CHILDHOOD ESSENTIALISM

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Abstract

Essentialism is the intuitive belief that certain categories, such as "tiger," "boy," or "gold," have an underlying reality that goes beyond surface appearances. Childhood essentialism provides insights regarding the nature, origins, and development of human cognition. This chapter reviews the current state of the art regarding research on childhood essentialism, addressing five key issues: (1) what is essentialism and why is it important?; (2) the role of experience (including context, culture, and identity); (3) language as a uniquely powerful mode of transmission; (4) developmental origins; and (5) consequences for social issues and education. Throughout, the chapter considers how children's essentialism works in concert with, and alongside, other cognitive, linguistic, social, and societal processes. Ultimately, childhood essentialism can be considered a "double-edged sword," contributing to human propensities that are both impressive (an early-developing ability to look beyond the obvious) and problematic (stereotyping, prejudice, and intergroup bias).

CHILDHOOD ESSENTIALISM

I have been researching and writing about childhood essentialism for over 40 years -- my entire career. I keep returning to this topic because I believe it speaks to enduring and foundational questions regarding cognitive development, including: the origins of human thought, the nature of conceptual change, the mechanisms by which ideas are transmitted from one generation to the next, and the consequences of childhood thought for education, social policy, and combating misconceptions that underlie social ills. In addition, the research on childhood essentialism keeps growing and getting more interesting. Every week, new findings and theoretical proposals are published -- often thought-provoking, broad-ranging, and revealing. Essentialism is a story that extends back thousands of years, and will likely continue as long as there are human minds attempting to organize the world into categories, and making sense of their biological and social surroundings.

The goal of this chapter is to review the current state of the art regarding childhood essentialism. The chapter has five main sections: (1) What is essentialism and why is it important? (2) The role of experience (including context, culture, and identity). (3) Language as a uniquely powerful mode of transmission. (4) Developmental origins. (5) Consequences for social issues and education. These are followed by conclusions and open questions.

WHAT IS ESSENTIALISM AND WHY IS IT IMPORTANT?

Psychological essentialism is the intuitive belief that certain categories, such as "lion," "gold," or "girl," have an underlying reality that goes beyond surface appearances. On this view, there is some essential, inherent substance or quality that all lions possess, and that gives a lion its identity.

Psychological essentialism is important because it guides our inferences -- for good and for ill. On the plus side, essentialism encourages overlooking misleading appearances and instead searching for hidden structure, which underlies the scientific impulse and knowledge creation. On the negative side, essentialism encourages treating categories like 'woman' and 'Black' as deeply predictive of the limits and properties of the individuals in those categories. Essentialism also predicts a host of problematic consequences for adults, including stereotyping and prejudice (Bastian & Haslam, 2006; Chen & Ratliff, 2018; Meyer & Gelman, 2016; Williams & Eberhardt, 2008; see Roth et al., 2023, for a review regarding race essentialism).

Childhood essentialism is important for challenging classic views about the nature of development. Essentialist beliefs in young children run counter to the standard view that children are concrete thinkers who build up their knowledge of the world from what they observe. Instead, research reveals an expectation that category members have hidden, non-obvious features (as detailed below).

Because the term 'essentialism' has been used variously over the centuries with a host of different meanings, I wish to clarify what I do and don't mean when I refer to essentialism (see also Gelman, 2003, 2004, for more detail). It is a ***psychological*** construct (about people's beliefs and representations) -- *not* a metaphysical claim about how the world actually is. Indeed, essentialism is a ***cognitive bias*** (Gelman & Marchak, 2020; Leslie, 2013; Medin, 1989). For example, essentialism may involve treating the Indian caste system as natural and immutable, rather than recognizing that it is a social construction with a deep historical basis. Essentialism may also involve treating racial categories as biologically based and having sharp boundaries (e.g., leading most Americans to agree with the false statement, "Two people from the same race will always be more genetically similar to each other than two people from different races"; Christensen et al., 2010), when in actuality they do not have a biological reality and correspond to as much within-category as between-category variability. Essentialism even leads to misconceptions of biological species. For example, individual members of a species do not have inherent properties that are identical for all members; rather, species differences are determined at a different level of analysis, by interbreeding populations (Sober, 1994).

Essentialism is a ***placeholder*** -- a belief that members of a category have some essential quality or substance that make them what they are -- but not necessarily any knowledge of what that essence might be (Medin, 1989). Thus, the essence in the sense used here is not a definition, nor does it specify which features are necessary for category membership (but for an example of definitional essentialism, see Machery et al., 2023). This is not to say that people have no beliefs about the essence placeholder, as it is understood to be internal, inherent, and causally powerful -- but beyond that, the specifics are unknown (Ahn et al., 2001).

It is also important to distinguish between psychological essentialism and other constructs with which it may be confused. For example, essentialism is not the same as stereotyping (see Ritchie & Knobe, 2020), it is not the 'pursuit of less' (McKeown, 2014), and it is not Plato's notion of an idealized, unrealized perfect form (Kraut, 2022). Psychological essentialism as discussed here is related to, but different from, value-based essentialism (Bailey et al., 2021), teleological essentialism (Rose & Nichols, 2019), and essentialism of personal identity, as reflected in belief in a true self (Horne & Cimpian, 2019; Umscheid et al., 2023).

Tests of childhood essentialism

Because the essence itself is a placeholder rather than an identifiable entity (property, part, or substance), it can be detected only indirectly, analogous to the detection of exoplanets: not visible via telescope but inferrable by alterations in the gravitational pull of nearby stars. Psychological essentialism in children likewise cannot be detected by naming or pinpointing the essence, but rather by tasks that reflect the assumption that a

category possesses a deeper, inherent, non-obvious reality. Some of these tasks are provided in Table 1.

Table 1. A sample of essentialism tasks used with young children.

Essentialism Task	Description	Citation
Transformation	A porcupine is superficially transformed to look like a cactus. What is it now: a porcupine or a cactus? Essentialist answer: a porcupine.	Keil (1989)
Induction	Triad task: Child learns a distinct property about a flamingo ["bird"] vs. a bat ["bat"]. Which property is true of a blackbird ["bird"] that looks like the bat? Essentialist answer: the same as the flamingo.	Gelman & Markman (1986)
Switched-at-birth	A newborn rabbit is raised by monkeys and never sees another rabbit. When it grows up, would it rather have carrots or a banana? Is it good at hopping or climbing? Essentialist answer: carrots, hopping	Gelman & Wellman (1991)
Category boundaries	Feppy (a character from far away), and all his friends, say that two items [a cat, a dog] are the same kind of animal. Could they maybe be right? Essentialist answer: no	Rhodes & Gelman (2009)
Causal innards	What if you take out all the stuff inside of a dog. Is it still a dog? Can it still bark and eat dog food? Essentialist answer: no.	Gelman & Wellman (1991)

Altogether, these tasks reveal a host of essentialist intuitions by 4 or 5 years of age. These include judgments that category membership is stable over transformations (e.g., a cactus cannot be transformed into a porcupine), inductive inferences in the face of dissimilarity (e.g., a blackbird shares characteristics with a flamingo, not a bat), reliance on nature over nurture (e.g., a baby rabbit raised with monkeys will nonetheless prefer carrots over bananas), judgments that category boundaries are objective and discrete (e.g., it is wrong to call a cat and a dog the same kind of animal), and belief that innards are causally powerful (e.g., a dog needs its insides to bark and eat dog food). By 7 or 8 years of age, these intuitions are sharpened further (e.g., a raccoon cannot transform into a skunk; Keil, 1989; receiving a heart transplant from a mean person will alter someone's personality, making them somewhat meaner; Meyer et al., 2017).

