The Roles of Group Status and Group Membership in the Practice of Hypodescent

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Hypodescent emerged in U.S. history to reinforce racial hierarchy. Research suggests that among contemporary U.S. adults, hypodescent continues to shape social perception. Among U.S. children, however, hypodescent is less likely to be endorsed. Here, we tested for hypodescent by introducing U.S. children (ages 4–9) and adults ($N = 273$) to hierarchically ordered novel groups (one was high status and another was low status) and then to a child who had one parent from each group. In Study 1, we presented the groups in a third-party context. In Study 2, we randomly assigned participants to the high-status or the low-status group. Across both studies, participants did not reliably endorse hypodescent, raising questions as to what elicits this practice.

Is a child with one Black parent and one White parent Black, White, or something else? According to the principle of *hypodescent*, Black-White children are Black (i.e., they are categorized as members of their lower-status parent group), but according to the principle of *hyperdescent*, they are White (i.e., members of their higher-status parent group; Davis, 1991; Ho, Sidanius, Levin, & Banaji, 2011; Roberts & Gelman, 2015). For much of U.S. history, hypodescent dictated how people with mixed-race parents were treated and thus contributed to maintaining a rigid U.S. racial hierarchy. In today's society, hypodescent is no longer a federal practice, but research demonstrates that it often persists as an individual belief among U.S. adults (Ho, Kteily, & Chen, 2017; Ho et al., 2011; Peery & Bodenhausen, 2008). Recent developmental research, however, suggests that hypodescent is less likely to be practiced by young U.S. children (Roberts & Gelman, 2015). The present experiments provide a systematic test of hypodescent among children and adults—using novel group targets devoid of sociocultural background and characterized only by status—and therefore further our understanding of when and how hypodescent emerges in development.

The History of Hypodescent in the United States

Hypodescent is embedded within notions of hierarchy and ancestry (Davis, 1991; Morning, 2005). During the era of U.S. slavery, *mulattos* (i.e., "hybrids," referring to Black-White individuals) were often perceived as threats to the social boundaries that separated low-status slaves (i.e., Black people) and high-status slavers (i.e., White people). In an effort to maintain White dominance, several states, particularly those in the South, enforced "one-drop rules" according to which Black-White individuals were classified as Black by virtue of their Black ancestry. For example, in Missouri, individuals with one-eighth of Black ancestry were legally classified as Black, whereas in Alabama, individuals with a single "drop" of "Black blood" were classified as Black. Thus,

although these laws proposed that race was quantifiable and rooted in ancestry, the fact that racial classifications varied across states (and across social groups, see Maillard, 2005) highlighted how socially constructed and arbitrary they were, and that their primary purpose was simply to maintain the Black-White color divide.

Indeed, even after slavery was abolished, the fear that Black-White individuals would disrupt the U.S. racial hierarchy persisted (Davis, 1991). Therefore, when the United States entered the era of Jim Crow, census enumerators enforced hypodescent nationally; Black-White individuals, regardless of where they lived or how they self-identified, were classified as Black (i.e., Negro). Although the one-drop rule was abolished across states over time, the federal practice of allowing Multiracial people to identify with only a single race continued until the "Multiracial Movement" of the 1990s, in which multiracial activists lobbied and protested against the use of rigid racial categories and subsequently led U.S. federal agencies to allow people to "check all that apply" (see Brunsma, 2006; Morning, 2005). Ultimately, as the United States entered the era of Barack Obama, U.S. race concepts became more flexible than ever.

Hypodescent is no longer a federal practice, though research demonstrates that it continues to shape how U.S. adults conceptualize Multiracial individuals. For example, Ho et al. (2011, 2017) found that both Black and White Americans categorize a Black-White person as more Black than White even when explicitly told that the person has one Black and one White parent. Social and cognitive psychological research point to at least two motivations for this effect: (a) a preference for high-status over low-status groups, which can combine with a negativity bias to lead perceivers to weigh low-status ancestry more heavily than high-status ancestry (Ho, Roberts, & Gelman, 2015; Noyes & Keil, 2018), and (b) a desire among high-status group members to protect the integrity of the high-status group, which can lead to "ingroup overexclusion" (Castano, Yzerbyt, Bourguignon, & Seron, 2002; Knowles & Peng, 2005). In the current studies, we set up a novel social hierarchy in which a preference for high-status over low-status groups (Studies 1 and 2) and a desire to protect the high-status ingroup (Study 2) may operate to produce hypodescent. This design allows us to test whether these factors are sufficient in eliciting hypodescent among children and adults.

The Motivation Behind Hypodescent

A Preference for High-Status Over Low-Status Groups and Negativity Bias

Rozin and Royzman (2001) integrated findings from a wide variety of domains to advance the view that human and nonhuman animals generally give greater weight to entities they view as negative, compared with equivalent entities they view as positive. For example, negative events have a greater influence on mood compared to positive events (Taylor, 1991) and monetary losses are weighed more heavily than equivalent monetary gains (Kahneman & Tversky, 1979; both cited in Rozin & Royzman, 2001). Extending their analysis to the domain of racial categorization, Rozin and Royzman (2001) quoted the legal scholar Neil Gotanda, who wrote, "The metaphor (for defining a racial underclass) is one of purity and contamination: White is unblemished and pure, so one drop of ancestral Black blood renders one Black. Black ancestry is a contaminant that overwhelms White ancestry." Rozin and Royzman (2001) further pointed to the example of the Hindu caste system, "where contact with lower castes produces much more contagion than does contact with higher castes," and to the Nazis' Nuremburg laws, which dictated that "one Jewish grandparent was sufficient for designation as Jewish."

Ho et al. (2015) examined whether White people's preference for White people over Black people might lead them to weigh Black ancestry more heavily than White ancestry when categorizing Black-White individuals (i.e., show a negativity bias), and found that this was indeed the case. Interestingly, and consistent with the notion that negatively evaluated entities are weighed more heavily than positively evaluated ones, Ho et al. (2015) also found some evidence that perceivers who preferred Black people over White people actually showed a tendency to categorize Black-White individuals as more *White* (but notably, participants on average preferred Whites over Blacks). Noyes and Keil (2018) found that this negativity bias was domain-general: how a sample of mostly United States White adults categorized liquid and racial mixtures was predicted by the extent to which they perceived components of the mixture as dangerous (e.g., a mixture of water and cyanide was conceptualized as cyanide, just as a mixture of White and Black was conceptualized as Black). In short, a preference for high-status over low-status groups can lead perceivers to weigh low-status

ancestry more heavily than high-status ancestry, leading to hypodescent. Notably, perceivers do not need to belong to the groups they are judging for this process to occur—they simply need to be biased against the low-status target group (e.g., due to a general and early emerging tendency to dislike low-status groups; Horwitz, Shutts, & Olson, 2014).

