these beliefs lead young girls to avoid activities that are described as being for children that are “really smart” (Bian et al. 2017).

Furthermore, Ambady et al. (2001) showed that activating gender (or race) identity influences children's performance on a math assessment. Specifically, when their gender

identity had been primed, girls in lower elementary school and middle school performed worse on a standardized math test (relative to children in a control condition). This finding suggests that girls in these studies had internalized gender stereotypes (that it is a domain more suited for males) and suffered when these stereotypes were activated by the priming manipulation. Similar effects have been found in other studies with girls as young as age five, demonstrating that stereotype-based performance effects can emerge relatively early in development (e.g., Galdi et al. 2014, Muzzatti & Agnoli 2007, Tomasetto et al. 2011; but see also Régner et al. 2014).

Girls' interest in STEM fields also appears to be mediated by their gender stereotypes. For example, girls who view STEM as more associated with boys express less academic interest and self-confidence in science and technology domains (Beghetto 2007, Cheryan et al. 2013, Master et al. 2016, McKenney & Voogt 2010, Shapiro & Williams 2012) and invest less energy trying to succeed in STEM courses (Steffens et al. 2010). Stereotypes about gender and math may also affect girls' academic choices by influencing how much they value math-related fields and their sense of belonging in those fields (Eccles et al. 1983, 1984). Indeed, adolescent girls are more likely to enroll in advanced mathematics courses if they view math as valuable for their future (Eccles & Wang 2016).

Girls' sense of belonging in math-related fields also appears to be influenced by gender stereotypes about the people and activities associated with STEM fields (Cheryan et al. 2009). For example, adolescent girls are more likely to express interest in computer science courses when the classroom environment fosters more gender-neutral associations with math and science (Master et al. 2016; see also Cheryan et al. 2013). These findings point to the role of cultural messages in shaping stereotypes and their influence on behavior, such that more gender-inclusive messages may result in greater gender equality in STEM. There are many other factors that contribute to the development of stereotypes and their influence on behavior, however. For instance, the strength of implicit and explicit math-gender stereotypes is related to the distribution of men and women in math-related fields (Cao & Banaji 2016, Eagly & Steffens 1984), and girls' math achievement is influenced by the number of female teachers that they are exposed to in STEM fields (Bottia et al. 2015). Furthermore, only a minority of primetime television characters with STEM careers are women (Cheryan et al. 2013, 2015; Eagly & Steffens 1984; Smith et al. 2002). Also, teachers' and parents' own gender stereotypes (Keller 2012) and levels of math anxiety (Beilock et al. 2010, Eccles & Jacobs 1986, Gunderson et al. 2012, Maloney et al. 2015, Nürnberger et al. 2016, Parsons et al. 1982) appear to directly influence children's developing representation of gender stereotypes. Together, this work underscores a broad set of factors that contribute to children's developing social category-based stereotypes.

REDUCING THE ADVERSE EFFECTS OF SOCIAL CATEGORIZATION IN CHILDREN

It is often difficult to change implicit bias in adults, and it is particularly challenging to do so in ways that persist over time (Lai et al. 2016). Childhood may be a more promising time to intervene, as children have experienced fewer years of reinforcement of cultural stereotypes

(making their biases less entrenched than those held by adults; Baron 2015). Indeed, several studies report the successful reduction of implicit racial bias in later childhood (Gonzalez et al. 2017a, Neto et al. 2015, Vezzali et al. 2011). In one study, Gonzalez et al. (2017b) examined the effectiveness of exposure to counterstereotypical exemplars in reducing negative attitudes toward racial out-groups among seven- and ten-year-olds. Compared to children in control conditions, which exposed children to positive White exemplars or positively valenced descriptions of flowers, brief exposure to positive Black exemplars reduced pro-White/anti-Black racial bias in children nine to twelve years of age (but not among children seven years of age). Similarly, K. Block, A.M. Gonzalez, C.J.X. Choi, Z.C. Wong & A.S. Baron (unpublished manuscript) examined implicit gender stereotypes following exposure to counterstereotypical exemplars with children ages seven to ten. Children in this study were exposed to vignettes of either stereotypical exemplars (i.e., boys who like math, girls who like reading) or counterstereotypical exemplars (e.g., girls who like math, boys who like reading). Children who were exposed to counterstereotypical exemplars no longer implicitly associated math with either boys or girls. This work suggests that brief exposure to exemplars can change implicit stereotypes immediately following the intervention.

Some interventions among children have even found change in implicit bias beyond the immediate postintervention assessment, which as noted above, is notoriously difficult to observe with adults. In one study, children showed significantly less implicit prejudice toward racial out-groups up to two years later following exposure to music over a 20-week period designed to foster more inclusive attitudes toward Black individuals (Neto et al. 2015). Specifically, 11-year-old children in the experimental condition were exposed to music from another culture, Cape Verdean music, and revealed a reduction in negative out-group attitudes. In another study, racial and ethnic bias has been successfully reduced following instructions to imagine episodes of out-group contact among Italian children, with effects lasting a full week post manipulation (Vezzali et al. 2011).

Successful attempts to reduce implicit race bias in younger children have also been observed. For example, Lee and colleagues (Qian et al. 2017, Xiao et al. 2015) found that training three-year-old children to perceptually individuate different Black faces (Xiao et al. 2015) led to lower levels of anti-Black racial bias that persisted for at least several months after the training. In this case, bias was reduced relative to both the period before the manipulation and to a comparison sample of children who were trained to individuate own-race faces. Furthermore, in a recent study A.M. Gonzalez, J.R. Steele, E.F. Chan, S.A. Lim & A.S. Baron (manuscript under review) found that exposing children to positive out-group exemplars reduced implicit bias more for children (ages seven and ten) than for adults, providing the first direct evidence that implicit bias may be easier to change earlier in development.

Social categorization does not only lead to negative effects on intergroup bias; there are positive consequences of social categorization as well. Although there is not more room to expand on these issues here, we note that fostering a positive sense of racial identity among Black adolescents is positively associated with academic achievement and mental health outcomes (Neblett et al. 2012). Also, Black adolescents who have a strong sense of racial

identity are better equipped to handle experiences with discrimination (Seaton et al. 2009). In previous work, research on the negative and positive consequences has often been conducted separately, often using very different methods and involving children from very different populations. In future work, it would be useful to integrate these literatures to move toward a more comprehensive framework for understanding the mechanisms by which social categorization can have negative and positive consequences for development and intergroup relations.

SUMMARY

Early in life children reveal a sophisticated ability to hone in on culturally meaningful groupings. From infancy, children begin to form representations of culturally significant dimensions of social groupings, including those based on gender, race, attractiveness, and spoken language (Bar-Haim et al. 2006, Kinzler et al. 2007, Maccoby 1988, Ramsey et al. 2004). Although the perceptual, conceptual, and social foundations of social categorization are in place or develop in infancy, the psychological processes and representations that underlie social categorization also go through extensive development across childhood and beyond. Indeed, over the first few years of life, children's social category concepts become substantially enriched and begin to constrain certain patterns of social interaction and obligation. Beginning in the preschool years, children start to integrate these systems—mapping their conceptual expectations about the structure and function of social groups onto salient social divisions in their communities. For instance, while four-year-olds can represent a variety of social categories, many children of this age do not yet use these categories to predict that individuals will have shared features (such as sharing similar preferences, experiences, traits, or abilities (Baron et al. 2014, Kalish 2002, Mandalaywala et al. 2018, Rhodes 2013, Rhodes et al. 2012, Shutts et al. 2013). In these examples, children do not yet use these categories to predict that individuals will have shared features, even though they can recognize the category. These are not cases of children ignoring categories; instead, they illustrate an importance of cultural learning to shape their theories of social structure and category meaning.

