

**Children's Understanding and Use of Four Dimensions of Social Status**

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## Abstract

Beginning early in life, children are exposed to people who differ in social status. In five studies, we investigate whether 3- to 6-year-old children recognize different dimensions of status (i.e., wealth, physical dominance, decision-making power, and prestige) and use these dimensions to inform their social judgments (preferences and resource allocation). Across studies, we found that by age 3, children identify high-status people as in-charge. Further, while 3-6-year-olds favor higher status individuals over lower status individuals on a preference measure, 5-6-year-olds allocate a resource to a *lower* status individual over a higher status individual and 3-4-year-olds are at chance in their allocation. We observed minimal differences across dimensions of status in these studies. Taken together, across five pre-registered studies, we demonstrated that children identify and use social status distinctions to inform their social judgments across a variety of different dimensions.

## Keywords

Social Status; Wealth; Physical Dominance; Decision-Making Power; Prestige; Social Cognitive Development

### **Children's Understanding and Use of Different Dimensions of Social Status**

Social status, or any hierarchy in which some people are positioned higher or lower than others based on a desirable dimension (Brown, 1991; Henrich & Gil-White, 2001; Van Vugt & Tybur, 2015), is ubiquitous across time and place. Throughout human societies, social status has played a key role in how we think about and interact with each other. Adults rapidly and accurately encode social status differences (Koski, Xie, & Olson, 2015; Mast & Hall, 2004; Shariff & Tracy, 2009; Smith & Galinsky, 2010), hold preferences based on status (Horowitz & Dovidio, 2017; Lott, 2012), and give based on status (Bickman, 1971; Van Berkel, Crandall, Eidelman, & Blanchard, 2015). When and how young children come to understand social status information and use status to inform their social judgments of others is therefore a question many research teams are beginning to ask about (for a review see Thomsen, 2019). Early evidence suggests that children (Charafeddine, Mercier, Clément, Kaufmann, Berchtold, Reboul, & Van der Henst, 2015; Gülgöz, & Gelman, 2017) and sometimes even infants (Mascaro & Csibra, 2012; Thomsen, Frankenhuys, Ingold-Smith, & Carey, 2011) recognize different dimensions of social status and use this information as the basis of their social judgments. In the current work, we aim to build upon past work by replicating, synthesizing, and systematically testing children's understanding of social status differences and investigating whether children use status differences to inform their social judgments (preferences and resource allocation).

### **The Importance of Studying Early Social Status Understanding**

The present work centers on broadening our understanding of how children think about and use social status distinctions in their social judgments. This work also addresses several key theoretical discussions for which there are mixed results in the literature. The first discussion concerns whether children (and humans more generally) distinguish different dimensions of

social status. Some have argued that different dimensions of social status serve distinct functions, and as a result, are presumably treated as psychologically distinct. For example, Henrich and Gil-White (2001) have argued that two dimensions of social status—physical dominance and prestige—have fundamentally different evolutionary functions. They argue that prestige evolved for the cultural transmission of knowledge, and therefore people should pay attention to prestigious over less prestigious individuals whereas dominant individuals gain status by force. If there are distinct purposes underlying the various dimensions of status, children might use these dimensions differently in their social judgments and/or they may show an understanding of these dimensions at different ages. Some existing evidence has supported the possibility that children may not treat all social status dimensions the same (Kajanus, Afshorid, & Warneken, 2020; Margoni, Baillargeon, & Surian, 2018) and that they may recognize status dimensions at varying ages (Gülgöz & Gelman, 2017). On the other hand, there is some evidence that children connect different aspects of status to one another. For example, both children and infants expect that someone who is physically dominant will have more resources (Charafeddine et al., 2015; Enright, Gweon, & Sommerville, 2017) and children believe that someone who is wealthy will also be more popular and competent (Shutts, Brey, Dornbusch, Slywotzky, & Olson, 2016) suggesting that children may link wealth to prestige. The latter might occur because children have a single concept of social status and as such, treat all aspects of status interchangeably. To begin to tease these possibilities apart, it is critical to examine and compare children's treatment of multiple dimensions of status.

Another theoretical question concerns why children favor high-status people in their social judgments (if they do). One possibility is that children map status onto the concept of good and bad, via a halo effect (Cain, Heyman, & Walker, 1997). Past work has suggested that

children, for example, like good people more than bad people and will also give resources to good people over bad people if there are limited resources to share (Kenward & Dahl, 2011; Olson, Banaji, Dweck, & Spelke, 2006). If children see status as a version of goodness, children should both like high-status people and also give more to high-status people. There is some preliminary evidence that young children will give more to high-status people and people they prefer (Charafeddine, Mercier, Clément, Kaufmann, Reboul, & Van der Henst, 2016; Olson, Dweck, Spelke, & Banaji, 2011).

Another possibility, however, is that children have a more nuanced understanding of social status, more akin to adults. For example, they may use social status information to sometimes favor high-status people, but also to sometimes favor lower status people. An example of this occurs in the literature wherein children appear to prefer wealthy people but give more resources to poor people (e.g. Li Spitzer, & Olson, 2014; Paulus, 2014). Li and colleagues (2014) suggested that different processes might underlie, for example, attitudes versus allocation behavior such that preferences may be largely affective responses, whereas allocation behavior, at least by the kindergarten years, appears to be more deliberative. They found that while children preferred a person with more resources to one with fewer, they gave more resources to the person with fewer resources. However, when there was a time delay between learning wealth-based status information and being asked to share—a delay in which children explicitly forgot who had more resources, but presumably remembered the resulting affective information—5-year-old children both preferred and gave resources to high-status people. This finding demonstrated that the initial giving response was likely driven by a distinct mechanism from the preference measure. Further, this finding suggests that children may not simply be mapping status onto a good-bad evaluation system, at least when making deliberative responses. Thus, the

present work aims to shed further light on what underlies social judgments concerning social status differentials—whether it is a general evaluative halo effect or a more nuanced status-specific response.

### **Past Research Exploring Early Use of Social Status Distinctions**

The present work focuses on four dimensions of status: wealth (having more or better resources), physical dominance (being bigger or stronger), decision-making power (having the power to call the shots), and prestige (being admired or followed for superior skills). These dimensions were selected because they are the areas in which there has been the most empirical and/or theoretical work on social status and because there is at least some evidence that children recognize these dimensions of status by the preschool years. Importantly, although there is some work investigating some aspects of this question, past work has included children of differing ages, utilized quite different methodologies, and assessed different dependent variables, making it difficult to compare findings across status dimensions to determine how systematically (or not) children think about social status across dimensions of status (e.g., physical dominance vs. wealth). Below we describe the work on each dimension of status to date, including remaining gaps and mixed findings the current work aims to resolve.

