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THE PSYCHOLOGY OF NATURAL KIND TERMS

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When he was three years old, the child of one of the authors came running into the living room to proclaim to her, "I know the dolphins in daddy's closet are *really* mammal-dolphins, like you said, and they breathe outside of water. But they *look* like fish-dolphins, so I'm going to pretend that's what they are".

There were no dolphins in the closet—not real ones, not toys, not pictures. They existed only in his imagination. But even in his imagination, this three-year-old child did not treat the categories of *fish*, *mammal*, or *dolphin* as arbitrary. His words signaled that he viewed these categories as real, objective facts about the world. He accepted that whether a *dolphin* was a fish or mammal was not a matter of his opinion (or something he could figure out by relying on his own perception), but a matter decided by experts. His beliefs were so firm about this that he couldn't think otherwise—even in his imagination—without signaling that he knew he was doing so "only for pretend".

In this example, the child used the words, "dolphin", "fish", and "mammal" as natural kind terms— words that speakers and listeners understand as referring to categories that they view as *natural kinds*. Not all category labels are natural kind terms because not all categories are natural kinds. Some are groupings that people agree are a matter of choice. For example, people can disagree over whether a hotdog is a sandwich, a beanbag is a chair, or whether sugar-free cookies belong in the category of *diet foods* (Gelman and Coley 1991; Malt 1990). Natural kind terms, in contrast, refer to those categories that we believe "carve nature at its joints" (Plato 380 B.C./1974; Mill 1884; e.g., Kripke 1972; Putnam 1973, 1975; Quine 1977; Schwartz 1979; Wilson 1999). From this perspective, grouping things into these kinds of categories is a matter of discovering these joints, not creating them. These intuitions are often wrong (Gelman and Rhodes 2012; Mayr 1982; Leslie 2013; Shtulman 2017), but their implications for psychology, linguistics, and conceptual development are profound. In this chapter, we review what it means to think of a category as a natural kind, how natural kind terms get their status in psychology and language, and how the language of natural kinds shapes cognition, development, and behavior.

Categories as Natural Kinds

The prototypical example of a category that people think of as a natural kind is a basic level species (e.g., *tiger, rose, bee*). In contrast to other types of groupings (e.g., ad-hoc categories, goal-directed groups, and even categories of human-made artifacts), people's conceptual representations of natural

kinds are distinctive in several ways (Gelman and Coley 1990). As illustrated in the above example, people think that the boundaries of these categories are set by nature, and therefore are an objective matter of fact, not up to individual opinion. Following what Putnam described as the *division of linguistic labor* (1973), people think it is reasonable to say, "according to experts, that's a planet", but not "according to experts, that's a toy", because we rely on experts to figure out the status of celestial bodies (whose status we view as set by nature and discovered by humans) but not to figure out the status of a toy (which could be whatever a child chooses to play with; Malt 1990). Similarly, people think that there are many flexible and subjective ways to classify human-made artifacts but only one correct, objective (natural) way to classify animals (Kalish 1998a; Rhodes and Gelman 2009a).

People also think that natural kinds have absolute boundaries: Although natural kind categories have a graded structure, and some category members are viewed as more representative and generalizable than others (Rosch and Mervis 1975), even an unusual bird (e.g., a penguin) is still fully a bird, while an unusual piece of furniture (e.g., a beanbag) can be "sort of" a chair (Diesendruck and Gelman 1999; Estes 2003, 2004; Kalish 2002; Rhodes and Gelman 2009b). As another consequence of thinking of natural kinds as carving nature at its joints, people think of these categories as capturing fundamental patterns of similarities and differences—that members of the same kind are deeply similar to each other and different from others in many observable and unobservable ways. Thus, people readily generalize the features of individual members of natural kinds to other members of their categories, more than they do for other types of groupings (Gelman 1988; Gelman and O'Reilly 1988; Rips 1975). Finally, people expect membership in natural kind categories (e.g., whether an individual animal is a tiger) to be stable, even across superficial transformations (e.g., if someone paints over its stripes; Gelman and Wellman 1991; Keil 1989) or changes in environment (e.g., if it grows up in a community of peaceful sheep; Gelman and Wellman 1991; Waxman, Medin, and Ross 2007).