Across childhood, children begin to revise and elaborate their beliefs about the nature of social categories, such that they begin to view some social groupings as marking something essential and fundamental about their members. As they do so, children begin to use certain (select) social categories to draw a broader range of inferences about their members, eventually supporting adult-like patterns of inference later in childhood (Astuti et al. 2004; Diesendruck & HaLevi 2006; Gelman 2003; Heyman & Gelman 1998, 1999, 2000a; Hirschfeld 1996; Liu et al. 2007; Taylor & Gelman 1993). Crucially, representations of social categories also shape patterns of intergroup evaluation, stereotyping and behavior, eventually forming the cornerstone of mature social cognition observed in adults.

Although identifying the foundations of social categorization in early development is a crucial step to identifying how the rich and problematic systems of social categorization that shape adult behavior develop, it is only the beginning. While infants learn to categorize by race within the first year of life, they certainly do not yet have racial stereotypes or racist ideologies (e.g., ideas that racial groups differ in terms of intelligence, other abilities, or

personality traits). The basic idea that skin color marks social categories that are stable and meaningful ways of dividing up the social world—which seems foundational to the development of stereotyping, prejudice, and discrimination—shows a lengthy, culture-dependent developmental trajectory across childhood (Kinzler & Dautel 2012; Rhodes & Gelman 2009; Roberts & Gelman 2016, 2017). As such, it is crucial to understand how social categories such as race are associated with social status and with the continuing consequences of systemic racism (e.g., Kraus & Tan 2015, Piff et al. 2018). Underscoring the practical importance of drawing on developmental science, insights from research on the development of social categorization promise to shed light not only on the pernicious effects of social categorization across the lifespan, but also on the role social categorization processes can play in fostering greater tolerance in intergroup contexts.

ACKNOWLEDGMENTS

Preparation of this article was partially supported by the Eunice Kennedy Shriver National Institute of Child Health & Human Development of the National Institutes of Health under Award Number R01HD087672 to M.R. It was also partially supported by Social Sciences and Humanities Research Council grants (435-2013-0286 and 895-2016-2011) to A.B.

LITERATURE CITED

- About FE. 1988 *Children & Prejudice*. Cambridge, MA: Basil Blackwell, Inc.
- About FE. 2003 The formation of in-group favoritism and out-group prejudice in young children: Are they distinct attitudes? *Dev. Psychol* 39:48–60 [PubMed: 12518808]
- Ahn W-K, Kim NS, Lassaline ME, Dennis MJ. 2000 Causal status as a determinant of feature centrality. *Cogn. Psychol* 41(4):361–416 [PubMed: 11121260]
- Ambady N, Paik SK, Steele J, Owen-Smith A, Mitchell JP. 2004 Deflecting negative self-relevant stereotype activation: the effects of individuation. *J. Exp. Soc. Psychol* 40(3):401–8
- Ambady N, Shih M, Kim A, Pittinsky TL. 2001 Stereotype susceptibility in children: effects of identity activation on quantitative performance. *Psychol. Sci* 12(5):385–90 [PubMed: 11554671]
- Anzures G, Quinn PC, Pascalis O, Slater AM, Lee K. 2010 Categorization, categorical perception, and asymmetry in infants' representation of face race. *Dev. Sci* 13(4):553–64 [PubMed: 20590720]
- Anzures G, Quinn PC, Pascalis O, Slater AM, Lee K. 2013 Development of own-race biases. *Vis. Cogn* 21(9–10):1165–82
- Aronson J, Lustina MJ, Good C, Keough K, Steele CM, Brown J. 1999 When White men can't do math: necessary and sufficient factors in stereotype threat. *J. Exp. Soc. Psychol* 35(1):29–46
- Astuti R, Solomon GEA, Carey S. 2004 Constraints on conceptual development: a case study of the acquisition of folkbiological and folksociological knowledge in Madagascar. *Monogr. Soc. Res. Child Dev.* 69(3):277
- Balas B, Quinn PC. 2015 Simulating classification of face race by infants: similarities and differences between model and infant looking performance. Paper presented at the Meeting of the Society for Research in Child Development, Philadelphia
- Bargh JA, Chartrand TL. 1999 The unbearable automaticity of being. *Am. Psychol* 54(7):462–79
- Bar-Haim Y, Ziv T, Lamy D, Hodes RM. 2006 Nature and nurture in own-race face processing. *Psychol. Sci* 17(2):159–63 [PubMed: 16466424]
- Baron AS. 2015 Constraints on the development of implicit intergroup attitudes. *Child Dev. Perspect* 9(1):50–54
- Baron AS, Banaji MR. 2006 The development of implicit attitudes: evidence of race evaluations from ages 6 and 10 and adulthood. *Psychol. Sci* 17(1):53–58 [PubMed: 16371144]
- Baron AS, Banaji MR. 2009 Evidence of system justification in children. *Soc. Psychol. Compass* 3:918–26

- Baron AS, Dunham Y. 2015 Representing “us” and “them”: building blocks of intergroup cognition. *J. Cogn. Dev* 16(5):780–801
- Baron AS, Dunham Y, Banaji M, Carey S. 2014 Constraints on the acquisition of social category concepts. *J. Cogn. Dev* 15(2):238–68
- Beghetto RA. 2007 Factors associated with middle and secondary students’ perceived science competence. *J. Res. Sci. Teach* 44:800–14
- Beilock SL, Gunderson EA, Ramirez G, Levine SC. 2010 Female teachers’ math anxiety affects girls’ math achievement. *PNAS* 107:1860–63 [PubMed: 20133834]
- Beilock SL, Rydell RJ, McConnell AR. 2007 Stereotype threat and working memory: mechanisms, alleviation, and spillover. *J. Exp. Psychol. Gen* 136:256–76 [PubMed: 17500650]
- Bem SL. 1981 Gender schema theory: a cognitive account of sex typing. *Psychol. Rev* 88(4):354–64
- Bian L, Leslie SJ, Cimpian A. 2017 Gender stereotypes about intellectual ability emerge early and influence children’s interests. *Science* 355:389–91 [PubMed: 28126816]
- Bian L, Sloane S, Baillargeon R. 2018 Infants expect ingroup support to override fairness when resources are limited. *PNAS* 115(11):2705–10 [PubMed: 29483252]
- Bigler RS, Jones LC, Lobliner DB. 1997 Social categorization and the formation of intergroup attitudes in children. *Child Dev.* 68(3):530–43 [PubMed: 9249964]
- Bigler RS, Liben LS. 2007 Developmental intergroup theory: explaining and reducing children’s social stereotyping and prejudice. *Curr. Dir. Psychol. Sci* 16(3):162–66
- Bloom P 1998 Theories of artifact categorization. *Cognition* 66(1):87–93 [PubMed: 9675980]
- Bodenhausen GV. 1988 Stereotypic biases in social decision making and memory: testing process models of stereotype use. *J. Pers. Soc. Psychol* 55:726–37 [PubMed: 3210142]
- Bottia MC, Stearns E, Mickelson RA, Moller S, Parker AD. 2015 The relationships among high school STEM learning experiences and students’ intent to declare and declaration of a STEM major in college. *Teach. Coll. Rec* 117:1–46
- Buttleman D, Böhm R. 2014 The ontogeny of the motivation that underlies in-group bias. *Psychol. Sci* 25:921–27 [PubMed: 24474724]
- Cao J, Banaji MR. 2016 The base rate principle and the fairness principle in social judgment. *PNAS* 113:7475–80 [PubMed: 27325760]
- Carter DB, Levy GD. 1988 Cognitive aspects of early sex-role development: the influence of gender schemas on preschoolers’ memories and preferences for sex-typed toys and activities. *Child Dev.* 59(3):782–92
- Chalik L, Dunham Y. 2018 Beliefs about moral obligation structure children’s social category-based expectations. *Child Dev.* 10.1111/cdev.13165. In press
- Chalik L, Rhodes M. 2014 Preschoolers use social allegiances to predict behavior. *J. Cogn. Dev* 15(1):136–60
- Chalik L, Rhodes M. 2015 The communication of naïve theories of the social world in parent-child conversation. *J. Cogn. Dev* 16(5):719–41
- Chalik L, Rhodes M. 2018 Learning about social category-based obligations. *Cogn. Dev* 48(June):117–24
- Cheryan S, Master A, Meltzoff AN. 2015 Cultural stereotypes as gatekeepers: increasing girls’ interest in computer science and engineering by diversifying stereotypes. *Front. Psychol* 6:49 [PubMed: 25717308]
- Cheryan S, Plaut VC, Davies PG, Steele CM. 2009 Ambient belonging: how stereotypical cues impact gender participation in computer science. *J. Pers. Soc. Psychol* 97:1045–60 [PubMed: 19968418]
- Cheryan S, Plaut VC, Handron C, Hudson L. 2013 The stereotypical computer scientist: gendered media representations as a barrier to inclusion for women. *Sex Roles* 69:58–71
- Cimpian A, Salomon E. 2014 The inherence heuristic: an intuitive means of making sense of the world, and a potential precursor to psychological essentialism. *Behav. Brain Sci.* 37(5):461–80 [PubMed: 24826999]
- Cimpian A, Steinberg OD. 2014 The inherence heuristic across development: systematic differences between children’s and adults’ explanations for everyday facts. *Cogn. Psychol* 75:130–54 [PubMed: 25291062]