Children's essentialism is sometimes expressed in the comments they spontaneously make when participating in the studies described above. Examples include: “Snakes are a little bit the same and a little bit different. Inside they’re the same.” “That’s the way rabbits

are, because that's how they are when they're born." "Every dog has the same stuff [inside]… Just because [they] have different colors doesn't mean they have different stuff."

It is also worth noting that there is an asymmetry between the sophisticated inferences that young children make when told an item's category membership (as in the essentialist assumptions summarized above) versus the difficulties they encounter when asked to form a categorization on their own (where more typically they rely on superficial appearance cues, such as shape; e.g., Imai et al., 1994). Deciding how to categorize an ambiguous item requires weighing competing cues and making use of expertise that a child may lack, whereas in their essentialist inferences, children are provided with labels from a trusted adult, and their responses indicate what expectations they hold about these categories that are transmitted via language (Gelman et al., 1986).

One construal or many?

At its most fundamental level, I suggest that essentialism reflects a single coherent assumption: category realism: Just as individuals are real (e.g., Fido exists as an independent entity), so too categories are real (e.g., "dogs" exists independently of us as humans). On this assumption, certain categories are not subjective or arbitrary human constructions but are out there in the world, waiting to be discovered; they "carve up nature at its joints." At the same time, essentialism has been analyzed as having multiple components or manifestations, as shown in Table 2. There is no consensus as to how many components or what they are, although there is much overlap across the lists.

Table 2. Some proposed components of essentialism.

Author(s)	Components
Gelman (2003)	Inductive potential; non-obvious properties; stability over transformations; boundary intensification; innateness; causal power.
Haslam et al. (2000)	Discreteness; uniformity; informativeness; naturalness; immutability; stability; inherence; necessity; exclusivity.
Rhodes & Mandalaywala (2017)	Natural kinds; strict boundaries; homogeneity; stability; causal.
Neufeld (2022)	Natural kinds; causal power; large inductive potential; sharp category boundaries; homogeneity; immutability; intrinsicality; innate potential; hidden and unobservable; distinctness and sameness; objectivity.
Fine et al. (2024)	Biological basis; discreteness; informativeness; immutability.

There is reason to treat different components as meaningfully distinct (see also Rhodes & Moty, 2020, for discussion). First, there are categories for which only some aspects of

essentialism apply and not others. For example, age categories, such as "adolescent," are not stable over time because people move in and out of such groupings; kinship categories such as 'cousin' have graded rather than absolute boundaries; and natural substances such as 'gold' cannot be said to have innate potential -- yet age, kinship, and natural substance categories are essentialized. Second, factor analyses with adults indicate at least two or three factors are needed to account for the full range of essentialist beliefs (Haslam et al., 2000; Haslam & Levy, 2006; Schudson & Gelman, 2023). Third, different aspects of essentialism are differentially predictive of outcomes such as stereotyping (e.g., Haslam & Levy, 2006) and consumer judgments (Gomez et al., 2024). Developmental data provide further evidence that essentialism has separable conceptual components. For children, different tasks or dimensions do not necessarily cohere (Diesendruck & Haber, 2009; Gelman et al., 2007). For example, learning that a characteristic is inborn does not lead first-grade children (6-8 years of age) to infer that it cannot change. More work is needed to map out this conceptual space: when different components of essentialism emerge in development, and the extent to which they cohere. Rhodes and Mandalaywala (2017) suggest that components will be more distinct when reasoning about social kinds.

THE ROLE OF EXPERIENCE (INCLUDING CULTURE, CONTEXT, AND IDENTITY)

A serious turn over the past 20 years has been an appreciation for the important role of culture, context, and identity in essentialist beliefs. Whereas studies consistently find broad essentialism of animal kinds across the world despite widely varying kinds of input (Astuti et al., 2004; Atran et al., 2001), there is substantial variation in which social categories (i.e., categories of people) are essentialized and to what degree (e.g., Coley et al., 2019; Pauker et al., 2020; Rhodes, 2020; Xu et al., 2021). Whether a community essentializes race, ethnicity, religion, nationality, or occupation depends on the category, the perceiver, and the cultural context. Examining this variation in the construal of social kinds is thus a valuable -- indeed, necessary -- opportunity to learn about the mechanisms that can foster or inhibit essentialism.

Culture and context

Here I provide a few illustrative examples of cultural and contextual variation in children's essentialist beliefs; see also the papers in volume 59 of this journal (Rhodes, 2020) for more extensive and detailed overviews. An overarching theme is that children's essentialist beliefs are embedded within a cultural context, but at the same time do not simply or passively mirror the adult belief systems:

- An extensive investigation of the Vezo of Madagascar found that children tended to essentialize group identity (whether a person is Vezo or Karany), despite the adult understanding that these groups are defined in terms of individuals' occupational activities and religious beliefs (not an inborn essence) (Astuti et al., 2004). This result indicates an early-emerging essentialist construal in the absence of overt

cultural support. At the same time, Vezo children typically did *not* essentialize the distinction between Vezo and a different group, the Masikoro (Astuti et al., 2004), suggesting that early theory-building mechanisms interact with a child's cultural environment.

- Children in the U.S. and Israel essentialized gender substantially more than occupation, but children in the two societies differed in how they essentialized race: race essentialism increased with age in the U.S., but decreased with age in Israel (Diesendruck, Goldfein-Elbaz, et al., 2013).
- In Northern Ireland -- as opposed to the U.S. -- children 8-10 years of age essentialized the culturally salient category of religion (Catholic vs. Protestant), though this pattern was found predominantly among those attending religiously segregated schools (Smyth et al., 2017).

Systematic variation in essentialist beliefs is found not only when comparing different peoples in different parts of the world, but also when comparing communities within a country, region, or city. For example, gender and race essentialism show different developmental trajectories for urban vs. rural communities in the U.S., even when comparing neighboring communities within the same state (Rhodes & Gelman, 2009). Whereas gender essentialism was high in early elementary school in both settings, it decreased with age in the urban communities but remained high over age in the rural communities (Fine et al., 2024; Gross et al., 2024; Rhodes & Gelman, 2009). In contrast, race essentialism was low in early elementary school in both settings, then increased with age in the rural community but remained low in the urban community (Rhodes & Gelman, 2009). In order to understand the relevant mechanisms, "urban" and "rural" would need to be unpacked, as they correspond to a cluster of differences, including diversity, income, education, and political leanings.