It feels like we discover natural kinds in the world, and that the reason we think of some categories this way (e.g., animal species) more than others (e.g., human-made artifacts) is because of the objective structure of nature—that the world of animals *simply is* composed of discrete and homogeneous natural kinds while the world of artifacts is not. But this is not the case. The distinction between natural kinds and other types of categories is psychological. This is illustrated by two key considerations. First, whether we construe a particular category as a natural kind is not entirely dependent on its ontological status. It might feel like the objective structure of the world dictates that there is an obvious answer to whether Pluto is a planet but reasonable disagreement over whether a hotdog is a sandwich, but people's intuitions about which kind of category is which originate in human culture. People in most (but not all; Astuti 1995) cultures studied to date think of basic level species categories as natural kinds—as having objective, discrete boundaries and picking out coherent, homogeneous categories (Atran 1990; Taverna, Medin, and Waxman 2016). But even in the biological domain, beliefs about the status of particular categories varies by experience (Medin, Ross, Atran, Cox, Coley, Proffitt, and Blok 2006; Medin, Waxman, Woodring, and Washinawatok 2010; Ross, Medin, Coley, and Atran 2003) and expertise (Bailenson, Shum, Atran, Medin, and Coley 2002; Burnett, Medin, Ross, and Block 2005; Lynch, Coley, and Medin 2000; Medin, Ross, Atran, Burnett, and Blok 2002). For example, most diners don't realize that when they order "grouper" from a restaurant menu, they could be served any of what the US Food and Drug Administration considers to be sixty-four different species of fish (Lowell, Mustain, Ortenzi, and Warner 2015). To be clear, this view of natural kind concepts is separable from arguments about whether there really are any objective categories. Our point is more limited—that natural kind concepts do not necessarily reflect objective truth, despite people's strong intuitions that they do (Boyd, this volume; Haslanger 1995). While natural kinds may exist in the world, natural kind *concepts* exist only in people's minds.

Second, our intuitions about natural kinds are incompatible with modern views of the structure of the world. Even basic level animal species—the prototypical example of natural kinds—do not have the type of absolute, objective, and stable boundaries that people usually think they do, nor do

they reliably pick-out categories that are highly homogeneous and distinct from other kinds of things (Gelman 2003; Leslie 2013; see also Kalish 1998a). For example, despite people's intuitions that animal species are stable across time and have immutable boundaries, different species like polar bears and grizzly bears sometimes breed in nature, resulting in hybrids that are "sort of" members of both kinds (Mallet 2008). While sometimes our intuitions about animal species will fit with reality as we experience it (e.g., an animal will still be a ferocious tiger if we paint over its stripes), these intuitions are cognitive shortcuts and are misleading in a broader sense (e.g., species boundaries change over evolutionary time: Gelman and Rhodes 2012). Even if people revise their intuitions in light of empirical evidence, natural kind concepts reflect a psychological, not a metaphysical, reality. In this way, they are a very important type of psychological concept, but can be a confusing and misleading construct in any theory of biology or metaphysics.