- Cooley S, Killen M. 2015 Children's evaluations of resource allocation in the context of group norms. *Dev. Psychol* 51(4):554–63 [PubMed: 25664833]
- Correll J, Urland GL, Ito TA. 2006 Event-related potentials and the decision to shoot: the role of threat perception and cognitive control. *J. Exp. Soc. Psychol* 42:120–28
- Cosmides L, Tooby J, Kurzban R. 2003 Perceptions of race. *Trends Cogn. Sci* 7:173–79 [PubMed: 12691766]
- Cvencek D, Kapur M, Meltzoff AN. 2015 Math achievement, stereotypes, and math self-concepts among elementary-school students in Singapore. *Learn. Instr* 39:1–10
- Cvencek D, Meltzoff AN, Greenwald AG. 2011 Math-gender stereotypes in elementary school children. *Child Dev.* 82(3):766–79 [PubMed: 21410915]
- Cvencek D, Meltzoff AN, Kapur M. 2014 Cognitive consistency and math-gender stereotypes in Singaporean children. *J. Exp. Child Psychol.* 117(1):73–91 [PubMed: 24141205]
- Danaher K, Crandall CS. 2008 Stereotype threat in applied settings re-examined. *J. Appl. Soc. Psychol* 38:1639–55
- Deeb I, Segall G, Birnbaum D, Ben-Eliyahu A, Diesendruck G. 2011 Seeing isn't believing: the effect of intergroup exposure on children's essentialist beliefs about ethnic categories. *J. Pers. Soc. Psychol* 101(6):1139–56 [PubMed: 22059842]
- Devine PG. 1989 Stereotypes and prejudice: their automatic and controlled components. *J. Pers. Soc. Psychol* 56:5–18
- Diesendruck G, Deblinger-Tangi R. 2014 The linguistic construction of social categories in toddlers. *ChildDev.* 85(1):114–23
- Diesendruck G, Goldfein-Elbaz R, Rhodes M, Gelman S, Neumark N. 2013 Cross-cultural differences in children's beliefs about the objectivity of social categories. *Child Dev.* 84(6):1906–17 [PubMed: 23581723]
- Diesendruck G, Haber L. 2009 God's categories: the effect of religiosity on children's teleological and essentialist beliefs about categories. *Cognition* 110(1):100–14 [PubMed: 19058796]
- Diesendruck G, HaLevi H. 2006 The role of language, appearance, and culture in children's social category-based induction. *Child Dev.* 77(3):539–53 [PubMed: 16686787]
- Dunham Y 2018 Mere membership. *Trends Cogn. Sci* 22(9):780–93 [PubMed: 30119749]
- Dunham Y, Arechar AA, Rand DG. 2019 From foe to friend and back again: the temporal dynamics of intra-party bias in the 2016 U.S. Presidential Election. *Judgm. Decis. Mak* 14(3):373–80
- Dunham Y, Baron AS, Banaji MR. 2006 From American city to Japanese village: a cross-cultural investigation of implicit race attitudes. *Child Dev.* 77(5):1268–81 [PubMed: 16999797]
- Dunham Y, Baron AS, Banaji MR. 2007 Children and social groups: a developmental analysis of implicit consistency in Hispanic Americans. *Self Identity* 6(2/3):238–55
- Dunham Y, Baron AS, Banaji MR. 2008 The development of implicit intergroup cognition. *Trends Cogn. Sci* 12(7):248–53 [PubMed: 18555736]
- Dunham Y, Baron AS, Carey S. 2011 Consequences of “minimal” group affiliations in children. *Child Dev.* 82(3):793–811 [PubMed: 21413937]
- Dunham Y, Chen EE, Banaji MR. 2013 Two signatures of implicit intergroup attitudes: developmental invariance and early enculturation. *Psychol. Sci* 24(6):860–68 [PubMed: 23558550]
- Dunham Y, Newheiser AK, Hoosain L, Merrill A, Olson KR. 2014 From a different vantage: Intergroup attitudes among children from low- and intermediate-status racial groups. *Soc. Cogn* 32(1):1–21
- Eagly AH, Steffens VJ. 1984 Gender stereotypes stem from the distribution of women and men into social roles. *J. Pers. Soc. Psychol* 46:735–54
- Eccles JS, Adler TF, Futterman R, Goff SB, Kaczala CM, et al. 1983 Expectancies, values, and academic behaviors In *Achievement and Achievement Motivation*, ed. Spence JT, pp. 75–146. San Francisco, CA: W. H. Freeman
- Eccles JS, Adler TF, Meece JL. 1984 Sex differences in achievement: a test of alternate theories. *J. Pers. Soc. Psychol* 46(1):26–43
- Eccles JS, Jacobs JE. 1986 Social forces shape math attitudes and performance. *Signs* 11:367–80