*Wealth.* The most studied social status dimension to date is wealth, or having access to more or fewer resources. Multiple studies have found that children identify wealthy people, or people with more resources, as “in-charge” over a person with fewer resources. Specifically, children as young as 3 years of age verbally recognize wealthy people as in-charge or the boss, suggesting that children recognize wealth as a dimension of social status (Charafeddine, et al., 2015; Gülgöz & Gelman, 2017). Children also use wealth-based status distinctions as the basis for their social preferences. Several studies, for example, find that 3-5-year-olds prefer wealthy

children over poor children (Ahl & Dunham, 2019; Li, et al., 2014; Shutts, et al., 2016), think that others would prefer wealthy (to less wealthy) playmates (Mookherjee & Hogan, 1981), and would rather join a wealthy group over a poorer group (Horwitz, Shutts, & Olson, 2014). Finally, wealth distinctions are also linked to children's resource allocation. In one study, 4-5-year-olds chose to give a resource to an individual who had fewer resources than to someone who had more resources (Li et al., 2014). This finding was replicated in another study with 5-year-olds, while 3-year-olds gave equally to people with more versus fewer resources (Paulus, 2014). In other studies involving wealth disparities, 3-5-year-old children initially seem more concerned with fairness, while older children were more concerned with inequality, aiming to correct inequities (Rizzo, Elenbaas, Cooley, & Killen, 2016). Children older than 5 years of age seem increasingly aware and concerned with others' welfare, sharing more with people who have less resources (Elenbaas & Killen, 2016; Elenbaas, Rizzo, Cooley, & Killen, 2016). Taken together, the studies to date suggest that by ages 3- to 5-years-old, children see a wealthier person as more likely to be "in-charge" and prefer wealthier individuals, while only children beginning around age 5-years allocate resources systematically by wealth, preferring to allocate more resources to those with *fewer* resources.

*Dominance.* There is also a body of work investigating both children's and infants' understanding and use of physical dominance differences. Using looking time methods, researchers have found that within the first year of life, infants expect that bigger people and groups are more likely to achieve their goals over smaller people and smaller groups (Pun, Birch, & Baron, 2016; Thomsen, et al., 2011), infants have expectations that people who physically achieved their goals over others will continue to achieve goals (Gazes, Hampton, & Lourenco, 2017; Mascaro & Csibra, 2012; 2014), and infants expect people who physically achieve their

goals over others will have more resources (Enright, et al., 2017). Further, children verbally pick out a physically dominant individual who wins a competition over another individual as “in-charge” or “the boss” (Castelain, Bernard, Van der Henst, & Mercier, 2016; Charafeddine et al., 2015; Gülgöz & Gelman, 2017), 3-year-old children predict that bigger individuals will win competitions over smaller individuals (Lourenco, Bonny, & Schwartz, 2015), and 3-5-year-olds match physical dominance to differences in posture (Terrizzi, Brey, Shutts, & Beier, 2019). Taken together, this work suggests that children think of physical dominance as a dimension of social status and systematically utilize physical dominance to infer power relations beginning even early in infancy. Only two studies to date have investigated early preferences based on physical dominance. In one study, 21- to 30-month-old toddlers preferred physically dominant individuals who achieved their goals, but only when force was not used (Thomas, Thomsen, Lukowski, Abramyan, & Sarnecka, 2018). However, if force is used, toddlers actually show the opposite preference and prefer the low-status, less physically dominant character. Conversely, 4-6-year-old children prefer and want to play with a person who wins fights over someone who does not win fights (Castelain et al., 2016). Therefore, it is possible that there may be an important developmental change around 3- to 4-years-of age in children’s preferences for physically dominant individuals. No literature to date has explored how children allocate resources to more or less physically dominant people. Thus, the existing literature provides fairly robust evidence that children use dominance to infer status (i.e., who is in-charge), mixed evidence on early preferences, and no evidence concerning how they would allocate resources based on an individual’s status in physical dominance.

*Decision-Making Power.* Less work has been conducted on our third dimension of status, decision-making power. Brey and Shutts (2015) found that 3- and 4-year-old children say a

person who gave instructions, and therefore was deciding what to do, was in-charge over a person who received the instructions and Charafeddine and colleagues (2015) found that 3-5-year-old children identified a person who chose what game to play as “the boss”. However, in another study, 3-6-year-olds failed to identify who was in-charge when one person, and not another, controlled access to a desired activity and got to decide what the other person got to do or what toys they could play with (Gülgöz & Gelman, 2016). In the same study, 7-9-year-olds *were* able to identify the decision maker as in-charge. Regarding preferences, two studies have found that 3- to 5-year-old children have no preference for (or against) people who have decision-making power (Bernard et al., 2016; Charafeddine et al., 2015). Similar to the wealth dimension findings, there is evidence for a developmental shift in children’s allocation behavior based on decision-making power. Specifically, the oldest children tested gave to low-status people (8-year-old children), younger children gave at chance (5-year-old children), and the youngest group (3- and 4-year-olds) reinforced status hierarchies by giving more to high-status decision-makers (Charafeddine et al., 2016). In sum, there are mixed results about whether preschool-age children differentiate people based on decision-making power and/or use decision-making power as the basis of their social judgments.

*Prestige.* Relatively little work has examined whether children see prestige as a dimension of social status and use it to inform their social judgements, though theoretical work has often used it as an example of an important dimension of social status (Henrich and Gil-White, 2001). One study has found that 21-month-old infants will differentiate between physically dominant leaders (a bully who hit others) and prestigious leaders (a leader who followers bowed down to). Specifically, infants expected followers to obey prestigious leaders regardless of whether they were present or not whereas infants did not expect followers to obey

physically dominant leaders when they were not present (Margoni, et al., 2018). Moreover, one study with 3- and 4-year-old children has found that children are more likely to pay attention to and imitate prestigious individuals over non-prestigious individuals, but found that children held no preferences based on prestige (Chudek, Heller, Birch, & Henrich, 2012). No one has directly tested if children explicitly identify prestigious people as in-charge, or if others' prestige impacts children's resource allocations. Thus, there is some reason to think children might differentiate between people based on prestige, but no evidence that they use prestige as the basis of their evaluations or allocation behavior.