Variability in natural kind beliefs is particularly striking in how people represent different social divisions. For instance, some people represent race as a natural kind—and think that race is a fundamental and objective way of categorizing people—whereas others (accurately) understand it as a social construction (Rhodes and Gelman 2009a). How people view race and ethnicity varies by their own political views (Mandalaywala, Amodio, and Rhodes 2018; and for children, those of their parents; Rhodes and Gelman 2009a), the diversity of their local environment (Deeb, Segall, Birnbaum, Ben-Eliyahu, and Diesendruk 2011; Mandalaywayla, Ranger-Murdock, Amodio, and Rhodes 2019), and their own membership in a majority or minority group (Kinzler and Dautel 2012; Mandalaywala, Amodio, and Rhodes 2018; Roberts and Gelman 2016). Similarly, whether people think of religion as marking natural kinds depends on their own religious upbringing (Chalik, Leslie, and Rhodes 2017; Diesendruck and Haber 2009) and whether religion is associated with social and political conflict in their environment (Diesendruck, Goldfein-Elbaz, Rhodes, Gelman, and Neumark 2013; Smyth, Feeney, Eidson, and Coley 2017). Even gender, which people often think of as the prototypical example of a natural kind division in the social world (Rothbart and Taylor 1992; Prentice and Miller 2007; Taylor 1996; Taylor, Rhodes, and Gelman 2009), is understood by some to be socially constructed and arbitrary (Fast and Olson 2018; Rhodes and Gelman 2009a). Representations of social categories illustrate several key things of natural kind beliefs: they are quite often *inaccurate* (in many—if not all—of these cases, a natural kind representation does not accurately reflect the objective structure of the social world), but they are also pervasive, variable, and potentially highly problematic (as will be discussed in more detail below).

How Natural Kinds Get Their Status in Psychology and Language

Given that natural kind concepts are psychologically created, there are two related questions about how they get their status in psychology and language. First: where does the tendency to think of some categories as marking natural kinds come from? That is, if natural kind representations are inaccurate, why do people have them? Second: why do people come to represent some particular categories (and not others) in this way?

Where Do Natural Kind Representations Come From?

One might think that natural kind beliefs arise as a product of formal science instruction or other aspects of Western education. It seems natural to assume that learning taxonomic systems of categorization, about DNA, and so on, could lead to the development of these beliefs. For example, learning about how genes are passed from parents to offspring provides an intuitive framework through which people might think of a wide range of properties—from skin color to musical talent—as heritable and fixed. Indeed, many biology curricula reinforce thinking of the biological world as composed of natural kinds, often to the detriment of students' conceptual understanding of the processes that underlie evolution, the consequences of climate change, and other important scientific concepts (Bean, Sinatra,

and Schrader 2010; Donovan 2014; Short and Hawley 2015; Shtulman and Calabi 2013; Shtulman 2017; Swiney, Bates, and Coley 2018).

But, although some curricula do (perhaps inadvertently) reinforce natural kind representations, formal education does not create them. Natural kind representations of the biological world develop even in cultures with diverse educational practices and even with little exposure to formal science instruction at all (Atran 1990; Taverna, Medin, and Waxman 2016). Further, these beliefs develop in children prior to the onset of formal schooling (Gelman and Kremer 1991; Gelman and Wellman 1991; Waxman, Medin, and Ross 2007). For example, before the age of six, children think that people might disagree over how to categorize human-made artifacts but that there is only one objectively accurate way to classify animals (Diesendruck, Goldfein-Elbaz, Rhodes, Gelman, and Neumark 2013; Rhodes and Gelman 2009a; Rhodes, Gelman, and Karuza 2014). Young children are also certain than a penguin is either 100 percent a bird or not a bird at all (even if they aren't sure which) but agree that sunglasses are "sort of" clothing, for example. Finally, young children expect babies born to tiger parents to grow up to be ferocious tigers no matter what they look like or how they are raised (Gelman and Wellman 1991; Keil 1989), and they expect members of basic level species categories to share fundamental properties, even if they look different from one another (Gelman and Markman 1986; Gelman 1988).

Young children across diverse cultural contexts hold these natural kind beliefs not only about animal species, but also about human gender categories (Rhodes and Gelman 2009a) and other social divisions that are salient in their environment (Diesendruck, Goldfein-Elbaz, Rhodes, Gelman, and Neumark 2013; Diesendruck and Haber 2009; Mandalaywala et al. 2019; Smyth, Feeney, Eidson, and Coley 2017). For example, children think it is objectively accurate to categorize people as *boys* or *girls* (Rhodes and Gelman 2009; Diesendruck, Goldfein-Elbaz, Rhodes, Gelman, and Neumark 2013), and they think that girls have many features in common with one another despite differences in appearance, personality, or preferences (Berndt and Heller 1986; Biernat 1991; Gelman, Collman, and Maccoby 1986; Taylor, Rhodes, and Gelman 2009). Young children sometimes hold these beliefs even in communities where adults have more flexible beliefs (Astuti, Gregg, Solomon, Carey, Ingold, and Miller 2004; Rhodes and Gelman 2009a).