- Eccles JS, Wang M. 2016 What motivates females and males to pursue careers in mathematics and science? *Int. J. Behav. Dev* 40:100–6
- Ellis AE, Xiao NG, Lee K, Oakes LM. 2017 Scanning of own- versus other-race faces in infants from racially diverse or homogenous communities. *Dev. Psychobiol* 59(5):613–27 [PubMed: 28577346]
- Enright EA, Gweon H, Sommerville JA. 2017 To the victor go the spoils: Infants expect resources to align with dominance structures. *Cognition* 164:8–21 [PubMed: 28346870]
- Ferera M, Baron AS, Diesendruck G. 2018 Collaborative and competitive motivations uniquely impact infants' racial categorization. *Evol. Hum. Behav* 39(5):511–19
- Foster-Hanson E, Leslie S, Rhodes M. 2019 Speaking of kinds: how generic language shapes the development of category representations. *PsyArXiv*. 10.31234/osf.io/28qf7
- Foster-Hanson E, Rhodes M. 2019a Is the most representative skunk the average or the stinkiest? Developmental changes in representations of biological categories. *Cogn. Psychol* 110:1–15 [PubMed: 30677631]
- Foster-Hanson E, Rhodes M. 2019b Normative social role concepts in early childhood. *Cogn. Sci* 43:e12782 [PubMed: 31446654]
- Foster-Hanson E, Roberts S, Gelman SA, Rhodes M. 2018 Categories convey normative information across domains and development. *PsyArXiv* B37AV. 10.31234/osf.io/b37av
- Galdi S, Cadinu M, Tomasello C. 2014 The roots of stereotype threat: when automatic associations disrupt girls' math performance. *Child Dev.* 85:250–63 [PubMed: 23713580]
- Garcia R, Piaget J. 1989 *Psychogenesis and the History of Science*. New York: Columbia Univ. Press
- Gazes RP, Hampton RR, Lourenco SF. 2017 Transitive inference of social dominance by human infants. *Dev. Sci* 20(2):e12367
- Gelman SA. 2003 *The Essential Child: Origins of Essentialism in Everyday Thought*. New York: Oxford Univ. Press
- Gelman SA, Collman P, Maccoby EE. 1986 Inferring properties from categories versus inferring categories from properties: the case of gender. *Child Dev.* 57(2):396–404
- Gelman SA, Heyman GD, Legare CH. 2007 Developmental changes in the coherence of essentialist beliefs about psychological characteristics. *Child Dev.* 78(3):757–74 [PubMed: 17517003]
- Gelman SA, Roberts SO. 2017 How language shapes the cultural inheritance of categories. *PNAS* 114(30):7900–7 [PubMed: 28739931]
- Gelman SA, Taylor MG, Nguyen SP. 2004 Mother-child conversations about gender: understanding the acquisition of essentialist beliefs. *Monogr. Soc. Res. Child Dev.* 69(1):1–142 [PubMed: 15566544]
- Gelman SA, Ware EA, Kleinberg F. 2010 Effects of generic language on category content and structure. *Cogn. Psychol* 61(3):273–301 [PubMed: 20638053]
- Gelman SA, Wellman HM. 1991 Insides and essences: early understandings of the non-obvious. *Cognition* 38(38):213–44 [PubMed: 2060270]
- Gibson B, Rochat P, Tone E, Baron AS. 2017 Sources of implicit and explicit intergroup race bias among African-American children and young adults. *PLOS ONE* 12(9):e0183015 [PubMed: 28957353]
- Gonzalez AM, Dunlop W, Baron AS. 2017a Malleability of implicit associations across development. *Dev. Sci* 20:e12481
- Gonzalez AM, Steele JR, Baron AS. 2017b Reducing children's implicit racial bias through exposure to positive out-group exemplars. *Child Dev.* 88(1):123–30 [PubMed: 27392212]
- Gopnik A, Wellman HM. 2012 Reconstructing constructivism: causal models, Bayesian learning mechanisms, and the theory theory. *Psychol. Bull* 138(6):1085–108 [PubMed: 22582739]
- Graham J, Nosek BA, Haidt J, Iyer R, Koleva S, Ditto PH. 2011 Mapping the moral domain. *J. Pers. Soc. Psychol* 101(2):366–85 [PubMed: 21244182]
- Greenwald AG, Banaji MR. 1995 Implicit social cognition: attitudes, self-esteem, and stereotypes. *Psychol. Rev* 102(1):4–27 [PubMed: 7878162]
- Greenwald AG, Poehlman TA, Uhlmann E, Banaji MR. 2009 Understanding and using the Implicit Association Test: III. Meta-analysis of predictive validity. *J. Pers. Soc. Psychol* 97:17–41 [PubMed: 19586237]

- Gülgöz S, Gelman SA. 2017 Who's the boss? Concepts of social power across development. *Child Dev.* 88(3):946–63 [PubMed: 27739071]
- Gunderson EA, Ramirez G, Levine SC, Beilock SL. 2012 The role of parents and teachers in the development of gender-related math attitudes. *Sex Roles* 66:153–66
- Hamlin JK, Hallinan EV, Woodward AL. 2008 Do as I do: 7-month-old infants selectively reproduce others' goals. *Dev. Sci* 11(4):487–94 [PubMed: 18576956]
- Hamlin JK, Mahajan N, Liberman Z, Wynn K. 2013 Not like me = bad: Infants prefer those who harm dissimilar others. *Psychol. Sci* 24(4):589–94 [PubMed: 23459869]
- Haslam N 2000 Psychiatric categories as natural kinds: essentialist thinking about mental disorder. *Soc. Res* 67(4):1031–58
- Haslam N, Rothschild L, Ernst D. 2000 Essentialist beliefs about social categories in Russia. *Br. J. Soc. Psychol* 39:113–27 [PubMed: 10774531]
- Haward P, Wagner L, Carey S, Prasada S. 2018 The development of principled connections and kind representations. *Cognition* 176:255–68 [PubMed: 29609100]
- Heyman GD, Gelman SA. 1998 Young children use motive information to make trait inferences. *Dev. Psychol* 34(2):310–21 [PubMed: 9541783]
- Heyman GD, Gelman SA. 1999 The use of trait labels in making psychological inferences. *Child Dev.* 70(3):604–19 [PubMed: 10368912]
- Heyman GD, Gelman SA. 2000a Beliefs about the origins of human psychological traits. *Dev. Psychol* 36(5):663–78 [PubMed: 10976605]
- Heyman GD, Gelman SA. 2000b Preschool children's use of trait labels to make inductive inferences. *J. Exp. Child Psychol.* 77(1):1–19 [PubMed: 10964456]
- Hirschfeld LA. 1995a Do children have a theory of race? *Cognition* 54(2):209–52 [PubMed: 7874877]
- Hirschfeld LA. 1995b The inheritability of identity: children's understanding of the cultural biology of race. *Child Dev.* 66(5):1418–37
- Hirschfeld LA. 1996 *Race in the Making: Cognition, Culture, and the Child's Construction of Human Kinds.* Cambridge, MA: MIT Press
- Hitti A, Killen M. 2015 Expectations about ethnic peer group inclusivity: the role of shared interests, group norms, and stereotypes. *Child Dev.* 86(5):1522–37 [PubMed: 26154412]
- Horwitz SR, Shutts K, Olson KR. 2014 Social class differences produce social group preferences. *Dev. Sci* 17(6):991–1002 [PubMed: 24702971]
- Hussak LJ, Cimpian A. 2015 An early-emerging explanatory heuristic promotes support for the status quo. *J. Pers. Soc. Psychol* 109(5):739–52 [PubMed: 26348600]
- Hussak LJ, Cimpian A. 2018 Investigating the origins of political views: biases in explanation predict conservative attitudes in children and adults. *Dev. Sci* 21(3):e12567 [PubMed: 28722292]
- Jin K, Baillargeon R. 2017 Infants possess an abstract expectation of ingroup support. *PNAS* 114(31):8199–204 [PubMed: 28716902]
- Kalish CW. 2002 Children's predictions of consistency in people's actions. *Cognition* 84:237–65 [PubMed: 12044735]
- Kalish CW. 2012 Generalizing norms and preferences within social categories and individuals. *Dev. Psychol* 48:1133–43 [PubMed: 22103303]
- Kalish CW, Lawson CA. 2008 Development of social category representations: early appreciation of roles and deontic relations. *Child Dev.* 79(3):577–93 [PubMed: 18489414]
- Kang J, Bennett MW, Carbado DW, Casey P, Dasgupta N, et al. 2012 Implicit bias in the courtroom. *UCLA Law Rev.* 59:1124–86
- Karnadewi F, Lipp OV. 2011 The processing of invariant and variant face cues in the Garner paradigm. *Emotion* 11(3):563–71 [PubMed: 21668107]
- Kawakami K, Young H, Dovidio JF. 2002 Automatic stereotyping: category, trait, and behavioral activations. *Pers. Soc. Psychol. Bull* 28(1):3–15
- Keller J 2012 Differential gender and ethnic differences in math performance: a self-regulatory perspective. *Z. Psychol* 220(3):164–71
- Kelly DJ, Gibson A, Smith M, Pascalis O, Quinn PC, et al. 2005 Three-month-olds, but not newborns, prefer own-race faces. *Dev. Sci* 8(6):31–36