A Desire to Protect the Ingroup

Research based on *social identity theory*—which argues that intergroup bias derives from individuals' desires to enhance the standing of social groups they belong to or identify with—has also found that members of high-status groups sometimes categorize racially ambiguous targets who share some features with the outgroup as members of the outgroup (i.e., "overexclude" individuals whose group membership is ambiguous). In particular, Castano et al. (2002) found that some Northern Italians (a high-status group) categorized ethnically ambiguous targets as Southern Italian (a lower status outgroup) rather than Northern Italian, in theory to protect the status of their high-status ingroup. Likewise, Knowles and Peng (2005) found that some White Americans (a high-status group) categorize racially ambiguous individuals as Black (a lower status outgroup), again in theory to protect the high-status ingroup. Regnier (2015) found similar processes in Madagascar among the *olo madio* (i.e., "clean people" who were descended from free people) toward the *olo tsy madio* (i.e., "dirty people" who were descended from enslaved people). In short, due to a motivation to protect the ingroup, high-status group members may sometimes engage in ingroup overexclusion, excluding individuals who combine their group with another lower status, stigmatized group (i.e., hypodescent). Unlike the negativity bias process described earlier, here, perceivers should only engage in hypodescent (categorizing a mixed-status target as a low-status group member) if they are a member of the high-status group. That is, whereas hypodescent based on the negative evaluation of a low-status group results from the domain general tendency to weigh negatively evaluated entities more heavily than positively evaluated entities (irrespective of what gave rise to the negative evaluation), hypodescent based on ingroup overexclusion results from members of a high-status group wanting to protect their *ingroup*.

Thus, based on the reasoning introduced here, hypodescent should emerge when one prefers the high-status over the low-status target group, and perhaps especially when one is a member of the high-status group (and thus may additionally be motivated to protect the ingroup).

The Development of Hypodescent

Few studies have examined hypodescent among U.S. children; indeed, all of the research on hypodescent cited in the previous section was conducted with adult participants. This gap is unfortunate, given that understanding when and how hypodescent emerges in development is important for helping to reveal the underlying mechanisms. The few developmental studies that have been conducted suggest that hypodescent does not emerge until adolescence. In his seminal work, Hirschfeld (1995) found that adults were more likely than second and fifth graders to endorse hypodescent (i.e., children believed that the offspring of a Black parent and a White parent would *look* more Black than White, but unlike adults, they were less likely to believe that the offspring would *be* more Black than White). In other words, adults, but not children, reasoned that the offspring was *categorically* Black, which is consistent with the "rule" of hypodescent (Davis, 1991). Two decades after Hirschfeld's (1995) studies, Roberts and Gelman (2015) examined how adults and children (ages 4–13), both Black and White, categorized real-world Black-White children (i.e., photographs). Participants were randomly assigned to one of two conditions. In one condition, participants were asked to categorize Black-White targets with unknown parentage. This "Parent-Absent" condition was designed to test perception-based categorizations (i.e., whether the targets looked more Black than White). In the second condition, participants were asked to categorize Black-White targets with known parentage (i.e., one Black parent and one White parent). This "Parent-Present" condition was designed to test hypodescent (e.g., whether the targets were more like their Black parent or White parent). Adults, both Black and White, categorized the Black-White targets as more Black than White in both conditions, thereby revealing both a perceptual bias and hypodescent. Children provided different responses depending on their own racial background and age. White children categorized the targets as more Black than White only in the Parent-Absent condition, thereby revealing only a perceptual bias. Black children did not categorize the targets as more Black than White in either condition. In fact, Black 4- to 6-year-olds in the Parent-Present condition categorized the targets as more White than Black (i.e., hyperdescent). In a

follow-up study with the same methodology, Roberts and Gelman (2017a) found that Multiracial adults were more likely to endorse hypodescent than were Multiracial children. Collectively, these studies suggest that across Black, White, and Multiracial samples, U.S. children are less likely than U.S. adults to endorse hypodescent. However, what remains unclear is why this may be the case.

One possibility is that U.S. children, unlike U.S. adults, do not reliably associate racial categories with a racial hierarchy, and therefore have no conceptual foundation from which to endorse hypodescent (or hyperdescent). That is, in order for children to reliably categorize Black-White individuals in accordance with their low-status parentage (i.e., Black) rather than their high-status parentage (i.e., White), they may need to be aware of the relative status of the two groups. Previous research suggests that children do at times associate race with social status, though the extent to which they do so may vary as a function of age, group membership, and context. Regarding age, Elenbaas and Killen (2016) found that although 10- to 11-year-olds associate race with social status, 5- to 6-year-olds did not. Regarding group membership, Shutts, Brey, Dornbusch, Slywotzky, and Olson (2016) found that White 4- to 5-year-olds associated race with status, but Black 4- to 5-year-olds did not. Bigler, Averhart, and Liben (2003) found that among 6- to 7-year-olds, both low and high socioeconomic status (SES) children associated higher status jobs with being White, though among 11- to 12-year-olds, only lower (but not higher) SES children showed this association. Regarding social context, Pauker, Xu, Williams, and Biddle (2016) found that children from regions marked by relatively high levels of racial inequality (e.g., Massachusetts) were more likely to associate race with social status than were children from regions with less inequality (e.g., Hawaii; see also Olson, Shutts, Kinzler, & Weisman, 2012, on race-status associations among children in a high inequality context). Similarly, Elenbaas (2018) found that children with greater exposure to resource inequality were more likely to rectify it, suggesting a greater concern for and awareness of inequality. Collectively, these studies document extensive variation in the extent to which children associate race with status differences. The previous research on children's use of hypodescent (Roberts & Gelman, 2015) recruited a wide age range of children (ages 4–13), both racial majority and minority, from a relatively liberal U.S. university community, and it used tasks that did not directly present children with racial inequality. Thus, the children in

these samples may not have recognized race-based status differences, which could explain the absence of hypodescent in that work. Indeed, children from this context have been shown to have remarkably flexible concepts of race (Rhodes & Gelman, 2009; Roberts & Gelman, 2016; Roberts & Gelman, 2017b).