That natural kind representations emerge so early in children's development suggests that they are the product of fundamental and basic conceptual biases, rather than the result of direct instruction (Gelman 2003; Rhodes and Mandalaywala 2017). Children rely on basic conceptual and explanatory biases to actively construct their understanding of the world (Wellman and Gelman 1992; Gopnik and Wellman 2012). In the course of this process, they use basic perceptual and conceptual processes to categorize entities into distinct groups (e.g., to distinguish tigers from wolves) and basic explana-tory biases to make sense of the patterns they observe (e.g., after observing that tigers have stripes and wolves do not, they could assume that there is something intrinsic to tigers and wolves that explains these differences; Cimpian and Steinberg 2014; Cimpian and Salomon 2014). The process of observing and explaining clusters of properties (e.g., having stripes, being orange, etc.) can also lead children to develop higher-order beliefs about the structure of the category—to assume that because tigers and wolves differ in several obvious ways, they probably differ in other ways not yet discovered as well, and that these differences are *generally* caused by intrinsic mechanisms (even if it isn't yet clear what those are).

Finally, children can then develop beliefs at still higher levels of abstraction—wherein after learning about tigers, wolves, birds, monkeys, and so on, they then assume that the biological domain—in general—is composed of natural kinds. This abstract framework theory about the structure of the domain can then guide how they represent and think about new species categories as they encounter them. Indeed, by age four, children hold domain-specific hypotheses about the structure of cat-egories: They expect animal categories, in general, to be natural kinds (Gelman and Markman 1986; Keil 1989), but they recognize that social categories have more variable structure, and not all groupings of people reflect deep homogeneity across members (Diesendruck, Goldfein-Elbaz, Rhodes, Gelman,

and Neumark 2013; Rhodes and Gelman 2009; Kalish and Lawson 2008). Importantly, natural kind beliefs describe a set of inter-related beliefs about the structure of categories (e.g., homogeneity, stability, fixed boundaries, and so on) which can operate in different ways across categories and domains (Noyes and Dunham 2019; Rhodes and Mandalaywala 2017).

Why Do People Come to Represent Any Particular Category as a Natural Kind?

Although children do not need to be explicitly taught that a particularly category is a natural kind, the processes by which they identify particular categories (or domains of categories) as natural kinds are highly sensitive to testimony from others and embedded in culture (Butler and Markman 2012; Butler and Tomasello 2016; Callanan 1990; Gelman 2009; Gelman, Ware, Manczak, and Graham 2013; Csibra and Gergely 2009; Harris and Koenig 2006). Just as adults defer to experts to know the "true" status of natural kind categories (Malt 1990), children look to the experts in their communities (i.e., adults) to learn how to divide up the world into meaningful units of experience (Danovitch and Keil 2004; Gelman and Markman 1986; Jaswal 2010; Jaswal, Lima, and Small 2009; Noyes and Keil 2017; VanderBorght and Jaswal 2009; Wilson and Keil 1998).

Language plays a powerful role in shaping these processes (Vygotsky 1962; Quine 1977). For example, labels mark categories as distinct kinds of things (Kripke 1972; Putnam 1973, 1975). Hearing noun labels helps even three-month-old infants group objects into categories (Fulkerson and Waxman 2007; Waxman and Hall 1993; Xu 2002). For example, young babies who see perceptually dissimilar members of a category (e.g., fish), categorize them into the same group if they are presented with the same label (e.g., "Look at this *toma*!"), but not otherwise (Ferry, Hespos, and Waxman 2010). Labels facilitate categorization because they are reliable cues of the speaker's intent to communicate that individuals are similar in some meaningful way (Ferguson and Lew-Williams 2016). While labels facilitate categorization, many labeled categories (e.g., toys, hammers, crackers) are not represented as natural kinds. Thus, simply being used as a category label does not turn a noun into a natural kind term.