The opportunity to engage with people from a different social group than oneself (contact effects) may play an important role in social essentialism. For example, race essentialism increased with age in children ages 4-11 in Massachusetts, but not those in Hawai'i, perhaps reflecting the notably greater community diversity in Hawai'i (Pauker et al., 2016). As noted earlier, essentialism of religion in Northern Ireland was lessened in integrated vs. segregated schools (Smyth et al., 2017). Similarly, Israeli and Arab children in integrated schools were less essentialist over age (from kindergarten through sixth grade) -- not by ignoring ethnicity, but by being more aware of it (Deeb et al., 2011).

In additional to differential rates of essentialism for different categories in different cultural contexts, there may also be cultural variation in the content or nature of children's essentialist beliefs. For example, the idea that an essence is inherent leaves open the causal mechanism -- is it inborn (as assessed in the switched-at-birth task) or is it acquired through early experience, such as mother's milk or contact with the land (see Gelman & Hirschfeld, 1999, for discussion)? And if it is inborn, how is it transmitted? Initial findings indicate the important role of community context. For example, Waxman et al. (2007) found that Native American (Menominee) children (ages 4-10) were more likely than

children in the three non-Native communities to endorse blood as a biological essence. And when comparing children ages 3-6 years in China and the U.S., Xu et al. (2025) found different developmental patterns in the two countries, with U.S. children increasing in their endorsement of features as inborn, stable, and inflexible, and Chinese children increasing in their judgments of category homogeneity. The question of how children in different cultural settings explain the transmission of essentialist identities remains largely unexplored, and is ripe for future research.

Identity

Diesendruck (2021) argued for the need to consider motivational factors -- not just cognitive factors -- to explain patterns of essentialist attributions. He proposed that several factors, including dominance, in-group identification, and need to belong, all contribute to biased intergroup attitudes and behaviors, and these in turn lead to increased essentialism regarding certain social groups. Consistent with this view, Mahalingam (2007) argued that "essentialist thinking serves the needs of those in power to justify existing social and economic hierarchies." Conversely, those not in power may also engage in 'strategic essentialism', whereby they reclaim and embrace an essentialized identity, as a means of achieving certain political goals (Eide, 2016), or to defend one's identity as real (Bartels et al., 2024).

Altogether, this theoretical perspective may help explain the pattern that a person's own identity may influence their essentialist beliefs -- in children as well as adults. For example, among adults in India, members of a high-status caste (Brahmins) held more essentialist beliefs about caste than members of a low-status caste (Dalits) (Mahalingam, 1998, 2003). Similarly, Srinivasan et al. (2016) examined views of caste in children from grades 3-11 and adults. They found that, beginning in middle school (though not earlier), the more that a participant viewed caste as central to their identity, the more they displayed determinist views of caste (i.e., that biology determines success or failure, that the kind of person someone is can't change, that they are born a certain way, etc. -- in other words, essentialist theories). They note that the causal direction here is unclear (e.g., caste attitudes may affect beliefs, the reverse may be true, or a third variable may be operative).

A study of Chilean kindergarteners examined their essentialist beliefs about poverty. Although all children endorsed certain essentialist beliefs (e.g., non-obvious basis and inductive potential), only the high-SES children (not the low-SES children) consistently reported that poverty is inherited and unchanging with age (del Río & Strasser, 2011).

Although the studies described above found that those in a higher-status position were more likely to endorse essentialist beliefs, this is not consistently the case. For example, gender essentialism is typically comparable for boys and girls (e.g., Taylor et al., 2009), despite the arguably higher status of boys, and race essentialism has been found to be higher in Black than White children ages 5 to 6 or 7 (Kinzler & Dautel, 2012; Mandalaywala

et al., 2019; Roberts & Gelman, 2016), despite the arguably higher status of White children in the U.S. (Mandalaywala et al., 2020). Pauker (2020) suggests that this latter pattern may reflect a tendency for many White families in the U.S. to avoid discussion of race, though more evidence is needed (e.g., Scott et al., 2020).

It is of special interest to examine individuals whose own lived experiences may run counter to certain essentialist assumptions, in order to examine more closely the effects of identity and experience on essentialist beliefs. For example, transgender children's own experience of gender is that it is not rooted in biological sex, and they may have experienced their gender as mutable over time. Similarly, the siblings of transgender children live in close contact with people holding such identities. Yet despite these differences in experience, recent research has found relatively few differences in gender essentialism among cisgender children, transgender children, and cisgender siblings of transgender children. For example, in a study of children ages 3-11 years, all three groups were above-chance in predicting that a child's sex at birth would predict their clothing and play preferences (e.g., that a girl raised in an all-male environment would prefer to wear dresses and play with dolls, despite the lack of a female role model) (Gülgöz et al., 2019). Similarly, in a study of children ages 6-11 years, using a range of essentialist questions, all three groups essentialized both sex [body parts] and gender identity [whether a character felt like a boy or a girl], treating them as how they were born -- although some subtle group differences did emerge (e.g., transgender children were less likely than the other two groups of children to essentialize gender/sex -- i.e., when the meaning of the word 'boy' or 'girl' was unspecified) (Gülgöz et al., 2021). It will be valuable to examine as well those children whose identity does not fit into a gender binary.

Byers-Heinlein and Garcia (2015) studied 5- to 6-year-old children who experienced different conditions of language learning: either monolingual (spoke only one language), simultaneous bilingual (spoke two languages from birth), or sequential bilingual (learned their second language after age 3). They hypothesized that sequential bilingual children would have a greater appreciation that the language one speaks is not innately determined (in contrast to young monolingual children, who believe that one's language is determined by one's birth parents rather than the family of upbringing; Hirschfeld & Gelman, 1997). As predicted, sequential bilingual children were less essentialist about language learning, when compared to monolingual and simultaneous bilingual children. Surprisingly, however, the sequential bilingual children were also less essentialist about the vocalizations and physical traits of animals. Whereas the monolingual and simultaneous bilingual children were consistently essentialist in their attributions, the sequential bilingual children showed a bimodal distribution -- roughly half consistently providing a 'birth-parent' response, and the others consistently providing an 'adoptive-parent' response. These provocative findings illustrate the influence of early experiences on children's essentialist theories.

Peretz-Lange and Kaebnick (2025) examine essentialist reasoning in children ages 4-8 years of age, comparing traditionally conceived children to those who were either adopted

or donor-conceived. Peretz-Lange and Kaebnick made use of a switched-at-birth task, in which children were asked to predict whether a child's attributes (hair color, spoken language, personality, interests, or intelligence) more closely match those of their birth vs. adoptive parents. The findings indicated substantial group differences: traditionally conceived children were three times as likely to provide an essentialist response, as compared to adopted and donor-conceived children. There were also qualitatively distinct developmental patterns across the two groups: increasing essentialism with age in traditionally conceived children, but decreasing essentialism with age in adopted and donor-conceived children. The authors note that the mechanism(s) underlying these changes (e.g., motivated cognition, messages from parents and others in child's life, and/or observations of their own different environments) will require further research.