The Present Research

The present experiments were designed to test whether U.S. children endorsed hypodescent in a context in which two groups were unambiguously hierarchically ordered, both when they were third-party observers (Study 1), and when they were members of either a high-status or low-status group (Study 2). Because past work has found that children evaluate low-status individuals more negatively than high-status individuals (Horwitz et al., 2014), and on the view that hypodescent results from a domain-general negativity bias, perceivers would be expected to give greater weight to the target's low-status (rather than high-status) ancestry, and thus categorize a mixed-status target according to the rule of hypodescent, even when they themselves have no membership within the hierarchy (Study 1). In Study 2, we assigned participants to be members of a high- or low-status novel group. Past work rooted in social identity theory has shown that assignment to novel groups is sufficient to elicit both explicit and implicit ingroup favoritism among 4- to 6-year-old children, even when the groups in question are "minimal" (e.g., groups arbitrarily defined by clothing color) and not distinguished by factors like status (Dunham, Baron, & Carey, 2011). Status differences should only serve to amplify intergroup bias among high-status group members (Dunham et al., 2011), some of whom may be worried about "contamination" by lower status group members (Castano et al., 2002; Knowles & Peng, 2005). Thus, in Study 2, participants assigned to the high-status group, in particular, may use hypodescent when categorizing a mixed-status target, both because of bias against the low-status group (Horwitz et al., 2014) and because of a motivation to protect the ingroup by "overexcluding" mixed-status targets.

Across both studies, we introduced U.S. children (ages 4–9) and adults to two novel groups: *Hibbles* and *Glerks*, with one group having a high social status and many resources (i.e., they lived on the top of a hill in a fancy house, and they owned a new car and lots of gold) and the other group having a low social status and few resources (i.e., they lived

on the bottom of the hill in a shack, and they owned an old car and had no gold). We counterbalanced which group (Hibbles or Glerks) was presented as high versus low (see Procedure); however, for ease of presentation, throughout this article we refer to the Hibbles as the high-status group and the Glerks as the low-status group. After being introduced to the novel groups, participants were told of a child who had one high-status parent and one low-status parent, and they were then asked a series of questions that assessed which parent the offspring would be most like.

In Study 1, the groups were presented in a third-party context (i.e., participants were not members of the groups), which enabled us to test participants' reasoning on the basis of the status of the groups alone. In Study 2, participants were randomly assigned to either the high-status or the low-status group, which enabled us to examine participants' reasoning when they themselves were situated within the hierarchy. We included an age range of children 4–9 years, because this is when social concepts undergo important changes regarding structure, inferences, and categorization (Hirschfeld & Gelman, 1997; Pauker, Williams, & Steele, 2016; Rhodes & Mandalaywala, 2017; Roberts & Gelman, 2016, 2017b). Additionally, U.S. children at this age have been found to be less likely than U.S. adults to use hypodescent (Roberts & Gelman, 2015).

In sum, the current studies provide the first test of hypodescent under conditions where (a) group status differences were explicitly described and unambiguous (rather than implied by the use of known target groups with a long sociocultural history within a social hierarchy, such as Black and White Americans), (b) target groups were novel and thus social perceivers could not bring to bear sociocultural knowledge in judging the groups, (c) perceivers were third-party observers without any vested interest in the target groups (Study 1), and (d) perceivers were randomly assigned to a high-status or low-status group (Study 2).

Study 1

In Study 1, our key question was whether status differences, on their own, would evoke hypodescent. There were several competing predictions. One possibility was that in the unambiguously hierarchical context of the present research, by virtue of a preference for high-status over low-status groups, children would conceptualize the offspring of mixed-status parents as more low-status than high-status (i.e., hypodescent), even in a third-party context in which they are not situated within the hierarchy. A second possibility was that children would conceptualize the offspring as more high-status than low-status (i.e., hyperdescent). That is, when children are themselves not situated within the hierarchy—and notwithstanding negative evaluations of the lower status group—they may not have sufficient motivation to categorize offspring of mixed-status parents as low-status. Instead, for instance, they could prefer high-status individuals and simply perceive the offspring in accordance with their preference, or simply believe that it is nicer to categorize the child as high-status. A third possibility was that children would perceive the offspring as equally high-status and low-status, as the most neutral choice. Indeed, independent of any historical, cultural, or social knowledge about a particular hierarchy, social perceivers may lack a sufficient basis to conceptualize the offspring in any regard with respect to status.

In order to comprehensively assess children's use of hypodescent, we tested children's reasoning about properties from several domains. First, we tested whether participants believed that the offspring of mixed-status parents would be biologically (i.e., blood type and eye color), culturally (i.e., food preferences and language spoken), or socially (i.e., games played and friends) more like their high-status parent or low-status parent. We included these different domains to test whether children's reasoning about biological traits would diverge from their reasoning about cultural and social traits. Even young preschoolers understand that biological traits are determined by one's birth parents, whereas cultural and social traits are more likely to be determined by one's upbringing (Springer, 1996; Taylor, Rhodes, & Gelman, 2009; Ware & Gelman, 2014; but see Hirschfeld & Gelman, 1997). Thus, it was possible that children would conceptualize the children as biologically intermediate to their parents, but culturally and socially more like one of the parent groups (we made no a priori predictions as to which parent group would be expected to pass on cultural or social traits). Second, we tested whether participants believed that the child would in the future possess more high-status or low-status possessions (e.g., a mansion or a shack, a fancy car or an old car), which permitted us to test whether participants believed that the offspring would have the same actual wealth as one of their parent groups. Third, we tested whether participants believed that

the child was categorically high-status or low-status, which provided a straightforward test of hypodescent (i.e., irrespective of the offspring's traits or future possessions, are they high-status or low-status?). Lastly, we tested whether participants preferred the high-status or low-status group, as a measure of participants' attitudes. All data and code are made publicly available via the Open Science Framework (https://osf.io/afzwm/).

Method

Participants

Three age groups of U.S. participants were included ($N = 121$): thirty-eight 4- to 6-year-olds (58% female, $M_{age} = 4.89$ years, $SD = 0.95$), thirty-nine 7- to 9-year-olds (49% female, $M_{age} = 8.05$ years, $SD = 0.89$), and 44 adults (41% female, $M_{age} = 23.5$ years, $SD = 5.96$). An additional five participants were excluded for failing at least one of the comprehension questions (in total: 2 at 4–6 years, 3 adults). Children were recruited in the Midwest at two children's museums. Adults were recruited on a college campus and via Amazon's Mechanical Turk. Participants were 78% White/European American, 9% Asian American/Asian/Pacific Islander, 4% Black/African American, 2% Hispanic/Latino, 2% Multiracial, 2% Native American, 1% Middle Eastern, and 1% other or not reported. Consistent with previous research (Casler, Bickel, & Hackett, 2013), preliminary analyses revealed no significant differences on the basis of adult recruitment site.