*Summary of Past Work.* Together this work indicates that young children likely notice differences in wealth, physical dominance, decision-making power, and prestige, and often relate these concepts to power (e.g., who is the boss). Further, to differing degrees for each dimension, children sometimes use social status to inform their preferences and resource allocation behavior, though whether they favor high- or low- status individuals or give more to low- or high-status individuals has differed by study, dimension, and age. Furthermore, only two studies to date have asked similar questions about multiple dimensions of status within a study (Charafeddine et al., 2015; Gülgöz & Gelman, 2017). While Gülgöz and Gelman (2017) examined multiple dimensions of status, they focused only on whether children mapped these dimensions onto status (e.g. asking children “who is in-charge?”). Charafeddine and colleagues (2015) asked about whether children mapped multiple dimensions onto status (e.g. asking children “who is the boss?”) and asked a preference-type question (e.g. asking children “who would you rather be friends with?”). Neither study investigated whether children applied social status understanding to allocation decisions and neither study investigated prestige, the least studied of these status dimensions in young children. Other work on children's understanding of social status focuses

on a single dimension and often a single dependent variable (e.g. Chudek et al., 2012; Lourenco et al., 2015; Paulus, 2014; Terrizzi et al., 2018). The latter approach helped us learn more about specific dimensions of status, but the approach makes it challenging to compare across dimensions, particularly because different ages of participants and tasks were used.

Importantly, comparing across dimensions *and* across different judgment types is crucial in order to address several theoretical questions underlying the study of social status understanding in children, as alluded to above. First, one must study multiple dimensions within the same design in order to address questions about whether children distinguish different indicators of status (i.e., do they think of prestige as different from dominance) or not. Second, one way to address questions about *why* children might favor high-status people (e.g., because of a halo effect) is to examine if they do so across different measures. If children use status similarly across different types of dependent variables, this might suggest a simplistic explanation like a halo effect. Alternatively, if children use social status differently across different dependent variables, this would suggest that children have a more nuanced understanding of status.

### **The Current Studies**

In the current set of studies, we aim to address four major questions: (1) whether children map the dimensions of wealth, physical dominance, decision-making power, and prestige onto social status? (2) if children use these social status dimensions as the basis for other social judgments (preferences and allocation behavior)? (3) whether children treat all dimensions of status similarly, and (4) whether the answers of these questions vary across the preschool years. In the process of addressing these questions, we also aim to clarify the existing literature through a combination of replication and new exploration. In particular, we pre-registered a series of five

studies, each employing a similar method, participant pool, and dependent variables to address these questions.

In this work, we focus on 3- to 6-year-old children because these are the ages implicated in past studies on the use of social status differences in guiding social judgments. Further, we also focused on these ages because there is some suggestion of developmental changes within this age range and because children at these ages are able to respond to the types of verbal questions and physical allocation tasks we aimed to use. Although we define social status broadly, as any hierarchy in which some people occupy a higher or lower position than others based on a desirable dimension, like past work, we also tested children's understanding of status by asking them to identify who is "in-charge". We choose to do this for a couple reasons. First, this allows us to replicate and compare our findings to past work. Second, we needed to use kid-friendly language to tap into children's knowledge of status understanding, and "in-charge" maps onto the relative positioning of individuals (e.g. being higher- or lower-than others). Of course, there is more to social status than being "in-charge", but this was a way for us to test children's understanding of social status before asking about how others' social status influenced children's social judgments.

We pre-registered our primary analyses within each study. Pre-registration is useful because it clarifies which analyses were decided *a priori*, reducing the number of researcher degrees of freedom (van't Veer & Giner-Sorolla, 2016) and easily distinguishes between planned and posthoc analyses (Moore, 2016; van't Veer & Giner-Sorolla, 2016). The pre-registration as well as data for all studies is available on Open Science Framework (OSF): <https://osf.io/6kypu/>. After submitting this manuscript, reviewers pointed out that Generalized Estimating Equations (GEEs) would be a more appropriate analysis than some of our pre-registered ANOVAs.

Therefore, in the manuscript we report our pre-registered analyses where appropriate, and when GEEs were better, we report these. The replaced pre-registered analyses are included in a supplement for transparency.

### **Study 1**

In Study 1, we asked whether children saw each of our four dimensions of status (wealth, physical dominance, decision-making power, and prestige) as indicating status (measured here as knowing who is “in-charge/the boss” as in Charafeddine et al., 2015; Gülgöz & Gelman, 2017). The aim of this study was to replicate past work finding that young children recognize wealth, physical dominance, and decision-making power (Charafeddine et al., 2015; Gülgöz & Gelman, 2017) and to test whether they also verbally recognize prestige as being associated with being “in-charge” in the preschool years. Additionally, we tested whether children systematically prefer high- or low-status individuals and whether this varies based on social status dimension. Previous work has suggested some evidence, albeit it mixed in direction for wealth and physical dominance (Ahl & Dunham, 2019; Castelain et al., 2016; Li, et al., 2014; Shutts, et al., 2016).

### **Method**

#### **Participants**

Forty-eight 4-year-old and 5-year-old children ( $M = 59.54$  months,  $SD = 7.04$  months, 24 girls) participated in the study<sup>1</sup>. Sample size was determined in advance and was pre-registered (<https://aspredicted.org/t36ua.pdf>). Specifically, we pre-registered  $n = 24$  per age group for this study and all subsequent studies based on past work that used similar sample sizes (Bernard et al., 2016; Brey & Shutts, 2015; Chudek et al., 2012). All participants in this study were recruited

<sup>1</sup> Additionally, we originally pre-registered that we would run  $n = 24$  3-year-olds. However, upon recruiting 3-year-olds, we found that many of them could not complete the study. Of the first 13 3-year-olds we recruited, we had to drop 5 (38%), so we deemed the task too difficult for 3-year-olds and decided to stop recruitment of this age group. However, we returned to including 3-year-olds in a simplified design in Study 5.

from a university database of families who indicated that they were interested in child development research. Although we did not collect demographic data for this study, participants in the lab generally come from high-SES families. There were an additional six participants who started the study and did not answer all of the questions. These children were excluded from analyses in accordance with our pre-registration.

### **Procedure**

In this study and the four following studies, all children participated in a separate room from parents, so parents could not influence children's answers. Before starting the study, the experimenter explained to the child that she had a computer activity where she would read some stories and then ask some questions about the stories. The experimenter told the participants that she was interested in their opinion, and there were no right or wrong answers. All children then verbally assented and the experimenter explained that they could skip questions or stop at any time if they wanted to.

The experimenter read 16 vignettes where one character was high-status and one character was low-status. Corresponding pictures to go along with each vignette were shown on a computer (See Figure 1). Participants heard four vignettes on wealth, four on physical dominance, four on decision-making power, and four on prestige. All vignettes were pilot tested to ensure that children understood the stories. Below is an example vignette for each status dimension.

Wealth Example Vignette: This is Clarissa. This is Kristin. Clarissa only has one shirt and one pair of pants and she doesn't have many toys. Kristin has new clothes every month and she always has the newest toy.

Physical Dominance Example Vignette: This is Zoe. This is Sydney. Zoe is stronger than Sydney. Zoe and Sydney like to play tug of war and try to get the rope closest to them. Since Zoe is stronger, she always wins and gets the rope.