Using labels to provide generic descriptions of categories, however, may begin to do so (Carlson 1977; Gelman 2003; Leslie 2008). Generic statements (e.g., "birds lay eggs", "girls wear pink") describe the properties of abstract categories, in contrast with quantified statements about specific category members (e.g., "these birds lay eggs", "Anna wears pink"; Carlson and Pelletier 1995). By at least thirty months, children understand generics to describe abstract categories, instead of particular examples. For example, upon looking at a picture of two penguins, two-year-old children respond "no" when they are asked, "Do these birds fly?" but "yes" (when looking at the same picture), when they are asked "Do birds fly?" (Gelman and Raman 2003; Graham, Nayer, and Gelman 2011; Hollander, Gelman, and Star 2002; Rhodes, Leslie, Bianchi, and Chalik 2017). Thus, by age two, children can track the difference between generic, abstract references to categories and references to particular members. By age three (and perhaps earlier), children also recognize generics as describing generalizable information about what category members are usually like, and they expect that the properties described by generics are common across category members (Cimpian, Brandone, and Gelman 2010; Leslie, Khemlani, and Glucksberg 2011), even when this is not always the case (for instance, the statement, "mosquitos carry the west Nile virus" is true of less than 1 percent of mosquitos, yet it can still be expressed generically).

Thus, within the first few years of life, children understand that generic statements communicate generalizable information about abstract categories. Generics communicate information about shared properties, which can trigger the processes of developing higher-order beliefs (e.g., that tigers have a lot in common in general), as well as explanatory assumptions that these patterns probably reflect intrinsic causes, as described above. Critically, children also defer to the expertise of adult speakers to use generics to signal that the category of interest is the type of category that carves nature at its joints. When an adult says, "Tigers have stripes", "Tigers are ferocious", "Tigers run very fast", children learn not only about three features of tigers, they also learn that a knowledgeable adult in their community

thinks that *tigers* is a meaningful way of dividing up the natural world. Thus, via multiple mechanisms, generic language contributes to the development of natural kind beliefs. Once a particular category label is described with generics, it can begin to take on the status of a natural kind term.

For generics to play this role in the creation of natural kind beliefs and natural kind terms, and to account for the culturally variable spread of natural kind beliefs about particular groupings, then two things must be true. First, hearing categories described with generics must trigger the formation of natural kind beliefs in people (including in young children), and second, knowledgeable speakers (including teachers and parents) must *produce* such generics for categories for which they themselves hold these representations. If so, generic language would serve as a vehicle by which natural kind beliefs about particular categories spread across communities.

There is indeed empirical support for both of these processes. First, generic language leads labels to take on the status of natural kind terms (in other words, hearing them elicits natural kind beliefs about referenced categories). Even hearing just a small number of generic statements about new categories of animals or people leads children and adults to view them as more homogeneous, stable, and causally powerful than they would otherwise (Gelman, Ware, and Kleinberg 2010; Rhodes, Leslie, and Tworek 2012). For example, hearing a series of generic statements about a new category (e.g., "*Zarpies* love to eat flowers", "*Zarpies* flap their arms when they're happy", and so on) leads people to think that *Zarpies* represents a meaningful kind and that individual *Zarpies* will share many other features that were not mentioned. Indeed, even two-year-old children form new social categories (i.e., they can identify members of the category *Zarpies*) when they hear both noun labels and generics (e.g., "*Zarpies* eat flowers"), but not when they hear noun labels alone (e.g., "This *Zarpie* eats flowers"; Rhodes, Leslie, Bianchi, and Chalik 2017; Rhodes, Leslie, and Tworek 2012).