Materials and Procedure

For participants recruited in-person, materials were presented on a laptop using PowerPoint. For participants recruited online, materials were presented using Qualtrics. The two novel groups, Hibbles and Glerks, each consisted of three individuals and were shown to be high-status (i.e., they lived at the top of a hill with high-status possessions) or low-status (i.e., they lived at the bottom of the hill with low-status possessions). Group membership was portrayed by group labels (Hibbles, Glerks) and clothing pattern (orange triangles, green stripes). Across participants, we counterbalanced which pattern depicted which social status, which pattern was associated with which group label, and the order in which the groups were presented (high status first and low status second, low status first and high status second).

Participants were first introduced to the Hibbles and Glerks (see Figure S1 for the full introduction and wording). Hibbles were positioned at the top of a hill and lived in large and luxurious houses, had new and nice cars, and had a pot filled with gold coins. Glerks were positioned at the bottom of a hill and lived in small and shabby houses, had old and broken cars, and had no gold coins. After this initial introduction, to ensure that participants understood that the groups were hierarchically ordered, participants were asked to indicate who was in charge of the hill and who was not in charge of the hill (i.e., "Who is in charge of the hill?" see also Gülgöz & Gelman, 2017). Across all studies, all participants in the final sample indicated that Hibbles were in charge and that Glerks were not in charge. Next, participants were shown that an individual Hibble descended the hill (half-way) and that an individual Glerk ascended the hill (half-way), and that they fell in love and had a baby together. Participants were then shown an image of a stroller in which the physical features of the baby could not be seen and were told that the only thing known about the baby was that it had one Hibble parent and one Glerk parent, and that their task would be to try to figure out some other things about the baby.

Measures and coding.   Following the novel group introduction, participants were assessed on the extent to which they believed the baby would be more like the low-status group or the high-status group on various properties. In total, there were six outcomes (i.e., biological properties, cultural properties, social properties, future possessions, categorical identity, preference). The first six questions assessed reasoning about biological, cultural, and social properties (counterbalanced across participants). Biological properties were assessed via two items: blood type and eye color (e.g., "Hibbles have Hibble blood and Glerks have Glerk blood. When this baby grows up, will it have Hibble blood or Glerk blood?"). Cultural properties were assessed via two items: food and language (e.g., "Hibbles eat Hibble berries and Glerks eat Glerk berries. When this baby grows up, will it eat Hibble berries or Glerk berries?"). Social properties were assessed via two items: games and friends (e.g., "Hibbles play Hibble games and Glerks play Glerk games. When this baby grows up, will it play Hibble games or Glerk games?"). These questions were presented in random order. Next, participants were asked about the baby's future possessions (i.e., whether they believed the baby would possess in the future either the high-status or the low-status possessions that were shown during

the novel group introduction: kind of house, kind of car, amount of gold). For example, "Hibbles live in really big houses and Glerks live in really small houses. When this baby grows up, will it live in a really big house like the Hibbles, or in a really small house like the Glerks?" These possessions were presented in counterbalanced order. Lastly, participants were asked about the baby's categorical identity as an adult ("When this baby grows up, will it be a Hibble or a Glerk?"), and about which group they preferred ("Who do you like better? Hibbles or Glerks?"). These questions appeared in a fixed order.

We coded whether participants indicated that the baby would share more properties with the low-status parent (i.e., hypodescent, coded as "0") or the high-status parent (i.e., hyperdescent, coded as "1"). Thus, lower scores reflected responses in accordance with the low-status parent group and higher scores reflected responses in accordance with the high-status parent group. If participants ever stated that they would be more like both parents (or like neither), they were asked to select only one parent (i.e., "OK, but if you had to choose only one, which would you choose?"). We chose this forced-choice method because previous research suggests that people are less likely to engage in hypodescent when they are given a third option (e.g., Multiracial, Black *and* White; see Chen & Hamilton, 2012). Thus, by virtue of only providing participants with two response options (i.e., high-status or low-status), we provided a relatively sensitive test of hypodescent.

Results and Discussion

Across both studies, there were no effects involving which domain (i.e., biological, cultural, social) was presented first, nor any of the counterbalancing factors (e.g., which group was introduced first), so data were collapsed across these variables. We conducted generalized linear mixed-effects models in which age group (4–6, 7–9, adults), group preference (high-status, low-status), and an interaction between these two variables were fixed-effects, with random intercepts by participant ID and stimulus item (allowing us to account for differences across items). The dependent measure was participants' trial-by-trial indication that the mixed-status offspring was more like the high-status parent (i.e., 1, hyperdescent) or more like the low-status parent (i.e., 0, hypodescent). These analyses informed us about whether participants categorized the target as high or low status *overall* rather than separately for each domain (e.g., category, biology, social, and

cultural), which prevented us from having to average across items (i.e., by creating composites for each domain), and which reduced family-wise error rates (from conducting separate tests with each domain as a dependent variable). Nevertheless, we present in Appendix S1 the results separated by domain (e.g., biology, cultural, social), which are consistent with results presented here (see online supplemental materials). Any results not reported were not statistically significant.

We found no evidence for hypodescent. Rather, there was a main effect of group preference ($b = 0.60$, $SE\ b = .15$, $z = 3.84$, $p < .001$), such that participants who liked the high-status group endorsed hyperdescent, $M = .72$, $SE = .04$, $t(77) = 7.53$, $p < .001$, Cohen's $d = 1.72$, whereas those who liked the low-status group were at chance, $M = .59$, $SE = .05$, $t(42) = 1.94$, $p = .058$, Cohen's $d = 0.61$. There were also effects of age group, such that adults were more likely to endorse hyperdescent than were 4- to 6-year-olds ($b = 1.24$, $SE\ b = .47$, $z = 2.62$, $p = .009$) or 7- to 9-year-olds ($b = 1.68$, $SE\ b = .46$, $z = 3.64$, $p < .001$). Nevertheless, each age group endorsed hyperdescent, 4–6: $M = .65$, $SE = .05$, $t(36) = 2.85$, $p = .007$, Cohen's $d = 0.95$; 7–9: $M = .59$, $SE = .04$, $t(38) = 2.54$, $p = .015$, Cohen's $d = 0.83$; adults: $M = .77$, $SE = .04$, $t(43) = 6.69$, $p < .001$, Cohen's $d = 2.04$. Thus, when presented with groups that were unambiguously distinct in their social status, neither children nor adults endorsed hypodescent. These findings were especially revealing given that a group preference for the high-status group over the low-status group predicted *hyperdescent*, even though this could have led to hypodescent by virtue of perceivers weighing negatively evaluated entities more heavily than positively evaluated ones (Ho et al., 2015).