Decision-Making Power Example Vignette: This is Tara. This is Helen. Tara and Helen wanted to eat a snack. Tara wanted chips, but Helen wanted to eat Oreos. Tara doesn't get to choose what to eat because Helen always decides. Since Helen wanted Oreos, Tara and Helen ate Oreos.

Prestige Example Vignette: This is Claire. This is Hailey. Claire and Hailey like to read books out loud. Both Claire and Hailey told their class that they were going to read a book. No one listened to Claire read out loud. Lots of people went to listen to Hailey read out loud.

All vignettes were gender-matched to participants and the drawings of the people in the vignettes did not vary on race. For a full list of all 16 vignettes and details on the pilot study, see the supplemental materials and OSF (<https://osf.io/6kypu/>).

Participants were asked who was in-charge to see if they inferred a status hierarchy from each vignette. They were also asked who they liked best in order to assess whether they had preferences for high- or low-status people. The order of these questions was counterbalanced across participants. In addition, four different vignette orders were created—two were created using a random number generator and the remaining two counterbalance orders were created by reversing the random number generated orders. All 16 vignettes were randomly ordered such that the four dimensions of status were intermixed. For all counterbalance orders, half of the time the high-status character was on the participant's right (and half of the time on the participant's left), half of the time the high-status character was mentioned first (and half of the time mentioned

second), and half of the time a specific character was high-status (and half of the time that same character was low-status).

## Results

*Analytic Plan.* We pre-registered that we would conduct ANOVAs and *t*-tests to determine whether children identified high-status people as in-charge and to determine children's preferences for high- or low-status people. However, reviewers pointed out that GEE analyses would be more appropriate than ANOVAs since children responded in a binary way (e.g. choosing either the high- or low-status person). Therefore, all pre-registered analyses that have been replaced with GEEs in the main text are now included in the supplement for transparency. Largely, the GEEs were consistent with our pre-registered analyses, however, footnotes are included whenever the GEEs resulted in a different pattern of significance in this study and all subsequent studies.

Here and in all subsequent GEE analyses, we ran gaussian, independent GEEs using the package 'geepack' in R and the function 'anova' to obtain a summary table of the Wald Statistics (Højsgaard, Halekoh, & Yan, 2006).

*Do children map wealth, physical dominance, decision-making power, and prestige onto social status?* In accordance with our pre-registration, to determine whether children map these four dimensions of social status onto the concept of social status, we added up the number of times in each dimension (out of 4) that children identified the high-status person as the person in-charge. Thus, children received a score of 0 (if they never picked the high-status person as in-charge) to a score of 4 (if they always picked the high-status person as in-charge). We compared children's scores to chance responding ( $M = 2$ ) with one-sample *t*-tests for each of the four status dimensions.

Overall, children were significantly more likely to identify the high-status person as in-charge in all four dimensions: wealth ( $M = 3.02, SD = 1.19$ ),  $t(47) = 5.92, p < .001, d = .86$ , physical dominance ( $M = 3.19, SD = 1.12$ ),  $t(47) = 7.32, p < .001, d = 1.06$ , decision-making power ( $M = 3.13, SD = .98$ ),  $t(47) = 7.94, p < .001, d = 1.15$ , and prestige ( $M = 2.98, SD = 1.21$ ),  $t(47) = 5.60, p < .001, d = .81$ .

Next, we used a GEE to investigate whether the status dimension (wealth, physical dominance, decision-making power, and prestige), the participant's age (in months), and/or the order of question (being asked about who is "in-charge" first or being asked who participants "liked best" first) impacted children's identification of high-status people. Overall, the status dimension did not impact children's identification of high-status people, (Wald chi-square = 1.86,  $p = .60$ ). However, children's age was significantly related to their identification of high-status people, (Wald chi-square = 7.96,  $p = .005$ ). Older children were slightly better at identifying high-status characters than low-status characters<sup>2</sup>. Additionally, the order in which the questions were asked mattered, (Wald chi-square = 14.74,  $p < .001$ ). Children who were asked who is in-charge first identified high-status characters more ( $M = 13.30, SD = 2.65$ ) than children who were asked who is in-charge after being asked who they liked best ( $M = 11.40, SD = 4.43$ )<sup>3</sup>. Regardless of question order, however, both children who were asked who is in-charge first ( $t(22) = 9.59, p < .001, d = 2.00$ ) and children who were asked who do you like best first ( $t(24) = 3.84, p = .001, d = .77$ ) identified high-status people at rates greater than chance.

<sup>2</sup> See supplement with our original pre-registered analyses correlating age in months with children's identification of high-status people broken down by each of the four status dimensions. Only in the wealth dimension was age in months significantly correlated with identifying high-status people. The other three dimensions did not show significant correlations with age.

<sup>3</sup> Using an ANOVA, as seen in the Supplement, there was *not* a significant order effect ( $p = .08$ ). This was one of the few differences between the ANOVA and GEE analyses.

*Do children have preferences for people based on status?* To determine whether children have preferences for people based on status, a similar analytic approach was taken based on our pre-registration. First, for each dimension, we counted the number of times children said they liked the high-status person best. This resulted in scores ranging from 0 (never preferring the high-status person) to 4 (always preferring the high-status person) for each dimension, which could be compared to chance (2) via a one-sample t-test. Overall, children did not differ from chance for each of the four dimensions: wealth ( $M = 2.35, SD = 1.36$ ),  $t(47) = 1.80, p = .078, d = .26$ , physical dominance ( $M = 2.23, SD = 1.43$ )  $t(47) = 1.11, p = .27, d = .16$ , decision-making power ( $M = 2.13, SD = 1.25$ ),  $t(47) = .69, p = .49, d = .10$ , and prestige ( $M = 2.23, SD = 1.31$ ),  $t(47) = 1.21, p = .23, d = .18$ .

Next, we used a GEE to investigate whether the status dimension (wealth, physical dominance, decision-making power, and prestige), the participant's age (in months), and/or the order of question (being asked about who is "in-charge" first or being asked who participants "liked best" first) affected children's preferences for high- or low-status people. Here again, we found that status dimension did not significantly impact children's preferences for high- versus low-status people, (Wald chi-square = 1.29,  $p = .73$ ) and neither did age, (Wald chi-square = .12,  $p = .73$ ). However, the order of questions asked did impact children's preferences based on status (Wald chi-square = 29.22,  $p < .001$ ). Children who were asked who they liked best first actually showed a preference for high-status over low-status people at rates greater than chance ( $M = 10.40, SD = 4.55, t(24) = 2.63, p = .015, d = .53$ ) whereas children who were asked who is in-charge first were at chance for their preferences ( $M = 7.35, SD = 4.27, t(22) = .73, p = .47, d = .15$ ). The same pattern emerges if we analyze each dimension separately, and these analyses are included in the supplement. Because the order effect was a post hoc analysis, we sought to

follow up on this by replicating preferences based on status (without “who is in-charge?” questions) in Study 4.