- Kelly DJ, Quinn PC, Slater AM, Lee K, Ge L, Pascalis O. 2007 The other-race effect develops during infancy. *Psychol. Sci* 18(12):1084–89 [PubMed: 18031416]
- Kinzler KD, Dautel JB. 2012 Children’s essentialist reasoning about language and race. *Dev. Sci* 15(1):131–38 [PubMed: 22251299]
- Kinzler KD, Dupoux E, Spelke ES. 2007 The native language of social cognition. *PNAS* 104(30):12577–80 [PubMed: 17640881]
- Kinzler KD, Shutts K, Correll J. 2010 Priorities in social categories. *Eur. J. Soc. Psychol* 40:581–92
- Kinzler KD, Spelke ES. 2011 Do infants show social preferences for people differing in race? *Cognition* 119(1):1–9 [PubMed: 21334605]
- Kohlberg LA. 1966 A cognitive developmental analysis of children’s sex role concepts and attitudes In *The Development of Sex Differences*, ed. Maccoby EC, pp. 82–173. Stanford, CA: Stanford Univ. Press
- Kotsoni E, De Haan M, Johnson MH. 2001 Categorical perception of facial expressions by 7-month-old infants. *Perception* 30(9):1115–25 [PubMed: 11694087]
- Kraus MW, Tan JJX. 2015 Americans overestimate social class mobility. *J. Exp. Soc. Psychol* 58:101–11
- Kuhlmeier V, Wynn K, Bloom P. 2003 Attribution of dispositional states by 12-month-olds. *Psychol. Sci* 14(5):402–8 [PubMed: 12930468]
- Kurzban R, Tooby J, Cosmides L. 2001 Can race be erased? Coalitional computation and social categorization. *PNAS* 98(26):15387–92 [PubMed: 11742078]
- Lai CK, Skinner AL, Cooley E, Murrar S, Brauer M, et al. 2016 Reducing implicit racial preferences: II. Intervention effectiveness across time. *J. Exp. Psychol. Gen* 145(8):1001–16 [PubMed: 27454041]
- Lee K, Quinn PC, Pascalis O. 2017 Face race processing and racial bias in early development: a perceptual-social linkage. *Curr. Dir. Psychol. Sci* 26(3):256–62 [PubMed: 28751824]
- Leinbach MD, Fagot BI. 1993 Categorical habituation to male and female faces: gender schematic processing in infancy. *Infant Behav. Dev* 16(3):317–32
- Leslie S, Cimpian A, Meyer M, Freeland E. 2015 Expectations of brilliance underlie gender distributions across academic disciplines. *Science* 347(6219):262–65 [PubMed: 25593183]
- Lieberman Z, Kinzler KD, Woodward AL. 2014 Friends or foes: Infants use shared evaluations to infer others’ social relationships. *J. Exp. Psychol. Gen* 143(3):966–71 [PubMed: 24059843]
- Lieberman Z, Kinzler KD, Woodward AL. 2018 The early social significance of shared ritual actions. *Cognition* 171:42–51 [PubMed: 29107887]
- Lieberman Z, Woodward AL, Kinzler KD. 2017 The origins of social categorization. *Trends Cogn. Sci* 21(7):556–68 [PubMed: 28499741]
- Lickel B, Hamilton DL, Wierzchowska G, Lewis A, Sherman SJ, Uhles AN. 2000 Varieties of groups and the perception of group entitativity. *J. Pers. Soc. Psychol* 78(2):223–46 [PubMed: 10707331]
- Liu D, Gelman SA, Wellman HM. 2007 Components of young children’s trait understanding: behavior-to-trait inferences and trait-to-behavior predictions. *Child Dev.* 78(5):1543–58 [PubMed: 17883447]
- Liu S, Quinn PC, Wheeler A, Xiao N, Ge L, Lee K. 2011 Similarity and difference in the processing of same-and other-race faces as revealed by eye tracking in 4- to 9-month-olds. *J. Exp. Child Psychol.* 108(1):180–89 [PubMed: 20708745]
- Liu S, Xiao WS, Xiao NG, Quinn PC, Zhang Y, et al. 2015 Development of visual preference for own-versus other-race faces in infancy. *Dev. Psychol* 51(4):500–11 [PubMed: 25664830]
- Maccoby EE. 1988 Gender as a social category. *Dev. Psychol* 24(6):755–65
- Macrae CN, Bodenhausen GV. 2000 Social cognition: thinking categorically about others. *Annu. Rev. Psychol* 51:93–120 [PubMed: 10751966]
- Mahajan N, Wynn K. 2012 Origins of “Us” versus “Them”: Prelinguistic infants prefer similar others. *Cognition* 124(2):227–33 [PubMed: 22668879]
- Maloney EA, Ramirez G, Gunderson EA, Levine SC, Beilock SL. 2015 Intergenerational effects of parents’ math anxiety on children’s math achievement and anxiety. *Psychol. Sci* 26:1480–88 [PubMed: 26253552]