Future directions

Given the evidence reviewed in this section, documenting variation in children's essentialist reasoning as a function of culture, context, and identity, more systematic cross-cultural studies hold promise for providing important comparative evidence. Weisman et al. (2024) have published a Phase 1 registered report that will assess children's (ages 4-10) essentialism of religious groups, in comparison to gender and wealth groups, across 17 countries and 13 languages. The hope, of course, is not only to determine when these differences arise, but also why. A focus on carefully selected identities and cultural contexts will also be valuable in teasing apart different causal mechanisms that underlie the variation described in this section. For example, Amemiya et al. (2023) suggested that Indonesia would provide a compelling test case of different factors that may underlie early essentialist reasoning. Generally speaking, Native Indonesians have relatively greater political influence, whereas Chinese Indonesians have more wealth, and children are sensitive to these associations by age 6.5 years. This cultural context would therefore allow testing the importance of groups holding distinct societal roles (which is the case for both these ethnic groups) vs. one group having a more dominant status (which is the case for neither).

LANGUAGE AS A UNIQUELY POWERFUL MODE OF TRANSMISSION

The variation reviewed above suggests that children are sensitive to cues from their environment to determine which categories to essentialize. There are likely a rich variety of cues that enhance the psychological salience of a category. Take the case of gender, for example. The salience of gender in the U.S. is strengthened for children by 'blue' and 'pink' aisles in toy stores, the use of gender as an organizing principle in elementary-school classrooms (e.g., separate bathrooms; forming separate lines before going out to recess), and gender-specific dress codes (Arthur et al., 2008). Moreover, historical and structural forces support the inference that gender has vast inductive potential, and that gender-linked attributes are immutable (e.g., that most firefighters and all U.S. presidents have been men) and have inductive potential.

With recognition that the nature and reach of these cues are likely important and deserving of study, here I focus on language as a starting point, given its uniquely powerful capacity for cultural transmission in the human species (Maynard Smith & Szathmáry, 1997). My focus is not on direct or explicit statements about categories, as essentialist beliefs can flourish even in the absence of such (e.g., Astuti et al., 2004; McIntosh, 2009). Indeed, explicit articulations of essentialism appear to be rare in parent-child speech (Gelman et al., 1998, 2004), even when parents are prompted to talk about appearance-reality distinctions (e.g., a bat that looks like a bird). Rather, I will review evidence suggesting that essentialist messages are *implicitly* conveyed, through **labels** and **generic language** (Gelman & Roberts, 2017). An important caveat to keep in mind throughout this section: the claim is not that labels and generics *create* childhood essentialism, but rather that they inform children as to *when to apply* this construal -- that is, which categories to essentialize.

Labels

Labels are a simple yet powerful means of transmitting our hard-won adult knowledge about the structure of the world to young children. For children, a category label may signal that an animal or person shares hidden, non-obvious properties with others of the same kind. For example, upon hearing a pterodactyl labeled as a "dinosaur", 2-year-olds infer that it does not live in a nest even though it looks like a bird (Gelman & Coley, 1990); upon learning that a newborn baby is a "girl", 4-year-olds infer that she will later enjoy playing with dolls, regardless of her upbringing (Taylor, 1996), and upon hearing that a child received a heart from a "pig", 6- to 7-year-olds infer that the child would be slightly more likely to enjoy rolling in the mud (Meyer et al., 2017). The form of the label packs particular punch. For example, hearing that a person is a "carrot-eater" (a novel noun label), as opposed to "eats carrots whenever she can" (verb phrase), leads children 5-7 years of age to treat her behavior as more stable over time and contexts (Gelman & Heyman, 1999; but see Reynaert & Gelman, 2007, for how conventional patterns of use also affect interpretation of familiar expressions).

The use of the category label "scientist" can have downstream negative consequences for children's engagement and interest in science, by implying that the category is stable and distinct from other kinds of people -- in other words, that scientific activities are appropriate only for this special kind of person (Rhodes et al., 2020). Describing science activities to children with a non-label (asking children to "do science") resulted in children's higher levels of interest and persistence in science activities, as compared to describing science activities with a label (asking children to "be scientists").

Although numerous labs have found that shared labels foster inductive inferences even in the face of dissimilarity (e.g., Booth, 2014; Davidson & Gelman, 1990; Graham et al., 2004; Jaswal & Markman, 2007), Sloutsky and colleagues (2001) suggest that this does not reflect a conceptual expectation about categories, but rather a reliance on perceptual similarity between items, which is increased when children hear the same auditory feature

(e.g., "bird") for two different items. In a series of papers, they employed a paradigm designed to tease apart these two theoretical accounts (see Sloutsky, 2018 for review). The basic set-up was as follows: (1) Children were taught two novel categories in which labels (ziblet and flurp) were orthogonally crossed with item similarity; (2) the rule for applying the labels was a relational property (i.e., ratio of buttons to fingers); and (3) no labels were provided during the inference task. Under these conditions, children were much more likely to make inductive inferences on the basis of item similarity than category membership (indicated by the relational property). However, the artificial categories in these experiments differed markedly from basic-level natural kinds (Gelman & Waxman, 2007), and the relational property "rule" for identifying category membership was unfamiliar and cognitively demanding. In contrast, when the categories are clearly conceptually distinct, the category indicator is a feature rather than a relational rule, and information-processing demands are reduced, children consistently make use of category membership to draw their inferences (Gelman & Davidson, 2013).

I think there are two key conclusions from this debate. First, not all categories are alike, for children as well as adults, and children's assessment and use of labels for reasoning reflects these differences (see also Waxman & Gelman, 2009). And second, concepts and perceptual similarity are not in opposition to one another but are mutually informative (e.g., perceptual features provide information that helps us identify category membership; see also Medin, 1989). This is true for children as well; children are both 'theorists' and 'data-analysts', making use of both similarity and conceptual information (Waxman & Gelman, 2009).

A final important point about labels is that they engender what Hacking (1995) calls "looping effects". Building on Hacking's idea, Steven Roberts and I (Gelman & Roberts, 2017) suggest:

> "Concepts of human kinds may lead to a cyclical pattern in which cultural practices lead groups to appear more distinct from one another, which confirms the categorizations, leading to more differentiating practices, and so forth. Viewing social kinds as having deep differences has cycling effects on behaviors that contribute to the reality of that social kind."

For example, differences between social groups (e.g., men/women; Jews/non-Jews, Whites/Blacks) have been exaggerated at different points in history via clothing, hairstyles, gait, bodily deformations, styles of speech, physical separation, and so forth -- both chosen and imposed. These differences then further support the notion that these labels refer to natural groups that support indefinitely many non-obvious inferences, thereby reifying the categories they name. In essence, labels create a self-reinforcing loop. The developmental origins of such looping effects deserve more direct study.