*Is identifying social status related to liking based on status?* Lastly, we pre-registered analyses to determine whether identifying who is in-charge is related to children’s preferences. Across all four dimensions, being able to identify who is in-charge was not significantly related to liking high-status individuals: wealth  $r(47) = -.24, p = .10$ , physical dominance,  $r(47) = -.03, p = .85$ , decision-making power,  $r(47) = -.12, p = .43$ , and prestige,  $r(47) = -.16, p = .28$ . Overall, pooling all four dimensions together, identifying status and liking based on status were not significantly related,  $r(47) = -.12, p = .43$ .

## Discussion

Across all four status dimensions, we found that children identified the high-status character as in-charge. These findings replicate some existing work on the dimensions of wealth (Charafeddine et al., 2015; Gülgöz and Gelman, 2017), physical dominance (Castelain, et al., 2016; Charafeddine et al., 2015; Gülgöz & Gelman, 2017), decision-making power (Brey & Shutts, 2015), and prestige (Chudek et al., 2012). Our findings suggest that 4- and 5-year-old children found it equally easy to deduce status on our four different status dimensions, with there being some evidence that children became better at identifying social status as they got older. Moreover, this is the first study testing children’s identification of status across these four dimensions utilizing the same basic methods.

Interestingly, we found mixed support for a relationship between status and preferences. That is, as a group, on each of the four dimensions, children did not systematically prefer higher status individuals (nor did they systematically prefer lower-status individuals). However, we did find a significant preference for high-status people when this was the first question children were

asked. A preference for high-status individuals is consistent with past work finding that children prefer wealthy over poor individuals (Ahl & Dunham, 2019; Horwitz et al, 2014; Li et al., 2014; Paulus 2014; Shutts et al., 2016) and physically dominant individuals over their subordinates (Castelain, et al., 2016; Thomas et al., 2018).

However, for children who were asked who was in-charge and *then* asked who they liked best, there was no systematic preference for high- or low-status individuals. Why? Li et al. (2014) have suggested that status-based preferences may be fairly automatic, affective responses. Perhaps asking children to explicitly identify people as “in-charge” requires more deliberation or reminds children of a norm to treat people fairly based on status differences. Once children have been explicitly reminded that the task is about status, it could be difficult to then return to their automatic, affective response. If this is the case, we would expect that in a replication (see Study 4) in which children are just asked for their preferences, we will again see children favoring the high-status targets. If this effect was spurious, a result of running so many tests, we would not expect to replicate this finding.

Another possibility is that children become more confused simply by being asked multiple questions, or when children were asked multiple questions, they may have wanted to be “fair” by choosing each of the characters once. One finding from the literature is relevant here. Chudek et. al (2012) showed children a prestigious person and a non-prestigious person and then asked children a battery of questions before asking who they liked best. In this format, Chudek and colleagues also found that children showed no significant preferences for the more prestigious individual. Thus, it may be the case that when a preference question is asked later in a set of questions, the effect goes away, perhaps suggesting that the preference effect is smaller

or more malleable than children's ability to identify high- and low-status individuals. We return to this issue in Study 4.

## Study 2

In Study 1, we found that 4- and 5-year-old children said that high- over low-status people are “in-charge”, leading us to infer, as in past research, that children have a robust understanding of social status. However, in Study 2, we wanted to confirm this finding with a second method by asking whether children would map these status dimensions onto a literal, physical hierarchy. Therefore, in Study 2, we used a task developed by Mandalaywala, Rhodes, and Tai (2019) to determine whether children would map people who vary in wealth, physical dominance, decision-making power, and prestige onto different places on a physical ladder, described as a type of status hierarchy. Evidence that children do so in a way consistent with adult understandings of hierarchies would give us greater confidence that children are mapping these dimensions onto an underlying concept of status.

## Methods

### Participants

Forty-eight, 4- and 5-year-old children ( $M = 60.81$  months,  $SD = 6.97$  months, 24 4-year-olds, 23 girls) participated in this study. Eighteen children participated in a developmental psychology lab and 30 children participated in their preschools. Sample size and analyses were pre-registered (<https://aspredicted.org/3pt2w.pdf>). Participants were from upper- middle-class or wealthy families. Ninety six percent of participants came from families where the primary caregiver had completed a bachelor's or a graduate degree, and 94% of participants came from families that earned \$75,001/year or more. There were an additional 4 participants who started the study and did not answer all of the questions, 6 participants who failed the practice trials, 3

participants who both failed the practice trials and did not answer all of the questions, and 1 participant who wanted to skip the practice trials. These children were excluded in analyses in accordance with our pre-registration<sup>4</sup>.

## **Procedure**

We used a ladder task modeled off of Mandalaywala, Rhodes, & Tai (2019) where children could place people on any of six rungs on a ladder where the top of the ladder indicated high social status and the bottom of the ladder indicated low social status.

### *Practice Trials*

The purpose of the practice trials was to ensure that children understood the ladder task and realized that they could place multiple people on the same rung of the ladder. Participants first were familiarized with the ladder (See Figure 2). They were shown that the ladder had six Velcro rows, and the experimenter counted the six rungs of the ladder with the participants. Then the experimenter explained to participants that in this activity, “different people go on different rows of the ladder, people who are in-charge or the boss go at the very top of the ladder” while pointing to the top row. Next, the experimenter explained that, “people who are not in-charge and are not the boss go at the bottom of the ladder”, while pointing to the bottom row. Children were also told that “people go in the middle of the ladder too, and that someone who is sometimes the boss and sometimes not the boss would go in the middle”. Children then had four practice trials to ensure that they understood the ladder and recognized that they could place multiple people on the same row of the ladder.

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<sup>4</sup> Given the high number of children who were excluded, we also analyzed the data inclusive of all children when there was data available. Importantly, we did not pre-register this approach, but were concerned about excluding so many participants. Our findings do not differ if all of these participants are included.

First, children received pictures of a “king” and a “worker in the kingdom” with instructions to place them on the ladder. Next, children saw pictures of a student and a teacher and placed them on the ladder. Third, children saw a picture of two 7-year-old boys and were told that “they go to the same school” and asked to place them on the ladder. Last, children saw a picture of a baby and “the baby’s mom” and asked to put them on the ladder. All pictures had Velcro on the back so children could Velcro them to any of the six rows on the ladder.

During the practice trials, if children demonstrated they understood the ladder (e.g. placing the king, teacher, and mom on a higher rung than the worker, student and baby and placing the two 7-year-old boys on the same rung) the participant immediately moved on to the test trials. However, if participants failed to demonstrate that they understood the ladder (e.g. placing the worker higher than the king, placing one of the 7-year-old boys higher than the other boy), then they were given up to three more opportunities to place the same people on the ladder. In this case, the experimenter would tell participants, “that’s a good idea but remember that people who are in-charge go at the top”. Thirty-eight percent of participants immediately passed all of the practice trials. The practice trial repeated most often was the practice trial with two 7-year-old boys that went to the same school. Initially, 40% of participants placed one boy higher on the ladder than the other boy. If children did not pass all practice trials after three tries, they were excluded in accordance with our pre-registration.