- Mandalaywala TM, Amodio DM, Rhodes M. 2017 Essentialism promotes racial prejudice by increasing endorsement of social hierarchies. *Soc. Psychol. Pers. Sci* 9(4):461–69
- Mandalaywala TM, Ranger-Murdock G, Amodio DM, Rhodes M. 2018 The nature and consequences of essentialist beliefs about race in early childhood. *Child Dev.* 90(4):e437–53 [PubMed: 29359456]
- Mandalaywala TM, Rhodes M, Tai C. 2019 Children’s use of race and gender as cues to social status. *PsyArXiv3RNEJ*. <https://psyarxiv.com/3rnej/>
- Markman EM. 1989 *Categorization and Naming in Children: Problems of Induction*. Cambridge, MA: MIT Press
- Martin CL, Eisenbud L, Rose H. 1995 Children’s gender-based reasoning about toys. *Child Dev.* 66(5):1453–71 [PubMed: 7555224]
- Martin CL, Ruble DN. 2010 Patterns of gender development. *Annu. Rev. Psychol* 61(1):353–81 [PubMed: 19575615]
- Mascaro O, Csibra G. 2012 Representation of stable social dominance relations by human infants. *PNAS* 109(18):6862–67 [PubMed: 22509020]
- Master A, Cheryan S, Meltzoff AN. 2016 Computing whether she belongs: Stereotypes undermine girls’ interest and sense of belonging in computer science. *J. Educ. Psychol* 108:424–37
- McGlothlin H, Killen M. 2006 Intergroup attitudes of European American children attending ethnically homogeneous schools. *Child Dev.* 77(5):1375–86 [PubMed: 16999805]
- McGlothlin H, Killen M, Edmonds C. 2005 European-American children’s intergroup attitudes about peer relationships. *Br. J. Dev. Psychol* 23:227–50
- McKenney S, Voogt J. 2010 Technology and young children: how 4–7 year olds perceive their own use of computers. *Comput. Hum. Behav* 26(4):656–64
- Meltzoff AN. 2007 ‘Like me’: a foundation for social cognition. *Dev. Sci* 10(1):126–34 [PubMed: 17181710]
- Meltzoff AN, Moore MK. 1977 Imitation of facial and manual gestures by human neonates. *Science* 198(4312):75–78 [PubMed: 17741897]
- Mervis CB, Rosch E. 1981 Categorization of natural objects. *Annu. Rev. Psychol* 32:89–115
- Miller DI, Eagly AH, Linn MC. 2015 Women’s representation in science predicts national gender-science stereotypes: evidence from 66 nations. *J. Educ. Psychol* 107(3):631–44
- Misch A, Over H, Carpenter M. 2016 I won’t tell: Young children show loyalty to their group by keeping group secrets. *J. Exp. Child Psychol.* 142:96–106 [PubMed: 26513328]
- Misch A, Over H, Carpenter M. 2018 The whistleblower’s dilemma in young children: when loyalty trumps other moral concerns. *Front. Psychol* 9:250 [PubMed: 29545763]
- Murphy GL. 2002 *The Big Book of Concepts*. Cambridge, MA: MIT Press
- Murphy GL, Medin DL. 1985 *Psychological Review*. *Psychol. Rev* 92(3):289–316 [PubMed: 4023146]
- Muzzatti B, Agnoli F. 2007 Gender and mathematics: Attitudes and stereotype threat susceptibility in Italian children. *Dev. Psychol* 43:747–59 [PubMed: 17484585]
- Neblett EW, Rivas-Drake D, Umaña-Taylor AJ. 2012 The promise of racial and ethnic protective factors in promoting ethnic minority youth development. *Child Dev. Perspect* 6(3):295–303
- Nesdale D, Flessler D. 2001 Social identity and the development of children’s group attitudes. *Child Dev.* 72(2):506–17 [PubMed: 11333081]
- Neto F, Pinto MC, Mullet E. 2015 Can music reduce anti-dark-skin prejudice? A test of a cross-cultural musical education programme. *Psychol. Music* 44:388–98
- Newheiser AK, Dunham Y, Merrill A, Hoosain L, Olson KR. 2014 Preference for high status predicts implicit outgroup bias among children from low-status groups. *Dev. Psychol* 50:1081–90 [PubMed: 24219317]
- Newheiser AK, Olson KR. 2012 White and Black American children’s implicit intergroup bias. *J. Exp. Soc. Psychol* 48:264–70 [PubMed: 22184478]
- Nguyen HHD, Ryan AM. 2008 Does stereotype threat affect test performance of minorities and women? A meta-analysis of experimental evidence. *J. Appl. Psychol* 93:1314–34 [PubMed: 19025250]

- Nock MK, Banaji MR. 2007 Prediction of suicide ideation and attempts among adolescents using a brief performance-based test. *J. Consult. Clin. Psychol* 75(5):707–15 [PubMed: 17907852]
- Nosek BA, Smyth FL, Sriram N, Lindner NM, Devos T, et al. 2009 National differences in gender-science stereotypes predict national sex differences in science and math achievement. *PNAS* 106(26):10593–97 [PubMed: 19549876]
- Noyes A, Dunham Y. 2017 Mutual intentions as a causal framework for social groups. *Cognition* 162:133–42 [PubMed: 28242344]
- Noyes A, Keil F. 2019 Collective recognition and function in concepts of institutional social groups. *PsyArXiv SJD7Y*. 10.31234/osf.io/sjd7y
- NSF (National Science Foundation). 2017 Women, minorities, and persons with disabilities in science and engineering: 2017 special report. NSF Doc. 17–310, Document Library, Alexandria, VA
- Nürnberger M, Nerb J, Schmitz F, Keller J, Sütterlin S. 2016 Implicit gender stereotypes and essentialist beliefs predict preservice teachers' tracking recommendations. *J. Exp. Educ* 84(1):152–74
- Olson KR, Shutts K, Kinzler KD, Weisman KG. 2012 Children associate racial groups with wealth: evidence from South Africa. *Child Dev.* 83(6):1884–99 [PubMed: 22860510]
- Organisation for Economic Co-operation and Development (OECD). 2015 The ABC of Gender Equality in Education: Aptitude, Behaviour, Confidence. Paris: Prog. Int. Stud. Assoc., OECD Publ.
- Over H, Vaish A, Tomasello M. 2016 Do young children accept responsibility for the negative actions of ingroup members? *Cogn. Dev* 40:24–32
- Parsons JE, Adler TF, Kaczala CM. 1982 Socialization of achievement attitudes and beliefs: parental influences. *Child Dev.* 53:310–21
- Patterson MM, Bigler RS. 2006 Preschool children's attention to environmental messages about groups: social categorization and the origins of intergroup bias. *Child Dev.* 77(4):847–60 [PubMed: 16942493]
- Payne BK. 2006 Weapon bias: split-second decisions and unintended stereotyping. *Curr. Dir. Psychol. Sci* 15(6):287–91
- Pietraszewski D, Cosmides L, Tooby J. 2014 The content of our cooperation, not the color of our skin: An alliance detection system regulates categorization by coalition and race, but not sex. *PLOS ONE* 9(2):e88534 [PubMed: 24520394]
- Piff PK, Kraus MW, Keltner D. 2018 Unpacking the inequality paradox: the psychological roots of inequality and social class. *Adv. Exp. Soc. Psychol* 57:53–124
- Plato. 1943 *Plato's The Republic*. New York: Books, Inc.
- Powell LJ, Spelke ES. 2018 Human infants' understanding of social imitation: inferences of affiliation from third party observations. *Cognition* 170(May 2016):31–48 [PubMed: 28938173]
- Pun A, Birch SAJ, Baron AS. 2016 Infants use relative numerical group size to infer social dominance. *PNAS* 113(9):2376–81 [PubMed: 26884199]
- Pun A, Birch SAJ, Baron AS. 2017a Foundations of reasoning about social dominance. *Child Dev. Perspect* 11:155–60
- Pun A, Ferera M, Diesendruck G, Kiley Hamlin J, Baron AS. 2017b Foundations of infants' social group evaluations. *Dev. Sci* 21(3):e12586 [PubMed: 28703876]
- Qian MK, Heyman GD, Quinn PC, Messi FA, Fu G, Lee K. 2016 Implicit racial biases in preschool children and adults from Asia and Africa. *Child Dev.* 87:285–96 [PubMed: 26435128]
- Qian MK, Quinn P, Heyman G, Pascalis O, Fu G, Lee K. 2017 Perceptual individuation training (but not mere exposure) reduces implicit racial bias in preschool children. *Dev. Psychol* 53:845–59 [PubMed: 28459274]
- Quinn PC. 2011 Born to categorize In *The Wiley-Blackwell Handbook of Childhood Cognitive Development*, ed. Goswami U, pp. 129–52. Hoboken, NJ: Wiley 2nd ed.
- Quinn PC, Lee K, Pascalis O, Tanaka JW. 2016 Narrowing in categorical responding to other-race face classes by infants. *Dev. Sci* 19(3):362–71 [PubMed: 25899938]
- Quinn PC, Uttley L, Lee K, Gibson A, Smith M, et al. 2008 Infant preference for female faces occurs for same- but not other-race faces. *J. Neuropsychol* 2:15–26 [PubMed: 19334302]