Study 2

In Study 2, we randomly assigned participants to be in either the high-status or low-status group, which permitted us to test for hypodescent when participants themselves were situated within the hierarchy. We used a manipulation that previously has been found to produce intergroup bias (Dunham et al., 2011; described next). According to social identity theory, this manipulation should provoke greater levels of hypodescent among those in the higher status group, due to the exclusion of mixed-status targets among higher status group members, on average (Castano et al., 2002; Knowles & Peng, 2005). Such a result, if obtained, would diverge from those detected in Study 1, in which children and adults who were not situated in the

hierarchy endorsed hyperdescent rather than hypodescent. We did not have predictions concerning how members of the lower status group would respond. Whereas past research has found that Black adults (a lower status group in the United States) use hypodescent because they perceive a common fate with Black-White multiracial individuals, rooted in perceptions that multiracial individuals experience discrimination (Ho et al., 2017), it is unlikely that lower status group members in this novel group paradigm would feel a shared experience of discrimination with a mixed-status target. Once again, negativity toward low-status groups (Horwitz et al., 2014) would also predict hypodescent. That is, high-status group members may categorize targets as low-status group members both because they want to protect the ingroup, and also because they possess a domain-general tendency to weigh negatively evaluated entities more heavily than positively evaluated ones (whatever the source of the negative evaluation).

Method

Participants

Three age groups of U.S. participants were included ($N = 152$): 53 4- to 6-year-olds (45% female, $M_{age} = 5.67$ years, $SD = 0.96$), 51 7- to 9-year-olds (39% female, $M_{age} = 8.40$ years, $SD = 0.87$), and 48 adults (50% female, $M_{age} = 30.56$ years, $SD = 5.79$). Twelve additional participants were excluded for failing at least one of the comprehension questions (in total: 5 at 4–6 years, 5 at 7–9 years, 2 adults). Children were recruited in the Midwest at two children's museums. Adults were recruited via Amazon's Mechanical Turk. Participants were 70% White/European American, 12% Multiracial, 6% Asian American/Asian/Pacific Islander, 5% Black/African American, 4% Hispanic/Latino, 2% Middle Eastern, and 1% other or not reported.

Materials and Procedure

The materials and procedure were identical to those used in Study 1, with the exception that after the introduction of the novel groups, participants were randomly assigned to either the high-status group or the low-status group. Children were asked to wear a t-shirt that was identical to the pattern that depicted either the high-status or low-status group and were then told that they belonged in the Hibble or the Glerk group (see Dunham et al., 2011 for a similar method). Adults were randomly

assigned to one of the novel groups and asked to respond as if they were a Hibble or a Glerk. As a comprehension check, participants were asked to indicate which group they belonged to. All participants in the final sample responded to this question correctly. Coding was identical to Study 1.

Results and Discussion

As a manipulation check, we conducted a generalized linear model in which age group (4–6, 7–9, adults), group membership (high-status, low-status), and the interaction between these two variables were fixed-effects, and group preference (high-status, low-status) was the dependent variable. If we successfully manipulated group membership, we should find differences in group preference across the two groups (Dunham, 2018). Indeed, there was a main effect of group membership ($b = 0.38$, SE $b = .06$, $z = 6.53$, $p < .001$), indicating that participants randomly assigned to be members of the high-status group preferred the high-status group, $M = .76$, $SE = .05$, $t(76) = 5.48$, $p < .001$, Cohen's $d = 1.26$, whereas participants randomly assigned to the low-status group were at chance, $M = .60$, $SE = .06$, $t(74) = 1.76$, $p = .08$, Cohen's $d = 0.41$. This effect did not vary as a function of age group. These results are consistent with previous research (with both children and adults) showing that real-world high-status groups tend to prefer their ingroup, whereas real-world low-status groups are less likely to do so (Clark & Clark, 1947; Jost, Banaji, & Nosek, 2004; Newheiser & Olson, 2012).

We next conducted generalized linear mixed-effects models in which age group (4–6, 7–9, adults), group preference (high-status, low-status), group membership (high-status, low-status), and interactions among these variables were our primary fixed-effects of interest, with random intercepts by participant ID and stimulus item. As in Study 1, the dependent measure was participants' trial-by-trial indication that the mixed-status offspring was more like the high-status parent group (i.e., 1, hyperdescent) or more like the low-status parent group (i.e., 0, hypodescent), and higher scores reflected more high-status responding and lower scores reflected more low-status responding. There were main effects of group membership ($b = 0.60$, SE $b = .15$, $z = 3.84$, $p < .001$) and group preference ($b = 0.97$, SE $b = .16$, $z = 6.21$, $p < .001$), which were qualified by a significant group membership by group preference interaction ($b = 0.34$, SE $b = .15$, $z = 2.19$, $p = .03$). Among participants randomly assigned to be members of the high-status group, those who preferred the high-

status group endorsed hyperdescent, $M = .81$, $SE = .03$, $t(58) = 10.81$, $p < .001$, Cohen's $d = 2.83$, whereas those who preferred the low-status group were at chance, $M = .42$, $SE = .09$, $t(16) = 1.49$, $p = .15$, Cohen's $d = -0.75$. In contrast, among participants randomly assigned to the low-status group, those who preferred the high-status group were at chance, $M = .55$, $SE = .05$, $t(44) = 1.02$, $p = .31$, Cohen's $d = 0.31$, whereas those who preferred the low-status group endorsed hypodescent, $M = .35$, $SE = .05$, $t(29) = -3.05$, $p = .005$, Cohen's $d = -1.13$. There was also a two-way age group by group preference interaction, such that among adults ($b = 1.91$, $SE\ b = .31$, $z = 6.25$, $p < .001$) and 4- to 6-year-olds ($b = 0.97$, $SE\ b = .42$, $z = 2.33$, $p = .02$), but not 7- to 9-year-olds ($b = 0.38$, $SE\ b = .19$, $z = 1.95$, $p = .051$), preferring the high-status over the low-status group predicted hyperdescent.