### *Test Trials*

During test trials, children heard the same 16 vignettes used in Study 1. The vignettes were shown pictorially in a picture-book and the characters in the story were Velcroed to the pages so that children could take the characters from the story and Velcro them to the ladder. Children were told they would be given two people to put on the ladder (just like before in the

practice trials) and were reminded that the people could go on different rows of the ladder or the same row. Importantly, children received no feedback on the test trials.

### *Coding*

In accordance with our pre-registration, we recorded a score from 1 (placing a character on the lowest rung) to 6 (placing a character on the highest rung) for each character in the vignettes. We then created an average score for participant's placement of the high- and low-status characters for each status dimension (e.g. wealth). We also created an overall composite score by averaging participant's placement of all high- and all low-status characters.

## **Results**

*Do children demonstrate an understanding of status in the ladder task?* In accordance with our pre-registration, we ran paired *t*-tests for children's average placement of the high- and low-status characters for each of the four social status dimensions. Across the board, children placed high-status characters on higher rungs of the ladder than low-status characters: wealth ( $M$  high-status = 4.92,  $M$  low-status = 2.30),  $t(47) = 8.65, p < .001, d = 1.99$ , physical dominance ( $M$  high-status = 5.19,  $M$  low-status = 2.20),  $t(47) = 11.53, p < .001, d = 2.49$ , decision-making power ( $M$  high-status = 4.65,  $M$  low-status = 3.18),  $t(47) = 5.17, p < .001, d = .98$ , and prestige ( $M$  high-status = 4.77,  $M$  low-status = 2.49),  $t(47) = 8.18, p < .001, d = 1.79$ .

Likewise, looking at children's overall composite score, children placed high-status characters ( $M = 4.88$ ) on higher rungs than low-status characters ( $M = 2.54$ ),  $t(47) = 9.89, p < .001, d = 2.02$ .

In an exploratory analysis (not pre-registered), we ran a repeated-measures ANOVA investigating whether children's ladder placement based on status differed by status dimension. To do this, we calculated a difference score for each of the four status dimensions by subtracting

children's average placement of low- from high-status people. The extent of the placement differences for high- and low-status people differed significantly by status dimension,  $F(3, 141) = 13.61, p < .001, \eta^2 = .23$ . Follow-up Bonferroni comparisons indicated smaller differences between scores of decision-making power than wealth ( $p = .003$ ), physical dominance ( $p < .001$ ), and prestige ( $p = .037$ ). Additionally, children had larger difference scores for physical dominance than for prestige ( $p = .006$ ). No other follow-up tests were significantly different ( $p > .36$ ). *Does age impact children's demonstration of social status understanding on the ladder task?* We found that age was unrelated to children's understanding of social status (using the composite score) on this task,  $r(47) = .07, p = .62$ .

## Discussion

Across all four dimensions of social status tested, 4- and 5-year-old children consistently placed high-status characters near the top of the ladder and low-status characters near the bottom of the ladder. These results add converging evidence to past work that children map wealth and physical dominance onto status hierarchies (Charafeddine, et al., 2015; Gülgöz & Gelman, 2017). Additionally, these results converge with the findings from Study 1 that preschool children map all four dimensions onto a concept of being “in-charge”. Although children differentiated between people based on status for all four dimensions, in post hoc analyses we found that children differentiated between high- and low-status people to a lesser degree in the decision-making power vignettes. It is possible that children may have more difficulty recognizing status differences for decision making power than other dimensions of status. Another possibility is that children do not view differences in decision making power as stark as differences in wealth, physical dominance, and prestige.

Using this method (where children have the option to place people on a variety of rungs) makes it possible to observe subtle differences based on status dimensions. Further, since children had the option to place both characters on the same rung of the ladder and were not forced to choose one character over another as being higher in status provides additional evidence that children have a robust understanding of social status. Past results (Charafeddine, et al., 2015; Gülgöz & Gelman, 2017 and Study 1 of this paper) therefore cannot be simply due to the forced-choice nature of previous tasks. Since children understood the vignettes in these studies and have some understanding of status, we next returned to the question of whether social status differences impact children's social judgements.

### **Study 3**

Our next question sought to address whether children differentially distribute a resource to high- or low-status individuals across the four status dimensions. Resource allocation is an important dependent measure because it presents an opportunity for children to systematically reinforce status hierarchies (by giving to the high-status person) or reduce inequities (by giving to the low-status person). Many studies have found that children give resources to the same people that they prefer (Dunham, Baron, & Carey, 2011; Paulus, 2016; Moore, 2009). Past work, along with some of our Study 1 results, suggest that children prefer high-status individuals (Ahl & Dunham, 2019; Castelain, et al., 2016; Li et al. 2014; Shutts et al., 2016). Therefore, a possible prediction is that children might reinforce social status hierarchies and give to the high-status person. However, past work has occasionally shown that children will rectify inequities by giving more to low-status people on the wealth dimension (Li et al., 2014; Paulus, 2014). Therefore, the opposite prediction—that children will give more to low-status individuals—was also plausible, particularly in the wealth dimension. Finally, some work has suggested age

changes in allocation behavior based on status wherein younger children tend to give more to high-status people, but older children give more to lower status people (Charafeddine et al., 2016).

## Methods

### Participants

Fifty<sup>5</sup> 4-year-old and 5-year-old children ( $M = 59.42$  months,  $SD = 7.35$  months, 24 4-year-olds, 28 girls) participated in the study. Sample size and analyses were pre-registered (<https://aspredicted.org/zm64n.pdf>). Participants came from families that were of high socioeconomic status. Eighty-five percent of participants came from a family where the primary caregiver completed college or a graduate degree, and 86% of participants came from families that earned greater than \$75,001 a year. Three additional participants were excluded from analyses in accordance with our pre-registration because they started the study, but did not answer all of the questions.

### Procedure

Before starting the study, the experimenter explained to the participants that she had a computer activity for them where they would be read some stories about people and then have an opportunity to choose which person to give an eraser to. The experimenter then read 16 vignettes on a laptop, each with corresponding pictures (the same vignettes as Study 1 and 2 with 4 vignettes on each status dimension). After each vignette, the experimenter placed a small box under each person. Children were asked, “who do you want to give the eraser to?”, and children could then place the eraser in a person’s box of their choosing. The experimenter then placed the

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<sup>5</sup> We pre-registered that we would run 48 participants. We accidentally ran two extra participants (both 5-year-olds girls). All analyses were computed with all 50 participants and with only the first 48 participants. The results reported in the main manuscript include all 50 participants for maximum power. The pattern of results did not change with the first  $n = 48$  participants with the expectation of one pre-registered analysis reported below.

boxes behind the laptop, with an understanding that the chosen person would get the eraser later. New boxes were used with each vignette.