Second, the production of generic language reflects speakers' beliefs. Speakers use more generics when talking about categories they view as natural kinds (e.g., animal kinds, gender categories) than about categories they do not view in this way (e.g., artifacts; Brandone and Gelman 2009; Gelman, Goetz, Sarnecka, and Flukes 2008; Gelman, Taylor, and Nguyen 2004; Goldin-Meadow, Gelman, and Mylander 2005; Pappas and Gelman 1998; Segall, Birnbaum, Deeb, and Diesendruck 2015). Inducing beliefs that a category is a natural kind even leads people to describe it using more generics (Rhodes, Leslie, and Tworek 2012). And this type of input is ubiquitous: generics are frequent in parent-child conversations (Gelman, Goetz, Sarnecka, and Flukes 2008; Graham, Nayer, and Gelman 2011) and—like natural kind concepts—across languages (Pirahã: Everett 2009; Spanish: Gelman, Sánchez Tapia, and Leslie 2016; Quechua: Mannheim, Gelman, Escalante, Huayhua, and Puma 2010; Mandarin: Tardif, Gelman, Fu, and Zhu 2012). Thus, children hear knowledgeable speakers use generics to communicate their natural kind beliefs in their daily lives, and hearing categories described with generics triggers the formation of natural kind beliefs. In this way, generic language serves as a powerful tool for communicating natural kind beliefs about particular categories across communities.

As described above, one way that generic language shapes beliefs that a particular category is meaningful and distinct is by communicating that a knowledgeable speaker thinks it is. In order to understand what people mean when they talk, listeners engage in complex calculations about a speaker's knowledge state and the set of relevant alternatives—the things the speaker could have said but chose not to (Clark 1996; Grice 1975; Horn 1984). To the extent that a set of other possibilities is salient in the communicative context (e.g., a knowledgeable speaker clearly *could* have generalized about children, but instead chose to generalize only about girls), the choice to use a generic to talk about a particular grouping is in itself informative. In support of this account, children infer that categories that a knowledgeable speaker describes with generics denote natural kinds, even if the particular properties the generics assert *about* the category later turn out to be wrong (Foster-Hanson, Leslie, and Rhodes 2019; see also Moty and Rhodes 2019).

How the Language of Natural Kinds Shapes Cognition, Development, and Behavior

Once people come to think of a particular category as a natural kind, these beliefs have a range of consequences for how they use that category in their daily lives. As described above, people use natural kinds to generalize information to new kind members (Gelman 1988; Gelman and O'Reilly 1988; Rips 1975), to infer fixed category boundaries (Diesendruck and Gelman 1999; Estes 2003, 2004; Kalish 2002; Rhodes and Gelman 2009b), and to reason about heritability (Gelman and Wellman 1991; Waxman, Medin, and Ross 2007). While these inferences provide useful cognitive shortcuts and can simplify learning, people's inferences about natural kinds can also be problematic. For example, beliefs that animal kinds are homogenous and discrete are at odds with modern views of evolutionary change (Gelman and Rhodes 2012; Mayr 1982) and can lead people to ignore category variability (Emmons and Kelemen 2015; Shtulman and Shulz 2008). Thinking of animal categories as stable can even impede people's ability to understand processes like metamorphosis (French, Menendez, Herrmann, Evans, and Rosengren 2018).

Thinking of human social categories (e.g., gender, race, or religion) as objectively true can be particularly troublesome, as such groupings are often determined by history and cultural convention, rather than the objective structure of the world (Hirschfeld 1996). For instance, thinking of race as a natural kind is associated with more prejudice towards Black people and more endorsement of existing social hierarchies (Mandalaywala, Amodio, and Rhodes 2018; Williams and Eberhardt 2008). Adults' beliefs that gender categories reflect the objective structure of the world are also correlated with more endorsement of gender stereotypes (Brescoll and LaFrance 2004; Brescoll, Uhlmann, and Newman 2013) and more support for boundary-enhancing initiatives like laws mandating that trans-gender people use restrooms corresponding to their biological sex (Roberts, Ho, Rhodes, and Gelman 2017). Inducing essentialist beliefs about novel social categories even leads four- to six-year-old children to share fewer resources with them (Rhodes, Leslie, Saunders, Dunham, and Cimpian 2017).