Generics

Generics are the most common linguistic device that we use to refer to kinds directly (Gelman et al., 1998, 2000, 2004; Gelman, 2003; Rhodes et al., 2025): *Birds lay eggs; Girls*

wear pink; Italians eat pasta. Generics are universal across the world's languages, frequent in child-directed speech, and both understood and produced in early childhood, by 2 or 3 years of age (Gelman, 2021; Gelman et al., 2008; Gelman & Raman, 2003; Hollander et al., 2002). Generics are notable for referring to a kind as a whole (e.g., birds, girls, or Italians, in the examples above) -- not any particular instance or set of instances. As such, they have two semantic features that support essentialist inferences: (1) they express features that are not tied to any particular time, place, or context, but rather are assumed to be enduring and non-accidental (e.g., "Birds have hollow bones"), and (2) they gloss over exceptions, thereby minimizing within-category variation (e.g., "Birds lay eggs", even though male birds and baby birds do not).

Generics imply that the property predicated of the kind (e.g., wearing pink) is generally true (Cella et al., 2022; Cimpian et al., 2010), distinctive (Moty & Rhodes, 2021; Novoa et al., 2023), inherent (Cimpian & Markman, 2009, 2011), and normative (Leshin et al., 2021; Roberts, Ho, & Gelman, 2017). Moreover, above and beyond the specific properties that are predicated of the kind, generics imply that the category itself is a real, objective, natural kind. For children, just by virtue of a speaker choosing to use a generic about a given category (e.g., “girls” rather than “this girl” or “children”), this communicates that the speaker thinks the category is a richly structured, objective natural kind (e.g., that 'girls' is a category about which a host of inferences can be made) -- and this assumption holds even when the features expressed are innocuous, counter-stereotypical, or externally caused (see Rhodes et al., 2025, for review).

Studies of parent-child conversation indicate that the rate of parental generics corresponds to parents' own essentialist beliefs (Gelman et al., 2014) and racial attitudes (Britton et al., 2024) and contribute to children's ethnic essentialism (Segall et al., 2015). Experimental studies indicate that generics boost essentialism about novel animal kinds (Gelman et al., 2010) and novel social kinds (Pronovost & Scott, 2022; Rhodes et al., 2012, 2018). Additionally, hearing generics about a novel social group (non-citizens) led children to require less evidence to label individuals as members of that group, to ignore negative consequences (e.g., jail or deportation) to those so identified, and to express higher certainty about their choices (Goldfarb et al., 2017).

In summary, generics are ubiquitous in the speech that children hear, and they implicitly convey essentialist messages -- even when the explicit messages are the opposite (Gelman et al., 2004). Messages conveyed generically may be particularly 'sticky', in that they are difficult to refute. Whereas a single counterexample undermines a universal claim, it does not undermine a generic claim, as these allow for exceptions (Cimpian et al., 2010; Simmons & Gelman, 2025). However, more research is needed to examine generics in other languages and cultures (e.g., Shahbazi et al., 2024), and to examine the contexts that may undermine their negative consequences -- a point to which I return in the final section of this chapter).

DEVELOPMENTAL ORIGINS

The question of the developmental origins of essentialism is an important one. It is revealing not only about early cognition, but also why humans essentialize, and how we may intervene to curb its most problematic consequences. Theoretical proposals have been various and wide-ranging, and are summarized in Table 3. They include (but are not limited to) claims that that essentialism is: (a) a late-emerging, historically contingent set of beliefs piggy-backed on learning about the work and tools of scientists (Historically Contingent), (b) an innate, domain-specific, modular capacity to reason about biological kinds (Biological Module), and (c) a broad assumption rooted in the logic of nouns -- due to the use of single labels for varied sets (e.g., "mountain" for all mountains, suggesting some common essence) (Inherent Consequence of Naming).

Table 3. Some different theoretical accounts of the origins of essentialism.

Theoretical position	**Key proponent(s)**	**Age of emergence**	**Scope of early essentialism**
Historically Contingent	Fodor (1998)	Late (when exposed to modern Western philosophy and technology)	[not specified]
Biological Module	Atran (1998); Gil-White (2001)	Innate	Biological; later extended to social kinds
Inherent Consequence of Naming	Hallett (1991); Mayr (1991)	With emergence of language (10-12 months)	All named categories
Domain-General Capacities, Selectively Applied	Gelman (2003)	Early (by 4-5 years of age, perhaps earlier)	Broad but limited, depending on fit with multiple perceptual, causal, linguistic, and social cues

Each of these first three views seems to fall short when considering the developmental data regarding when essentialism emerges in development, as well as the scope of early essentialism. In the remainder of this section, I review the theoretical implications of these issues, and then turn to my own view, "Domain-General Capacities, Selectively Applied." This view posits that essentialism emerges from a set of domain-general capacities that are beneficial for human development, capacities that are applied selectively to categories for which there is a perceived 'fit'. The convergence of multiple such capacities fosters psychological essentialism.

When essentialism emerges in development

As summarized in earlier sections of this chapter, numerous signatures of childhood essentialism are present early in development -- prior to formal schooling, and in a range of societies, both industrialized and non-industrialized. This refutes the suggestion that essentialism is historically contingent on knowledge of Western philosophical traditions and modern scientific tools and discoveries, such as microscopes and genes (Fodor, 1998). Formal schooling and exposure to Western philosophy are not required for essentialism.

Although it is an open question as to when in development essentialism first appears, there is provocative evidence for essence-like construals in infancy. Croteau et al. (2024) suggest that two key aspects of infants' sortal-kind concepts display evidence for psychological essentialism: infants place greater reliance on deeper, causal features than surface-level features, selectively attending more to the former than the latter, when reasoning about objects (see evidence for this capacity by 13-14 months of age; e.g., Cacchione et al., 2013; Taborda-Osorio & Cheries, 2018). And by 9 months of age, infants draw rich inductive inferences from their kind concepts (e.g., Baldwin et al., 1993). This is consistent with the possibility that essentialism is part of core cognition, and inherent in the logic of basic-level kinds (Carey, 2015). Croteau et al. (2024) also note that infants treat ontological boundaries as immutable (e.g., an inanimate object cannot change into an agent or an animate object). Although the authors are careful to point to the need for further research to examine how these findings relate to psychological essentialism, certainly these results indicate an appreciation that categories extend beyond superficial features and have inductive potential.

Indeed, similar findings have been documented in some non-human species as well, although this evidence is more speculative and limited. Impressively, certain non-human primates can categorize based on non-obvious features -- for example, baboons make use of sophisticated and subtle dominance hierarchies (Seyfarth & Cheney, 2009), and great apes can prioritize kind identity over superficial features (Cacchione et al., 2016; Lurz et al., 2022). However, it is also notable that without language, these concepts differ in several important ways from essentialism in language-using children (see Gelman & Roberts, 2017, for discussion): they are less efficient in transmitting category information, limited in inducing conceptual innovation and conceptual change, and narrow in scope of application (e.g., centered primarily on food and within-species social relations, such as mating and dominance, as opposed to the broad range of animal and social kinds to which young children apply essentialism). Thus the nature and extent of early essentialist-like behaviors -- in infants and non-human primates -- remains an important issue for future research (see also Rakoczy & Caccione, 2019).

The early emergence of essentialism would seem consistent with two theoretical positions: the Biological Module view and the Inherent Consequence of Naming view. However, both face problems when considering the scope of early essentialism, to which I turn next.