We used the counterbalance orders from Study 1 and 2 to ensure that the order of the questions was counterbalanced. Half of the time the high-status character was on the participant's right (and half of the time on the participant's left), half of the time the high-status character was mentioned first (and half of the time mentioned second), and half of the time a specific drawing of a character was high-status (and half of the time that same character was low-status).

## Results

*Do children systematically give to high- or low-status individuals?* In accordance to our pre-registration, to determine whether children systematically give to high- or low-status individuals, we added up the number of times that children gave to the high-status person in each dimension (out of 4). Thus, children received a score of 0 to 4. We compared children's scores to chance responding ( $M = 2$ ) with one-sample  $t$ -tests.

As a group, children distributed resources to high- and low-status individuals at near-chance rates for the wealth ( $M = 1.82$ ,  $SD = 1.40$ ),  $t(49) = .91$ ,  $p = .37$ ,  $d = .13$ , and the physical dominance dimensions ( $M = 1.80$ ,  $SD = 1.63$ ),  $t(49) = .87$ ,  $p = .40$ ,  $d = .12$ . The prestige dimension was not significant when including all 50 participants, ( $M = 1.60$ ,  $SD = 1.44$ ),  $t(49) = 1.96$ ,  $p = .056$ ,  $d = .28$ , but was significant when only the first 48 (originally planned) participants were included, ( $M = 1.56$ ,  $SD = 1.43$ ),  $t(47) = 2.12$ ,  $p = .039$ ,  $d = .31$ . Children gave significantly fewer resources to high-status individuals in the decision-making dimension ( $M = 1.64$ ,  $SD = 1.21$ ),  $t(49) = 2.11$ ,  $p = .040$ ,  $d = .30$ .

To assess whether children gave differently depending on the status dimension and their age (in months), we ran a GEE. Status dimension did not impact children's giving (Wald chi-square = 1.90,  $p = .59$ ). However, children's age in months did significantly influence their giving (Wald chi-square = 38.40,  $p < .001$ ). Specifically, older children were significantly less likely to give to high-status individuals across the four dimensions. To further explore this age relation, in posthoc analyses, we broke participants up by age group (4- and 5-year-olds) and ran a one-way  $t$ -test comparing children's total distribution of resources to high-status individuals to chance ( $M = 8$ ). Overall, 4-year-olds were giving to high- and low-status individuals at chance rates ( $M = 8.25$ ,  $SD = 4.11$ ),  $t(23) = .30$ ,  $p = .77$ , whereas 5-year-olds gave significantly fewer resources to high-status individuals ( $M = 5.58$ ,  $SD = 5.16$ ),  $t(25) = 2.39$ ,  $p = .025$ .

## Discussion

In the pre-registered analyses, children gave significantly more to low-status people on the decision-making status dimension, and to some extent, on the dimension of prestige, but not on the wealth or physical dominance dimensions. However, our analyses also demonstrated that none of these effects were different from one another. Exploratory analyses suggested there may be an underlying age effect. Dividing the data into 4- versus 5-year-olds suggested that 5-year-olds showed a significant tendency to allocate resources to lower status individuals, while 4-year-olds responded at chance. This age-based allocation finding is consistent with past work showing that 5-year-olds will give more resources to poor, as opposed to wealthy individuals, whereas 3-year-olds did not preferentially give to poor versus wealthy people (Paulus, 2014). Because the key finding—that 5-year-old children may allocate resources preferentially toward those with fewer resources—was a posthoc finding, in Study 4 we aimed to replicate this finding,

along with the posthoc finding from Study 1 (that children hold preferences for high-status people when immediately asked about preferences).

### **Study 4**

Studies 1 and 3 provide preliminary evidence that children's preferences and behavior may vary as a function of the social status of the people they are forming preferences about or acting toward. Specifically, children may prefer high-status individuals and, by 5 years of age, may give resources to low-status individuals. However, each of these effects was observed in posthoc analyses. To confirm whether these findings were spurious, we randomly assigned children to the preference condition ("who do you like best?") or to the distribution condition ("give a resource to the high- or low-status individual"). We chose a between-subjects design to ensure that children's answers to who they liked best would not influence who they gave to and vice versa. Further, because of the suggested age effect in Study 3, which found that systematic allocation of resources may not occur until age 5, in this study we recruited 5- and 6-year-old children.

### **Method**

#### **Participants**

Ninety-six 5-year-old and 6-year-old children ( $M = 71.30$  months,  $SD = 7.44$  months, 48 5-year-olds, 41 girls) participated in the study, with 24 children per age group (5 vs. 6 years) assigned to each condition (preference vs. allocation). In addition to running children in the lab ( $n = 67$ ), we also recruited children to participate from area schools ( $n = 29$ ). For 31% of participants, no demographic information was requested, but for the remaining participants in which demographic information is available, the majority of participants came from high socioeconomic status (94% had a primary caregiver who attended college or graduate school,

90% of participants came from families that earned greater than \$75,001 a year). Sample size and analyses were pre-registered (<https://aspredicted.org/tc3p6.pdf>). There were an additional three participants who started the study and did not answer all of the questions. These children were excluded from analyses in accordance with our pre-registration.

### Procedure

Children were randomly assigned to either the preference condition or the resource condition. All children heard the same vignettes from Studies 1, 2, and 3, but in the preference condition, they were asked who they liked best and in the resource condition, they were asked to give an eraser to one of the characters in the vignettes.

### Results

*Do five- and six-year-olds systematically prefer high-status people?* To determine whether children preferred high- or low-status people, we added up the number of times in each dimension (out of 4) that children said they liked the high-status person best. Thus, children received a score from 0 to 4. We compared children's scores to chance responding ( $M = 2$ ) with one-sample  $t$ -tests, consistent with our pre-registration.

Five- and six-year-old children preferred high-status individuals significantly above chance on all dimensions: wealth ( $M = 2.93$ ,  $SD = 1.16$ ),  $t(47) = 5.62$ ,  $p < .001$ ,  $d = .81$ , physical dominance ( $M = 2.69$ ,  $SD = 1.19$ ),  $t(47) = 4.01$ ,  $p < .001$ ,  $d = .37$ , decision-making power ( $M = 2.50$ ,  $SD = 1.15$ ),  $t(47) = 3.02$ ,  $p = .004$ ,  $d = .44$ , and prestige ( $M = 2.65$ ,  $SD = 1.10$ ),  $t(47) = 4.06$ ,  $p < .001$ ,  $d = .59$ .