Describing behaviors that children are familiar with using category labels (e.g., "helpers", "drawers") can even shape their attitudes and behavior (Cimpian, Arce, Markman, and Dweck 2007; Foster-Hanson, Cimpian, Leshin, and Rhodes 2018; see also Gelman and Heyman 1999). Finally, hearing categories described using generics leads young children to infer not only what category members usually *are* like, but also what they *should* be like, and to say it's wrong to do things differently from the group (Roberts, Ho, and Gelman 2017).

Other Interpretations of Generics

While generics can communicate natural kind beliefs, they communicate other information and are open to alternate interpretations as well. For instance, generics also communicate information about the prevalence of particular properties (Cimpian, Brandone, and Gelman 2010), as people assume that the properties described by generics are more prevalent for the referenced category than for other similar categories (Tessler and Goodman 2019).

More broadly, people's concepts are situated within causal frameworks about the structure of the world (Murphy and Medin 1985). Thus, people interpret generic claims about categories in the context of their previous expectations about the structure of the category and the domain. In some cases, for example, people might have expectations that category regularities are *not* caused by intrinsic mechanisms, but instead result from extrinsic or structural forces (Vasilyeva, Gopnik, and Lombrozo 2018). For example, some people might assume that "girls wear pink" because girls naturally love pink (an intrinsic cause) whereas others might assume that this is because stores mostly sell pink clothes for girls (a structural cause). When people have these structure-based beliefs, generic descriptions are unlikely to elicit natural kind representations.

Thus, whether generics lead people to think of category labels as natural kind terms does not depend on the language alone, but on how it interacts with their developing conceptual frameworks. As described above, a critical component of these frameworks is whether people think that category regularities are explainable by intrinsic or structural causes. While children can understand structural explanations when they are given (Vasilyeva, Gopnik, and Lombrozo 2018), they are harder for children to generate on their own. For example, structural causes are often not readily observable, and understanding them relies on relational reasoning (Gentner 1983, 2005; Richland, Morrison, and Holyoak 2006) and thinking counterfactually about how things could have been (Beck, Robinson, Carroll, and Apperly 2006; Rafetseder, Cristi-Vargas, and Perner 2010), both capacities that emerge relatively late in development. In contrast, internal causes for category regularities are often easier for people to learn and bring to mind (Cimpian and Salomon 2014; Hussak and Cimpian 2018). A preference for intrinsic causes may even be a basic cognitive bias: Young infants often infer internal causes when no external causes are apparent (Gelman 1990; Premack 1990; Spelke, Phillips, and Woodward 1995; Stewart 1984). Thus, understanding generics as describing the underlying nature of categories appears to be a cognitive bias (Cimpian and Cadena 2010; Cimpian and Markman 2011; Gelman 2004; Leslie 2014; Lyons 1977; Prasada and Dillingham 2009), although possibly one that varies by culture (Carstensen, Zhang, Heyman, Fu, Lee, and Walker 2019; see also Choi, Nisbett, and Norenzayan 1999).

Concluding Thoughts

In summary, natural kind terms refer to natural kinds—categories that people think are objectively true, but that in fact reflect a psychological—rather than a metaphysical—reality. In this way, natural kind terms do not directly refer to the true state of the world (whatever it may be), but rather to people's beliefs about the true state of the world. People communicate their beliefs about which categories are natural kinds through the way they talk, especially by describing categories using generic noun phrases like, "Tigers have stripes", Gold is a precious metal", and "Boys just like to get messy". Once people come to see a category as a natural kind, these beliefs shape their cognition and behavior in a variety of ways, some of which (e.g., stereotyping and prejudice) can be harmful. Given the many ways that natural kind terms shape how people think and act, understanding how they are transmitted across cultures and generations is therefore crucial to the study of human thought.

Acknowledgments

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