Scope of early essentialism

An important constraint on theories of developmental origins is the scope of early essentialism. Certainly for adults, essentialism does not apply broadly to all categories or domains. For example, people can form categories of simple artifacts (e.g., cups or tables; Rosch et al., 1976), random dot patterns (Posner & Keele, 1968), and arbitrary groupings (e.g., items on the even-numbered pages of a google search for animals; Ahn et al., 2013) -- yet none of those categories are presumed to support rich inductive inferences or have an innate basis. The domain-specific nature of essentialism is evident in young children as well. By age 3-4 years, children treat animals as having stricter category boundaries than artifacts (Rhodes et al., 2014); and by second grade, children distinguish between animals and artifacts in their judgments of immutability (Keil, 1989) and inductive potential (Gelman, 1988). Altogether, essentialism seems to be a better fit for natural kinds than artifacts, by preschool age.

Importantly, this result argues against the proposal that essentialism is a domain-general capacity that follows from how nouns function (Inherent Consequence of Naming).

By contrast, the domain-specificity of essentialism has been argued to support the Biological Module view. This account proposes that essentialism has its origins in reasoning about biological kinds, as part of an innate, universal biological module (Atran, 1998; Atran et al., 2001). On this view, we essentialize because we have special reasoning systems dedicated to processing the biological domain, and essentialism is extended to social kinds by analogy (see also Rothbart & Taylor, 1990) -- especially those social categories that are most similar to biological kinds (Gil-White, 2001). Potentially consistent with this view, Davoodi et al. (2020) and Shahbazi et al. (2024) suggest that children's patterns of essentializing social categories across different cultural contexts (U.S., Iran, and Turkey) are strongest for categories that have a biological or quasi-biological basis (e.g., with gender the most strongly essentialized and sports teams least strongly essentialized). Thus, biological essentialist perceptions of social categories (e.g., that a member of a category was born that way; whether category membership could be detected in the blood) were associated with higher levels of essentialism on a switched-at-birth task (Shahbazi et al., 2024). This conclusion is limited, however, in that the measure of essentialism was itself a biological outcome (inheritance), and did not include other dimensions of essentialism, such as immutability or inductive potential.

However, there are two primary arguments against essentialism as initially a domain-specific, biological construal. First, young children also essentialize nonbiological natural kinds such as gold and salt, expecting dissimilar members to share non-obvious properties (Gelman & Markman, 1986) and expecting that a substance can be invisible yet still have causal effects (e.g., when sugar is dissolved in water, it still makes the water sweet; Au et al., 1993). Natural substances have none of the biological features of animal kinds. Second, there is no evidence that children essentialize biological kinds (e.g., animals) prior to their essentialism of social kinds (e.g., especially gender, but other social kinds as well,

such as language). Not only are both social and biological kinds essentialized across a range of tasks in the preschool years, but children's essentialism of certain social kinds (again, most notably gender, but also language and personality) may be stronger for children than adults (Heyman & Gelman, 2000; Hirschfeld & Gelman, 1997; Taylor et al., 2009).

Domain-General Capacities, Selectively Applied

I now turn to my own account of the developmental origins of essentialism, which I call "Domain-General Capacities, Selectively Applied". I propose that we essentialize not because we have special reasoning systems dedicated to processing the biological domain, not due to the logic of nouns, and not the consequence of a particular historical moment. Rather, I propose that essentialism is the application of multiple, domain-general psychological capacities or tendencies, each evolved to solve a different set of foundational problems in development (see Gelman, 2003, for more detail). Each of these capacities can apply to a broad range of concepts or problems that a child will face--including artifacts as well as animals. However, they also sensibly apply to some categories better than others. Which capacities are invoked will depend on cues from the real-world causal structure, as well as from context and language. When the full suite of capacities converge, they are more than the sum of their parts, and result in what we would call "essentialism."

The precise set of these capacities is up for debate, but some candidate tendencies include: causal determinism, induction from property clusters, the distinction between appearance and reality, deference to experts (but see Noyes & Keil, 2017, for an example of how essentialism can in certain contexts instead lead to rejection of expertise), attention to history, and an inherence heuristic. None is sufficient by itself for essentialism, but when they converge, they result in a powerful set of essentialist expectations. Each is present early in development, and each applies broadly, not just to essentialized kinds.

- *Causal determinism* (the assumption that all events have a cause and do not occur randomly) may contribute to the essentialist belief that there is some unknown essence that accounts for why birds all have wings, feathers, and the same basic body structure. But causal determinism also applies to how infants and young children reason about simple mechanical devices, as when they search for a button or internal mechanism to explain why an object behaves in an unexpected way, or when they attribute a transparent artifact's apparently self-generated motion to 'invisible batteries' (Bullock et al., 1982; Chandler & Lalonde, 1994; Gelman & Gottfried, 1996; Muentener & Schulz, 2014).
- *Induction from property clusters* can account for the rich inductive potential of natural kinds (where shared features serve as 'magnets' for even more shared features), but it also can account for children's sophisticated tracking of property correlations to make inferences about the causal affordances of artifacts (e.g.,

Gopnik et al., 2001; Sobel et al., 2007; Walker et al., 2014) and overhypotheses regarding object sets (Dewar & Xu, 2010).

- The *appearance/reality distinction* and *deference to experts* can account for how children accept counterintuitive labels for natural kinds (e.g., accepting that a bat is not a bird, and a legless lizard is not a snake). But they can also account for young children's broad reliance on the labels that adults provide for artifacts – as when a sponge-rock is called "a sponge", or a crayon with a wick is called "a candle" (Lane et al., 2014).
- *Attention to history* may underlie the essentialist belief that once a raccoon, always a raccoon (immutability) and that a baby's gender at birth will determine her later preferences and abilities, regardless of the environment in which she's raised (innate potential). But it also accounts for how children apply labels to artifacts (Gelman & Bloom, 2000), decide who owns what (Friedman et al., 2011; Gelman et al., 2012, 2016), determine an object's value (Hood & Bloom, 2008; Gelman & Davidson, 2016; Tasimi & Gelman, 2021), and extract social information from traces of objects' history (Jara-Ettinger & Schachner, 2024).
- An *inherence heuristic* can explain that the causal essence is assumed to be internal to each member of a kind and immutable. But it also accounts for a range of cases in which children (and adults) appeal to inherent or intrinsic factors more than extrinsic or external factors to explain the attributes of artifacts -- as when explaining that people drink orange juice for breakfast because of inherent qualities it possesses (Cimpian & Salomon, 2014).

These underlying capacities do not themselves constitute essentialism, and do not emerge "for" essentialism. Rather, each has independent adaptive value for young humans, when they are taking in information and building knowledge structures. However, when these capacities converge, they may collectively foster a host of essentialist consequences, including a realist assumption about categories and names, boundary intensification, attention to internal features, and an expectation that a category is immutable over time and over transformations.

CONSEQUENCES FOR SOCIAL ISSUES AND EDUCATION

To this point I have focused on basic research on childhood essentialism. In this section I address two broad sets of consequences that essentialism has for children beyond the laboratory: for social issues, and for education.