Thus, when participants were presented with groups that were unambiguously distinct in their social status, and when participants were additionally randomly assigned to have membership in either the high-status or the low-status group, we found that high-status group members who preferred their own ingroup endorsed *hyperdescent*, whereas low-status group members who preferred their own ingroup endorsed *hypodescent*. These findings were especially striking given that a preference for the ingroup over the outgroup predicted ingroup *inclusion*, even though this could have licensed *exclusion* (Castano et al., 2002).

General Discussion

Throughout U.S. history, the practice of hypodescent has shaped the conceptual, social, and legal boundaries that separate White and Black people (Davis, 1991). Although hypodescent is no longer practiced federally, it is practiced individually by U.S. adults (Ho et al., 2011, 2017; Peery & Bodenhausen, 2008). However, it is less likely to be endorsed by U.S. children (Roberts & Gelman, 2015). We proposed that one reason U.S. children do not endorse hypodescent is because they may not reliably associate race with status differences and thus do not differentially weigh lower versus higher status in categorization. In the present research, we presented children and adults with novel groups that were unambiguously distinct in their social status (e.g., *Hibbles* who lived on the top of a hill with high-wealth items, and *Glerks* who lived at the bottom of the hill with low-wealth items), thereby providing a sensitive test of whether

status is considered in hypodescent. Doing so enabled us to directly test some of the theories regarding motivations underlying hypodescent in adults: a preference for high-status over low-status groups (Study 1 and Study 2) and a desire among high-status group members to protect the ingroup from "undesirable outsiders" (Study 2). Overall, in our data, neither of these motivations was sufficient to license hypodescent among children or adults.

In Study 1, in which the novel groups were presented in a third-party context and participants were not situated within the hierarchy, both children (ages 4–9) and adults endorsed *hyperdescent*, associating offspring with mixed-status parents more with their *higher* status parent group. These findings were particularly striking given that children felt more negatively toward the low-status groups than toward the high-status groups, which we theorized would license *hypodescent* (Ho et al., 2015; Noyes & Keil, 2018; Rozin & Royzman, 2001). Thus, these data provide an important first step by demonstrating that even when the groups were unambiguously distinct in their social status, and even in light of relatively negative feelings toward the low-status group, neither children nor adults endorsed hypodescent.

In Study 2, we turned to how children and adults conceptualized individuals with mixed-status parentage when they were randomly assigned to either the high-status group or the low-status group and were therefore situated within the hierarchy. This study was motivated by research grounded in social identity theory, which shows that assignment to minimal groups fosters intergroup bias (Dunham et al., 2011), and that high-status group members are often motivated to exclude low-status individuals from their ingroup (Castano et al., 2002; Knowles & Peng, 2005). We found that when presented with the offspring of a high-status parent and a low-status parent, high-status participants who preferred the high-status over the low-status group, endorsed *hyperdescent*, including targets in their high-status ingroup (i.e., ingroup inclusion, rather than exclusion). These findings contrast with past work demonstrating that high-status individuals reliably endorse hypodescent (Ho et al., 2011, 2017; Roberts & Gelman, 2015). In contrast, low-status participants who preferred the low-status ingroup (over the high-status outgroup) endorsed *hypodescent*, including targets in their low-status ingroup (again, ingroup inclusion, rather than exclusion). These findings align with past work to an extent, demonstrating that low-status individuals endorse hypodescent (Ho et al., 2017; Roberts & Gelman, 2015).

Collectively, then, these data suggest that one's position within a hierarchy and preferences for groups within that hierarchy influence how one perceives the offspring of mixed-status parents, but that such positioning and preferences need not result in the use of hypodescent. That is, being high status and preferring the high status may not be sufficient in eliciting hypodescent, so additional factors may need to be at play (see following). However, being low status and preferring low status may be sufficient in eliciting hypodescent, possibly because in this case, hypodescent serves as a means to maintain and strengthen the relatively weaker ingroup (see Ho et al., 2017). Undeniably, these data raise questions as to when and why hypodescent emerges across development, and reveals that there remains much to be understood.

Future Directions

What factors need to be in play for hypodescent to emerge? The cases of hypodescent that have been investigated most systematically (regarding individuals with Black and White parentage in the United States) involve a history of slavery, intergroup conflict, and both legal and political incentives. These additional factors were absent from the current experiments. It may be, for example, that in order to endorse hypodescent, members of high-status groups need to additionally feel that their resources are limited and under threat (Ho, Sidanius, Cuddy, & Banaji, 2013; Krosch & Amodio, 2014; Rodeheffer, Hill, & Lord, 2012). Future research that presents individuals with an unambiguous hierarchy, manipulates their membership within that hierarchy, and additionally manipulates perceptions of threat may be particularly well-suited to test this possibility.

Notably, even under the minimal conditions that participants faced here, those who were assigned to the low-status group in Study 2, and who favored the ingroup over the outgroup, did use hypodescent. Future research could further explore what mechanism(s) may be responsible for this result. For example, past research has shown that when members of a low-status group feel a sense of linked fate rooted in a shared experience of discrimination, they are especially likely to categorize mixed-status targets as ingroup members (i.e., use hypodescent; Ho et al., 2017). Thus, future studies that manipulate low-status participants' sense of linked fate with the target —for example, by making salient the disadvantages that the low-status group, and mixed-status targets, encounter—can provide more evidence for the role of linked fate in hypodescent. Moreover, future

research that includes both children and adults could shed light on *when* and *why* people endorse hypodescent across the lifespan. With the exception of low-status participants who liked the low-status group in Study 2, neither children nor adults consistently endorsed hypodescent (and even in this case, additional research is needed to understand the mechanism(s)).

Future research should also consider other manipulations of social status. That is, in the present research, we manipulated two powerful indicators of social status: a group's wealth (i.e., the quantity and quality of their resources) and vertical position (i.e., whether they were positioned over or under another group), both of which have been shown in prior research to signal status or power (Horwitz et al., 2014; Keupp, Barbarroja, Topolinski, & Fischer, 2018; Lakoff & Johnson, 1980; Lu, Schubert, & Zhu, 2017; Olson et al., 2012). There are, however, additional cues to social power that may elicit stronger effects, including, for example, a group's ability to control the resources of others, to achieve their goals at the expense of others, or to grant or deny others permission (Gülgöz & Gelman, 2017). In the real world, high-status groups do indeed possess such forms of power (Sidanius & Pratto, 1999), which may contribute to the practice of hypodescent (e.g., a member of a high-status group may worry about losing power by "admitting" a member of a lower status group). Similarly, future research could manipulate a group's numerosity (i.e., how many members a given group has), which even young infants use as an indicator of social dominance (Pun, Birch, & Baron, 2017). We look forward to research that examines how different cues to social status elicit (or fail to elicit) hypodescent.