- Quinn PC, Yahr J, Kuhn A, Slater AM, Pascalis O. 2002 Representation of the gender of human faces by infants: a preference for female. *Perception* 31(9):1109–21 [PubMed: 12375875]
- Raabe T, Beelmann A. 2011 Development of racial, ethnic, and national prejudice in childhood and adolescence: a multinational meta-analysis of age differences. *Child Dev.* 82:1715–37 [PubMed: 22023224]
- Rai TS, Fiske AP. 2011 Moral psychology is relationship regulation: moral motives for unity, hierarchy, equality, and proportionality. *Psychol. Rev* 118(1):57–75 [PubMed: 21244187]
- Ramsey JL, Langlois JH, Hoss RA, Rubenstein AJ, Griffin AM. 2004 Origins of a stereotype: categorization of facial attractiveness by 6-month-old infants. *Dev. Sci* 7(2):201–11 [PubMed: 15320380]
- Régner I, Steele JR, Ambady N, Thinus-Blanc C, Huguet P. 2014 Our future scientists: a review of stereotype threat in girls from early elementary school to middle school. *Int. Rev. Soc. Psychol* 27:13–51
- Rhodes M 2012 Naïve theories of social groups. *Child Dev.* 83(6):1900–16 [PubMed: 22906078]
- Rhodes M 2013a How two intuitive theories shape the development of social categorization. *Child Dev. Perspect* 7(1):12–16
- Rhodes M 2013b The social allegiance hypothesis In *The Development of Social Cognition*, ed. Banaji M, Gelman SA, pp. 258–62. New York: Oxford Univ. Press
- Rhodes M 2014 Children’s explanations as a window into their intuitive theories of the social world. *Cogn. Sci* 38(8):1687–97 [PubMed: 25052813]
- Rhodes M, Brickman D. 2011 The influence of competition on children’s social categories. *J. Cogn. Dev* 12(2):194–221
- Rhodes M, Chalik L. 2013 Social categories as markers of intrinsic interpersonal obligations. *Psychol. Sci* 24(6):999–1006 [PubMed: 23613213]
- Rhodes M, Gelman SA. 2009 A developmental examination of the conceptual structure of animal, artifact, and human social categories across two cultural contexts. *Cogn. Psychol* 59(3):244–74 [PubMed: 19524886]
- Rhodes M, Hetherington C, Brink K, Wellman HM. 2015 Infants’ use of social partnerships to predict behavior. *Dev. Sci* 18(6):909–16 [PubMed: 25441335]
- Rhodes M, Leslie SJ, Bianchi L, Chalik L. 2018 The role of generic language in the early development of social categorization. *Child Dev.* 89(1):148–55 [PubMed: 28129455]
- Rhodes M, Leslie S-J, Tworek CM. 2012 Cultural transmission of social essentialism. *PNAS* 109(34):13526–31 [PubMed: 22869722]
- Rhodes M, Mandalaywala TM. 2017 The development and developmental consequences of social essentialism. *WIREs Cogn. Sci* 8(4):e1437
- Rips LJ. 1975 Inductive judgments about natural categories. *J. Verbal Learn. Verbal Behav.* 14(6):665–81
- Roberts SO, Gelman SA. 2016 Can white children grow up to be black? Children’s reasoning about the stability of emotion and race. *Dev. Psychol* 52(6):887–93 [PubMed: 27148779]
- Roberts SO, Gelman SA. 2017 Now you see race, now you don’t: Verbal cues influence children’s racial stability judgments. *Cogn. Dev* 43(March):129–41
- Roberts SO, Gelman SA, Ho AK. 2017 So it is, so it shall be: Group regularities license children’s prescriptive judgments. *Cogn. Sci* 41:576–600 [PubMed: 27914116]
- Rosch E, Levitin DJ. 2002 Principles of categorization In *Foundations of Cognitive Psychology: Core Readings*, ed. Levitin DJ, pp. 251–70. Cambridge, MA: MIT Press
- Rothbart M, Taylor M. 1992 Category labels and social reality: Do we view social categories as natural kinds? In *Language, Interaction and Social Cognition*, ed. Semin G, Fiedler K, pp. 11–36. London: Sage
- Ruble DN, Alvarez J, Bachman M, Cameron J, Fuligni A, et al. 2004 The development of a sense of ‘we’: the emergence and implications of children’s collective identity In *The Development of the Social Self*, ed. Bennett M, Sani F, pp. 29–76. New York: Psychology Press
- Rudman LA. 2004 Sources of implicit attitudes. *Curr. Dir. Psychol. Sci* 13(2):79–82

- Rudman LA, Phelan JE, Heppen JB. 2007 Developmental sources of implicit attitudes. *Pers. Soc. Psychol. Bull* 33(12):1700–13 [PubMed: 18000104]
- Rutland A, Cameron L, Milne A, McGeorge P. 2005 Social norms and self-presentation: children's implicit and explicit intergroup attitudes. *Child Dev.* 76(2):451–66 [PubMed: 15784093]
- Rutland A, Killen M, Abrams D. 2010 A new social-cognitive developmental perspective on prejudice: the interplay between morality and group identity. *Persp. Psychol. Sci* 5(3):279–91
- Schmader T, Johns M. 2003 Converging evidence that stereotype threat reduces working memory capacity. *J. Pers. Soc. Psychol* 85(3):440–52 [PubMed: 14498781]
- Schulz LE, Sommerville J. 2006 God does not play dice: causal determinism and children's inferences about unobserved causes. *Child Dev.* 77(2):427–42 [PubMed: 16611182]
- Seaton EK, Yip T, Sellers RM. 2009 A longitudinal examination of racial identity and racial discrimination among African American adolescents. *Child Dev.* 80(2):406–17 [PubMed: 19467000]
- Segall G, Birnbaum D, Deeb I, Diesendruck G. 2015 The intergenerational transmission of ethnic essentialism: *How* parents talk counts the most. *Dev. Sci* 18(4):543–55 [PubMed: 25212249]
- Setoh P, Lee KJJ, Zhang L, Qian MK, Quinn PC, et al. 2017 Racial categorization predicts implicit racial bias in preschool children. *Child Dev.* 90:162–71 [PubMed: 28605007]
- Shapiro JR, Williams AM. 2012 The role of stereotype threats in undermining girls' and women's performance and interest in STEM fields. *Sex Roles* 66(3–4):175–83
- Sherif M, Harvey OJ, White BJ, Hood WR, Sherif CW. 1961 *Intergroup Conflict and Cooperation: The Robbers Cave Experiment*. Norman, OK: Univ. Okla. Book Exch.
- Shilo R, Weinsdörfer A, Rakoczy H, Diesendruck G. 2018 The out-group homogeneity effect across development: a cross-cultural investigation. *Child Dev.* 90:2104–17 [PubMed: 29732552]
- Shutts K. 2015 Young children's preferences: gender, race, and social status. *Child Dev. Perspect* 9(4):262–66
- Shutts K, Brey EL, Dornbusch LA, Slywotzky N, Olson KR. 2016 Children use wealth cues to evaluate others. *PLOS ONE* 11(3):e0149360 [PubMed: 26933887]
- Shutts K, Roben CKP, Spelke ES. 2013 Children's use of social categories in thinking about people and social relationships. *J. Cogn. Dev* 14(1):35–62 [PubMed: 23646000]
- Shweder RA, Mahapatra M, Miller JG. 1987 Culture and moral development In *The Emergence of Morality in Young Children*, ed. Kagan J, Lamb S, pp. 1–83. Chicago, IL: Univ. Chicago Press
- Smith MA, Scott RM. 2017 20-month-olds use social-group membership to make inductive inferences In *Proceedings of the 39th Annual Conference of the Cognitive Science Society*, ed. Gunzelmann G, Howes A, Tenbrink T, Davelaar EJ, pp. 3203–8. Austin, TX: Cogn. Sci. Soc.
- Smith SL, Nathanson AI, Wilson BJ. 2002 Prime-time television: assessing violence during the most popular viewing hours. *J. Commun* 52(1):84–111
- Smyth K, Feeney A, Eidson RC, Coley JD. 2017 Development of essentialist thinking about religion categories in Northern Ireland (and the United States). *Dev. Psychol* 53(3):475–96 [PubMed: 28230403]
- Spelke ES, Kinzler KD. 2007 Core knowledge. *Dev. Sci* 10(1):89–96 [PubMed: 17181705]
- Spelke ES, Phillips A, Woodward AL. 1995 Infants' knowledge of object motion and human action In *Causal Cognition: A Multidisciplinary Debate*, ed. Sperber D, Premack D, Premack AJ, pp. 44–78. New York: Oxford Univ. Press
- Spencer SJ, Steele CM, Quinn DM. 1999 Stereotype threat and women's math performance. *J. Exp. Soc. Psychol* 35(1):4–28
- Spielman DA. 2000 Young children, minimal groups and dichotomous categorization. *Pers. Soc. Psychol. Bull* 26:1433–41
- Starmans C, Sheskin M, Bloom P. 2017 Why people prefer unequal societies. *Nat. Hum. Behav* 1:0082
- Steele CM, Aronson J. 1995 Stereotype threat and the intellectual test performance of African Americans. *J. Pers. Soc. Psychol* 69(5):797–811 [PubMed: 7473032]
- Steele CM, Aronson J. 1998 Stereotype threat and the test performance of academically successful African Americans In *The Black-White Test Score Gap*, ed. Jencks C, Phillips M, pp. 401–27. Washington, DC: Brookings Inst. Press