Implications for social issues

One of the more important and problematic aspects of childhood essentialism is its association with social ills, including stereotyping, prejudice, stigma, and negative intergroup relations (see Rhodes & Mandalaywala, 2017, for review). For example, children's race essentialism was predictive of reduced liking of Black children (Mandalaywala et al., 2019) and out-group stereotyping (Pauker et al., 2016), and

children's gender essentialism was predictive of prejudice toward gender-non-conforming children; Fine et al., 2024; Gross et al., 2024). Inducing essentialism resulted in negative inter-group attitudes (Diesendruck & Menahem, 2015), and led children to share fewer resources with outgroup members (Rhodes et al., 2018).

At the same time, research with both adults and children has found that essentialism can at times have the opposite effect, for example reducing prejudice based on body weight, same-sex attraction, and incarceration (see Peretz-Lange, 2021, for review). Peretz-Lange (2021) proposes a causal discounting theory to explain these contrasting effects:

> "Essentialism may promote prejudice by leading children to discount structural explanations (i.e., to reason that a group is low-status because of its personal deficiencies rather than its structural disadvantages), but it may mitigate prejudice by leading children to discount agentic explanations (i.e., to reason that a group was 'born that way' rather than choosing to be that way). Thus, the consequences of essentialism may reflect both the explanations children endorse as well as those they discount."

This important point indicates the double-edged sword of essentialist beliefs, as well as the need to probe more fully children's (and adults') causal explanations in order to understand their consequences. Consider, for example, essentialist beliefs about criminal behavior. There are striking developmental changes with age: children were substantially more likely than adults to attribute law-breaking to internal, unchanging behaviors, and to attribute imprisonment to internal moral qualities (e.g., "Prison is a place where bad people go"; Dunlea & Heiphetz, 2020). However, whether essentialist explanations for criminal behavior are linked to greater or lesser endorsement of punishment, depend on the component of essentialism that is assessed (e.g., biology vs. immutability), the target of essentialism (e.g., behaviors vs. moral character), and whether the actor is believed to have control of their actions (Martin & Heiphetz, 2021; Martin et al., 2022; Meyer et al., 2022; Xu et al., 2022).

This framework can be applied to a host of children's concepts of disability. Jaswal and Robertson (2024) note that children's essentialist views of disability could increase prejudice (by decreasing awareness of structural explanations), and/or could reduce prejudice by highlighting a person's lack of control (see Lebrón-Cruz & Orvell, 2023, for protective effects of essentialist beliefs about neurodivergence, in an adult sample). Menendez and Gelman (2024) likewise suggested that essentialist models of disability may foster viewing the disability as residing in the disabled individual, and as highly informative and predictive of other features (treating all with that disability as alike), and may lead to under-appreciation for the role of non-biological factors. At the same time, essentializing a disability might lead people to place less blame on the disabled individual, but also contribute to a fatalistic assumption that a disability cannot be improved. Both Jaswal and Robertson (2024) and Menendez and Gelman (2024) point to the need for future research in this area. For example, Menendez & Gelman argue for more systematically examining

different components of essentialism, each of which may have different implications for children's attitudes and beliefs.

Given the potential for biased reasoning about essentialized groups, researchers have proposed methods for reducing such bias. One such means is via intergroup contact, which has been theorized to lower bias and discrimination against stigmatized outgroup members (e.g., Allport, 1954). Evidence for reduced essentialism resulting from intergroup contact has been documented in children (e.g., Deeb et al., 2011; Pauker et al., 2016). Intergroup contact can be either direct or indirect (i.e., via children's media). For example, in one study, cisgender children learned about a transgender child via a child-friendly animated video, resulting in their having a better understanding of transgender identities and lower gender essentialism on a few specific measures (Fine et al., in press).

Another strategy may be to introduce alternative, non-essentialist explanations for group differences. For example, recent research indicates that even young children are capable of appreciating structural explanations, according to which group differences are attributable to the external circumstances in which the groups find themselves (e.g., Peretz-Lange et al., 2021; Vasilyeva et al., 2018; Zhang et al., 2024). This may be a promising approach for countering bias resulting from essentialism. At the same time, it should be noted that increasing structural explanations does not necessarily reduce children's reliance on internal explanations (Yang et al., 2022). Furthermore, children may ignore structural factors when they are consistent with an existing stereotype (Amemiya et al., 2022). To reduce prejudiced beliefs, it may be necessary not only to draw children's attention to external factors, but also to highlight individuals' potential for change (Vasilyeva et al., 2018).

To this point I have focused on children's own attitudes toward members of different social groups, but adults' own essentialist beliefs toward social policies also have consequences for children. For example, Roberts, Ho, Rhodes, & Gelman (2017) found that adults who endorsed higher levels of essentialism were also more likely to endorse boundary-enhancing legislation, policies, and social services -- both ones that were designed to disadvantage vulnerable social groups (e.g., mandating that transgender individuals use bathrooms for their biological sex), as well as ones that were design to help them (e.g., support for single-sex classrooms). This result was obtained even after controlling for participants' conservatism, education, religiosity, and anti-gay attitudes. Adults' essentialist views regarding language learning (that language is innate and biologically based) were associated with endorsing language-related educational neuromyths and rejecting educational policies that promote multilingual education (Sun, Nancekivell, et al., 2023). Adults' belief in the myth of 'learning styles' corresponded to their beliefs regarding the efficacy of multimodal instruction for children (Nancekivell et al., 2020, 2021), as well as the beliefs of both parents and teachers about children's academic potential (Sun, Norton, et al., 2023). Adults' essentialist belief that success in certain fields requires raw, innate, natural talent or 'brilliance' (Leslie al., 2015) is one that emerges early

in childhood and may have negative consequences for children's own goals and aspirations (Bian et al., 2017; Muradoglu et al., 2025).

Implications for education

A second set of consequences are in the field of education, where lay essentialist beliefs may be imported into people's construal of scientific biological concepts, thereby introducing distortions and misunderstandings. I focus on two such examples: genetics and evolution.

Genetic essentialism. In 2011, Dar-Nimrod and Heine introduced the notion of 'genetic essentialism', which they define as "the tendency to infer a person's characteristics and behaviors from his or her perceived genetic makeup." They provide evidence that learning that an attribute has a genetic cause has several potentially negative consequences, including treating it as (1) immutable and determined, (2) having a specific etiology, (3) homogeneous and discrete, and (4) natural (and therefore more morally acceptable). Essentialist misconceptions about genetics are found in nationally representative samples of adults in the U.S. (Christensen et al., 2010; Jayaratne et al., 2009). More problematically, essentialist misconceptions about genetics are also found in widely used biology textbooks aimed for high school students -- for example, portraying sex and gender differences as discrete rather than continuously variable and overlapping, and overemphasizing the role of sex chromosomes vs. environmental factors and gene-environment interactions (Donovan, Syed, et al., 2024). Curricular changes have been proposed with the goal of reducing essentialist views of race and gender (e.g., Blake, 2004; Donovan, Weindling, et al., 2024; Pérez, 2024).