One limitation of the present research is that we relied on samples from relatively homogenous contexts (i.e., University affiliated museums, a college campus, and Amazon's Mechanical Turk), and we did not measure participants' own SES or experiences with inequality, both of which have been shown to influence children's social cognition (see Elenbaas, 2018). One possibility is that children from contexts marked by severe inequality, and who are themselves high-status, may be particularly motivated to endorse hypodescent as a means to protect their ingroup from the lower status outgroup. Furthermore, participants' own SES may moderate how much they are affected by a group status manipulation, such as the one used in Study 2—in particular, participants who have higher or lower SES, compared to those who have intermediate status, may be somewhat less affected by experimental

manipulations of social status. Thus, an additional task for future research will be to examine whether and to what extent participants' own SES and exposure to inequality affect their motivation to use hypodescent. Such research could also examine if participants' SES moderates the impact of experimental manipulations of social status.

Until then, the present experiments suggest that status differences and group membership may in and of themselves be insufficient to yield hypodescent in novel groups. Additional research is needed to understand when, why, and how U.S. citizens practice hypodescent. Such research would shed much needed insight into the development of a practice that continues to pervade U.S. society.

References

Bigler, R. S., Averhart, C. J., & Liben, L. S. (2003). Race and the workforce: Occupational status, aspirations, and stereotyping among African American children. *Developmental Psychology*, 39, 572–580. https://doi.org/10.1037/0012-1649.39.3.572

Brunsma, D. L. (2006). Public categories, private identities: Exploring regional differences in the biracial experience. *Social Science Research*, 35, 555–576. https://doi.org/10.1016/j.ssresearch.2004.10.002

Casler, K., Bickel, L., & Hackett, E. (2013). Separate but equal? A comparison of participants and data gathered via Amazon's MTurk, social media, and face-to-face behavioral testing. *Computers in Human Behavior*, 29, 2156–2160. https://doi.org/10.1016/j.chb.2013.05.009

Castano, E., Yzerbyt, V., Bourguignon, D., & Seron, E. (2002). Who may enter? The impact of in-group identification on in-group/out-group categorization. *Journal of Experimental Social Psychology*, 38, 315–322. https://doi.org/10.1006/jesp.2001.1512

Chen, J. M., & Hamilton, D. L. (2012). Natural ambiguities: Racial categorization of multiracial individuals. *Journal of Experimental Social Psychology*, 48, 152–164. https://doi.org/10.1016/j.jesp.2011.10.005

Clark, K. B., & Clark, M. P. (1947). Racial identification and preference among Negro children. In T. M. Newcomb & E. L. Hartley (Eds.), *Readings in social psychology* (169–178). New York, NY: Holt, Rinehart, and Winston.

Davis, F. J. (1991). *Who is black? One nation's definition*. University Park, PA: Pennsylvania State University Press.

Dunham, Y. (2018). Mere membership. *Trends in Cognitive Sciences*, 22, 780–793. https://doi.org/10.1016/j.tics.2018.06.004

Dunham, Y., Baron, A. S., & Carey, S. (2011). Consequences of "minimal" group affiliations in children. *Child Development*, 82, 793–811. https://doi.org/10.1111/j.1467-8624.2011.01577.x

Elenbaas, L. (2018). Interwealth contact and young children's concern for equity. *Child Development*, 90, 108–116. https://doi.org/10.1111/cdev.13157

Elenbaas, L., & Killen, M. (2016). Children rectify inequalities for disadvantaged groups. *Developmental Psychology*, 52, 1318–1329. https://doi.org/10.1037/dev0000154

Gülgöz, S., & Gelman, S. A. (2017). Who's the boss? Concepts of social power across development. *Child Development*, 88, 946–963. https://doi.org/10.1111/cdev.12643

Hirschfeld, L. A. (1995). The inheritability of identity: Children's understanding of the cultural biology of race. *Child Development*, 66, 1418–1437. https://doi.org/10.2307/1131655

Hirschfeld, L. A., & Gelman, S. A. (1997). What young children think about the relationship between language variation and social difference. *Cognitive Development*, 12, 213–238. https://doi.org/10.1016/S0885-2014(97)90014-9

Ho, A. K., Kteily, N., & Chen, J. M. (2017). "You're one of us": Black Americans' use of hypodescent and its association with egalitarianism. *Journal of Personality and Social Psychology*, 113, 753–768. https://doi.org/10.1037/pspi0000107

Ho, A. K., Roberts, S. O., & Gelman, S. A. (2015). Essentialism and racial bias jointly contribute to the categorization of multiracial individuals. *Psychological Science*, 26, 1–7. https://doi.org/10.1177/0956797615596436

Ho, A. K., Sidanius, J., Cuddy, A. J. C., & Banaji, M. R. (2013). Status boundary enforcement and the categorization of Black-White biracials. *Journal of Experimental Social Psychology*, 49, 940–943. https://doi.org/10.1016/j.jesp.2013.04.010

Ho, A. K., Sidanius, J., Levin, D. T., & Banaji, M. R. (2011). Evidence for hypodescent and racial hierarchy in the categorization and perception of biracial individuals. *Journal of Personality and Social Psychology*, 100, 492–506. https://doi.org/10.1037/a0021562

Horwitz, S. R., Shutts, K., & Olson, K. R. (2014). Social class differences produce social group preferences. *Developmental Science*, 17, 991–1002. https://doi.org/10.111/desc.12181

Jost, J. T., Banaji, M. R., & Nosek, B. A. (2004). A decade of system justification theory: Accumulated evidence of conscious and unconscious bolstering of the status quo. *Political Psychology*, 25, 881–919. https://doi.org/10.111/j.1467-9221.2004.00402.x

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *The Econometric Society*, 47, 263–292. https://doi.org/10.2307/1914185

Keupp, S., Barbarroja, N., Topolinski, S., & Fischer, J. (2018). Are monkeys intuitive Aristotelians? Associations between target size and vertical target position in long-tailed macaques. *Royal Society Open Science*, 5, 170889. https://doi.org/10.1098/rsos.170889

Knowles, E. D., & Peng, K. (2005). White selves: Conceptualizing and measuring a dominant-group Identity. *Journal of Personality and Social Psychology*, 89, 223–241. https://doi.org/10.1037/0022-3514.89.2.223

Krosch, A. R., & Amodio, D. M. (2014). Economic scarcity alters the perception of race. *Proceedings of the National Academy of Sciences of the United States of America*, 111, 9079–84. https://doi.org/10.1073/pnas.1404448111

Lakoff, G., & Johnson, M. (1980). *Metaphors we live by*. Chicago, IL: University of Chicago Press.