- Steele CM, Aronson J. 2000 Stereotype threat and the intellectual test performance of African Americans In *Stereotypes and Prejudice: Essential Readings*, ed. Stangor C, pp. 369–89. New York: Psychol. Press
- Steele JR, George M, Williams A, Tay E. 2018 A cross-cultural investigation of children’s implicit attitudes toward White and Black racial outgroups. *Dev. Sci* 21:e12673 [PubMed: 29756669]
- Steffens MC, Jelenec P, Noack P. 2010 On the leaky math pipeline: comparing implicit math-gender stereotypes and math withdrawal in female and male children and adolescents. *J. Educ. Psychol* 102:947–63
- Stricker LJ, Ward WC. 2004 Stereotype threat, inquiring about test takers’ ethnicity and gender, and standardized test performance. *J. Appl. Soc. Psychol* 34:665–93
- Tajfel H 1981 *Human Groups and Social Categories*. New York: Cambridge Univ. Press
- Tajfel H, Turner JC, Austin WG, Worschel S. 1979 An integrative theory of intergroup conflict In *The Social Psychology of Intergroup Relations*, ed. Austin WG, Worschel S, pp. 33–47. Brooks Cole Publ.
- Taylor MG. 1996 The development of children’s beliefs about social and biological aspects of gender differences. *Child Dev.* 67(4):1555–71 [PubMed: 8890500]
- Taylor MG, Gelman SA. 1993 Children’s gender- and age-based categorization in similarity and induction tasks. *Soc. Dev* 2(2):104–21
- Taylor M, Rhodes M, Gelman SA. 2009 Boys will be boys; cows will be cows: children’s essentialist reasoning about gender categories and animal species. *Child Dev.* 80(2):461–81 [PubMed: 19467004]
- Terrizzi BF, Brey E, Shutts K, Beier JS. 2019 Children’s developing judgments about the physical manifestations of power. *Dev. Psychol* 55(4):793–808 [PubMed: 30589336]
- Thomsen L, Frankenhuus WE, Ingold-Smith M, Carey S. 2011 Big and mighty: Preverbal infants mentally represent social dominance. *Science* 331:477–80 [PubMed: 21273490]
- Ting F, He Z, Baillargeon R. 2019 Toddlers and infants expect individuals to refrain from helping an ingroup victim’s aggressor. *PNAS* 116(13):6025–34 [PubMed: 30858320]
- Tomasetto C, Alparone FR, Cadinu M. 2011 Girls’ math performance under stereotype threat: the moderating role of mothers’ gender stereotypes. *Dev. Psychol* 47:943–49 [PubMed: 21744956]
- Turner JC, Oakes PJ, Haslam SA, McGarty C. 1994 Self and collective: cognition and social context. *Pers. Soc. Psychol. Bull* 20:454–63
- Tworek CM, Cimpian A. 2016 Why do people tend to infer “ought” from “is”? The role of biases in explanation. *Psychol. Sci* 27(8):1109–22 [PubMed: 27485133]
- Vasilyeva N, Gopnik A, Lombrozo T. 2018 The development of structural thinking about social categories. *Dev. Psychol* 54(9):1735–44 [PubMed: 30148401]
- Vezzali L, Capozza D, Giovannini D, Stathi S. 2011 Improving implicit and explicit intergroup attitudes using imagined contact: an experimental intervention with elementary school children. *Group Process. Intergroup Relat.* 15:203–12
- Walton GM, Cohen GL. 2003 Stereotype lift. *J. Exp. Soc. Psychol* 39(5):456–67
- Walton GM, Spencer SJ. 2009 Latent ability: Grades and test scores systematically underestimate the intellectual ability of negatively stereotyped students. *Psychol. Sci* 20(9):1132–39 [PubMed: 19656335]
- Waxman S, Medin D, Ross N. 2007 Folkbiological reasoning from a cross-cultural developmental perspective: Early essentialist notions are shaped by cultural beliefs. *Dev. Psychol* 43(2):294–308 [PubMed: 17352540]
- Waxman SR. 2010 Names will never hurt me? Naming and the development of racial and gender categories in preschool-aged children. *Eur. J. Soc. Psychol* 40(4):593–610
- Waxman SR, Markow DB. 1995 Words as invitations to form categories: evidence from 12- to 13-month-old infants. *Cogn. Psychol* 29:257–302 [PubMed: 8556847]
- Weisman K, Johnson MV, Shutts K. 2015 Young children’s automatic encoding of social categories. *Dev. Sci* 18(6):1036–43 [PubMed: 25483012]

- Wellman HM, Gelman SA. 1998 Knowledge acquisition in foundational domains In Handbook of Child Psychology, Vol. 2: Cognition, Perception, and Language, ed. Damon W, Lerner RM, Kuhn D, Siegler RS, pp. 523–73. Hoboken, NJ: Wiley
- Williams A, Steele JR. 2017 Examining children’s implicit racial attitudes using exemplar and category-based measures. *Child Dev.* 90:e322–38 [PubMed: 29115675]
- Xiao NG, Mukaida M, Quinn PC, Pascalis O, Lee K, Itakura S. 2018 Narrowing in face and speech perception in infancy: developmental change in the relations between domains. *J. Exp. Child Psychol.* 176:113–27 [PubMed: 30149243]
- Xiao WS, Fu G, Quinn PC, Qin J, Tanaka JW, et al. 2015 Individuation training with other-race faces reduces preschoolers’ implicit racial bias: a link between perceptual and social representation of faces in children. *Dev. Sci* 18(4):655–63 [PubMed: 25284211]
- Xu F, Kushnir T. 2013 Infants are rational constructivist learners. *Curr. Dir. Psychol. Sci* 22(1):28–32