The extent to which children likewise view genetics in an essentialist manner, and at what ages, is still a largely open question. Recent research does suggest elements of essentialist and non-essentialist views of genes in childhood, as well as age-related changes in children's reasoning (e.g., Menendez et al., 2024; Meyer et al., 2020) -- but more research is needed.

Evolutionary theory. Marjorie Rhodes and I proposed that essentialist concepts contribute to two sorts of obstacles to evolutionary theory and natural selection: those that stand in the way of understanding, and those that stand in the way of acceptance (Gelman & Rhodes, 2012; see Table 4).

Table 4. Essentialist components that undermine acceptance and understanding of evolutionary principles.

Essentialist components	**Beliefs undermining understanding of evolution**	**Beliefs undermining acceptance of evolution**

Stability over transformations	--	Species cannot change.
Strict boundaries	There are sharp, absolute boundaries between species.	There are no intermediate forms in biology.
Uniformity	Members of a species vary in only superficial respects; they are alike in their essence.	There is minimal variation across members of a species.
Inherence	Evolution entails individual-level change, not population-level change.	--

Shtulman and Schulz (2008) found that children (ages 4-9 years) and adults greatly underestimated the degree of variation within a species (needed for appreciating natural selection), and that this essentialist construal correlated with misunderstanding evolution (e.g., believing that change takes place over time within individuals, rather than at the population level). Ware and Gelman (2014) found that adults also endorsed a Lamarckian view of evolution: if an individual animal needs a feature to survive, then it will develop that feature and even pass it down to its offspring. Importantly, however, simple and direct instruction can successfully inform even young children (5-8 years old) of the principles of natural selection (Kelemen et al., 2014).

CONCLUSIONS

Childhood essentialism is a double-edged sword: it is a source of great achievements and serious misconceptions. On the one hand, it is impressive that preschool children are capable of thinking about entities in their everyday world in terms of non-obvious features and hidden potential. Essentialism reveals a precocious ability to look beyond the obvious, and contrasts with the classical view of children as captivated by appearances and fixated on the 'here-and-now' (Gelman, 2023). Furthermore, the placeholder nature of essentialism, along with the expectation that natural kind categories have rich inductive potential, encourages children to assume that there is always more to learn about the world around them. It is a perspective with the potential to engender additional knowledge growth. In this regard, I view essentialism as a starting-point for learning -- not merely its outcome (see also Gelman & Wellman, 1991). On the other hand, essentialism is a source of stereotyping, prejudice, and intergroup bias. It has contributed to some of the most terrible conflicts in human history. It also fosters serious and persistent misconceptions about science. Altogether, the study of childhood essentialism is a stark reminder that the cognitive mechanisms that make us so smart and sophisticated are simultaneously sources of distortion and bias (Gelman, 2023; Noyes & Keil, 2017).

Although essentialism can be examined as a construct unto itself, I have tried to emphasize, throughout this chapter, that children's essentialism always works in concert with, and alongside, other cognitive, linguistic, social, and societal processes. For

example, essentialism does not entail the absence of similarity-based reasoning. As Medin (1989) points out, most of the time, things that look alike can be assumed to share deeper properties; appearances are therefore a useful heuristic for children as well as adults. Likewise, a full understanding of essentialism and its consequences will require continued study of the complex array of messages that children receive, and their sensitivity to such messages -- in different communities, cultures, contexts, and languages.

Although childhood essentialism emerges early in development, it is also important to note that much of the research I have reviewed has also obtained age-related changes. A broad theme appears to be that childhood essentialism becomes increasingly differentiated over time, in terms of the categories and properties to which an essentialist framework does (and does not) apply (e.g., Diesendruck, Birnbaum, et al., 2013; Peretz-Lange & Kaebnick, 2025; Davoodi et al., 2020; Shahbazi et al., 2024; Waxman et al., 2007). Essentialism may also change as children gain experience with a scientific knowledge base (e.g., see Gottfried et al., 1999, for an example in children's reasoning about the brain) and with cultural or community beliefs (Rhodes & Gelman, 2009). Rhodes and Moty (2020) also propose an interesting developmental change, in which children are initially essentialist about specific categories (e.g., tigers, wolves) but then over time construct over-hypotheses such that essentialism applies also to entire domains (e.g., animals). They note that such a shift would be especially powerful, as it would guide children's reasoning about even novel categories they have not previously experienced.

An open question is the extent to which we (as adults) restructure our concepts away from essentialism as we learn about phenomena that conflict with some of its foundational assumptions (phenomena such as natural selection; epigenetics; and structural bases for disparities associated with socioeconomic status, race, ethnicity, or gender). Formal scientific knowledge about species, an appreciation for statistical variation within kinds, and exposure to historical, geographic, and epidemiological sources of social group differences may all contribute to an appreciation for within-category variability, the limits of genetic causation, the importance of structural factors and complex environmental influences, and so forth. At the same time, it is certainly not the case that essentialism disappears altogether, at least for many adults. Extensive evidence over the past few decades documents that many adults hold essentialist beliefs regarding a range of social and biological categories (e.g., Berent et al., 2020; Haslam & Whelan, 2008; Sun et al., 2021). Moreover, essentialist and anti-essentialist beliefs may co-exist within an individual, for example with the reappearance of essentialism under speeded testing conditions (e.g., Eidson & Coley, 2014). Whether adults generally reduce their reliance on essentialist construals relative to children, and under what conditions, remains an important question.

A tendency to resort to essentialist reasoning may also be true of our own science (Mahoney, 2023). Oyama (2000, 2002) proposed that theorists may treat statistical evidence of a trait as if it were “a hidden truth, rooted in the past and already there” (in other words, an essence). Siegler (1996) argued that the questions that developmental

psychologists pose often treat age categories as uniform and static, rather than variable and continuously changing -- as if 5-year-olds (for instance) can be understood as possessing a single, underlying, true nature. Similarly, Barrett (2017) suggested that scientists incorporate essentialism into their theories -- erroneously implying that categories (such as emotion categories) are uniform and universal rather than variable and influenced by contextual factors. And in reporting the results of our research in scientific journals, there is an overwhelming tendency to use generic language, a tendency that glosses over exceptions (DeJesus et al., 2024). In all of these respects, there is a danger that we may lapse into essentializing assumptions about the very constructs we are trying to explain.

I end this chapter by reproducing (with some modifications) the final paragraph of my 2003 book, which I believe still holds today:

> I conclude by considering why we essentialize in the teleological sense—in plain terms, what it buys us. There are, I think, two sorts of answers. First, each of the underpinnings of essentialism is useful for making sense of the world, each in its own distinct way. We attend to object history in order to recognize individuals through space and time. We defer to experts in order to benefit from cultural knowledge. We draw inductive inferences from property clusters, and distinguish appearance from reality, in order to make (generally) accurate predictions. We search for causes in order to create more useful tools and technologies. And so forth. In other words, each of the underpinnings of essentialism is motivated for independent purposes – not for essentialism per se. There is a second answer as well. Essentialism is a by-product, with unintended and unpredictable consequences. Each strand that underpins essentialism is beneficial in our interactions with the world. Yet the cumulative effect of these tendencies is more mixed, presenting deep problems alongside the benefits.

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