Lu, L., Schubert, T. W., & Zhu, L. (2017). The spatial representation of power in children. *Cognitive Processing*, *18*, 375–385. https://doi.org/10.1007/s10339-017-0814-9

Maillard, K. N. (2005). The Pocahontas exception: The exemption of American Indian ancestry from racial purity law. *Michigan Journal of Race and Law*, *12*, 1–42. https://doi.org/10.2139/ssrn.870196

Morning, A. (2005). Multiracial classification on the United States Census: Myth, reality, and future impact. *Revue Européenne Des Migrations Internationales*, *21*, 2–19. https://doi.org/10.4000/remi.2495

Newheiser, A., & Olson, K. R. (2012). White and Black American children's implicit intergroup bias. *Journal of Experimental Social Psychology*, *48*, 264–270. https://doi.org/10.1016/j.jesp.2011.08.011

Noyes, A., & Keil, F. C. (2018). Asymmetric mixtures: Common conceptual priorities for social and chemical kinds. *Psychological Science*, *29*, 1094–1103. https://doi.org/10.1177/0956797617753562

Olson, K. R., Shutts, K., Kinzler, K. D., & Weisman, K. G. (2012). Children associate racial groups with wealth: Evidence from South Africa. *Child Development*, *83*, 1884–1899. https://doi.org/10.1111/j.1467-8624.2012.01819.x

Pauker, K., Williams, A., & Steele, J. R. (2016). Children's racial categorization in context. *Child Development Perspectives*, *10*, 33–38. https://doi.org/10.111/cdep.12155

Pauker, K., Xu, Y., Williams, A., & Biddle, A. M. (2016). Racial essentialism and social contextual differences in children's racial stereotyping. *Child Development*, *86*, 1409–1422. https://doi.org/10.1017/CBO9781107415324.004.

Peery, D., & Bodenhausen, G. V. (2008). Black + White = Black: Hypodescent in reflexive categorization of racially ambiguous faces. *Psychological Science*, *19*, 973–977. https://doi.org/10.111/j.1467-9280.2008.02185.x

Pun, A., Birch, S. A. J., & Baron, A. S. (2017). Foundations of reasoning about social dominance. *Child Development Perspectives*, *11*, 155–160. https://doi.org/10.1111/cdep.12235

Regnier, D. (2015). Clean people, unclean people: The essentialisation of 'slaves' among the Southern Betsileo of Madagascar. *Social Anthropology*, *23*, 152–168. https://doi.org/10.1111/1469-8676.12107

Rhodes, M., & Gelman, S. A. (2009). A developmental examination of the conceptual structure of animal, artifact, and human social categories across two cultural contexts. *Cognitive Psychology*, *59*, 244–274. https://doi.org/10.1016/j.cogpsych.2009.05.001

Rhodes, M., & Mandalaywala, T. M. (2017). The development and developmental consequences of social essentialism. *Wiley Interdisciplinary Reviews: Cognitive Science*, *8*(4), 1–18. https://doi.org/10.1002/wcs.1437

Roberts, S. O., & Gelman, S. A. (2015). Do children see in Black and White? Children's and adults' categorizations of multiracial individuals. *Child Development*, *86*, 1830–1847. https://doi.org/10.1111/cdev.12410

Roberts, S. O., & Gelman, S. A. (2016). Children's reasoning about the stability of emotion and race. *Developmental Psychology*, *52*, 887–893. https://doi.org/10.1037/dev000132

Roberts, S. O., & Gelman, S. A. (2017a). Multiracial children's and adults' categorization of multiracial individuals. *Journal of Cognition and Development*, *18*, 1–15. https://doi.org/10.1080/15248372/2015.1086772

Roberts, S. O., & Gelman, S. A. (2017b). Now you see race, now you don't: Verbal cues influence children's racial stability judgments. *Cognitive Development*, *43*, 129–141. https://doi.org/10.1016/j.cogdev.2017.03.003

Rodeheffer, C. D., Hill, S. E., & Lord, C. G. (2012). Does this recession make me look Black? The effect of resource scarcity on the categorization of Biracial faces. *Psychological Science*, *23*, 1–3. https://doi.org/10.1177/0956797612450892

Rozin, P., & Royzman, E. B. (2001). Negativity bias, negativity dominance, and contagion. *Personality and Social Psychology Review*, *5*, 296–320. https://doi.org/10.1207/S15327957PSPR0504_2

Shutts, K., Brey, E. L., Dornbusch, L. A., Slywotzky, N., & Olson, K. R. (2016). Children use wealth cues to evaluate others. *PLoS ONE*, *11*, e0149360. https://doi.org/10.1371/journal/pone/0149360

Sidanius, J., & Pratto, F. (1999). *Social dominance: An intergroup theory of social hierarchy and oppression*. New York, NY: Cambridge University Press.

Springer, K. (1996). Young children's understanding of a biological basis for parent-offspring relations. *Child Development*, *67*, 2841–2856. https://doi.org/10.1111/j.1467-8624.1996.tb01891.x

Taylor, M. G., Rhodes, M., & Gelman, S. A. (2009). Boys will be boys; cows will be cows: Children's essentialist reasoning about gender categories and animal species. *Child Development*, *80*, 461–481. https://doi.org/10.111/j.1467-8624.2009.01272.x

Taylor, S. E. (1991). Asymmetrical effects of positive and negative events: The mobilization-minimization hypothesis. *Psychological Bulletin*, *110*, 67–85. https://doi.org/10.1037/0033-2909.110.1.67

Ware, E. A., & Gelman, S. A. (2014). You get what you need: An examination of purpose-based inheritance reasoning in undergraduates, preschools, and biological experts. *Cognitive Science*, *38*, 197–243. https://doi.org/10.1111/cogs.1209

Supporting Information

Additional supporting information may be found in the online version of this article at the publisher's website:

Figure S1. Sample Trial. Study 1 and 2
Appendix S1. Supplemental Analyses—Domain Differences/Similarities