A GEE investigated whether children's preferences were influenced by the status dimension or their age in months. Both the status dimension (Wald chi-square = 5.68,  $p = .13$ )

and children's age in months (Wald chi-square = .87,  $p = .35$ ) were not significantly related to children's preferences.

*Do five- and six-year-olds systematically correct inequities and give to low-status people?* To determine whether children systematically gave to high- or low-status people, we added up the number of times in each dimension (out of 4) children gave to the high-status individual. Thus, children received a score from 0 to 4. We compared children's scores to chance responding ( $M = 2$ ) with one-sample  $t$ -tests, consistent with our pre-registration.

Five- and six-year-old children systematically gave to low-status individuals which was significantly different from chance on all dimensions: wealth ( $M = 1.13$ ,  $SD = 1.47$ ),  $t(47) = 4.13$ ,  $p < .001$ ,  $d = .60$ , physical dominance ( $M = 1.10$ ,  $SD = 1.29$ ),  $t(47) = 4.80$ ,  $p < .001$ ,  $d = .69$ , decision-making power ( $M = 1.13$ ,  $SD = 1.39$ ),  $t(47) = 4.35$ ,  $p < .001$ ,  $d = .63$ , and prestige ( $M = 1.35$ ,  $SD = 1.38$ ),  $t(47) = 3.25$ ,  $p = .002$ ,  $d = .47$ .

A GEE investigated whether children's giving behavior was influenced by the status dimension or children's age in months. Children's giving was not significantly impacted by the status dimension (Wald chi-square = 2.30,  $p = .51$ ). However, age was significantly related to children's giving to high- versus low-status people (Wald chi-square = 44.30,  $p < .001$ ); older children gave more to low-status people.

## Discussion

In Study 4, children preferred high-status individuals yet allocated more resources to low-status individuals, mirroring a pattern observed in two papers on wealth (Li et al., 2014; Paulus, 2014) and extending this finding to other social status dimensions. These preferences and giving behaviors did not differ by status dimension. We found that the allocation behavior—giving to the lower status person—was more common among 6-year-olds than 5-year-olds. This mirrors

the general developmental pattern suggested by Paulus (2014) in the domain of wealth in which he observed 3-year-olds not showing an allocation bias, but older children showing a tendency to favor the poor. Interestingly, Charafeddine et al., (2016) found that 3- to 4-year-old children favor high-status decision makers on an allocation task, whereas 5-year-old children gave equally based on status, and 8-year-olds gave more to low-status non-decision makers. This suggests a full shift from a very early preference to give to high-status individuals, to a lack of an allocation preference, to a preference favoring allocation to low-status people. Our results are consistent with this general trend.

### **Study 5**

Our final study aimed to investigate the same types of questions as our previous studies, but in 3-year-old children using a simpler design where we shortened the task to make it more feasible for younger children (piloting the same exact measures lead to large attrition rates). Importantly, studying 3-year-old children allowed us to determine whether there is age-related change across various measures. Particularly interesting is investigating change on resource allocation behavior because past work may suggest that young children will give more to high-status individuals (e.g. Charafeddine et al., 2016). Additionally, examining whether even 3-year-olds demonstrate an understanding of all four dimensions of status when asked to report their knowledge verbally and if they hold systematic preferences for high-status people including whether this varies based on the dimension of status, were of great interest as well.

### **Method**

#### **Participants**

Seventy-three 3-year-old children ( $M = 42.36$  months,  $SD = 3.07$  months, 37 girls) participated in the study. Children were randomly assigned to one of three conditions: an

identification condition ( $n = 24$ ), a preference condition ( $n = 25$ )<sup>6</sup>, and a resource condition ( $n = 24$ ). Children were run in the lab ( $n = 39$ ), in area schools ( $n = 32$ ), and in public libraries ( $n = 2$ ). For 11% of participants, no socioeconomic status demographic information was requested, but for the 89% of participants who did have demographic information available, the majority of participants came from high socioeconomic status (84% of participants came from families where the primary caregiver has a college degree or attended graduate school and 81% of families made at least \$75,0001 a year). Sample size and analyses were pre-registered (<https://aspredicted.org/cc6ip.pdf>). There were an additional 2 participants who started the study and did not answer all of the questions. These children were excluded from analyses in accordance with our pre-registration.

### Procedure

Children heard the same vignettes as in the previous studies, except each participant only heard eight vignettes instead of 16 because we found that 3-year-old children could not sit through as many vignettes. Specifically, children heard two vignettes for each of the status dimensions (i.e., wealth, physical dominance, decision-making power, and prestige). New counterbalance orders were made with a random number generator such that half of children heard one set of eight randomly chosen vignettes and the other half of children heard the other set of eight randomly chosen vignettes. The dependent variables were phrased as: “who is in-charge?” (identification), “who do you like best?” (preference), and “who do you want to give this eraser to” (allocation).

### Results

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<sup>6</sup> We accidentally ran one extra 3-year-old participant in the preference condition. For maximal power, we include their data in the manuscript, but results do not change if the extra participant is excluded.

*Analytic plan*

In accordance with our pre-registration, we first added up the number of times (out of 8) that children chose the high-status person in each of the three conditions (identification, preference, resource). Thus, children received a score from 0 to 8. We then compared children's scores to chance responding ( $M = 4$ ) with one-sample  $t$ -tests to see if children overall were choosing high-status people, low-status people, or were at chance.

Next, we determined whether 3-year-olds treated the four status dimensions differently, by conducting three generalized estimating equations (GEE). Because this study was run after reviewers suggested using GEE analyses, this study was pre-registered to use GEEs whereas the other studies were pre-registered to use ANOVAs. One GEE was run for each of our three conditions. We pre-registered that we would only run follow-up tests if the GEE found that the status dimensions were significantly different.

*Do 3-year-olds have an understanding of social status?* Overall, we found that 3-year-old children identified who was in-charge at rates above chance ( $M = 5.54$ ,  $SD = 1.44$ ),  $t(23) = 5.23$ ,  $p < .001$ ,  $d = 1.07$ . A GEE found that there was no significant difference based on status dimensions (Wald chi-square = 6.36,  $p = .095$ ).

*Do 3-year-olds prefer high- or low-status people?* Overall, 3-year-old children preferred high- over low-status people ( $M = 5.32$ ,  $SD = 1.38$ ),  $t(24) = 4.80$ ,  $p < .001$ ,  $d = .96$ . A GEE found that there was not a significant difference based on social status dimensions (Wald chi-square = 2.05,  $p = .56$ ).

*Do 3-year-olds give to high- or low-status people?* Overall, while numerically, 3-year-olds gave slightly more resources to high-status people, this difference was not significant ( $M =$

$4.58, SD = 1.69$ ),  $t(23) = 1.69, p = .10, d = .34$ . A GEE found that there was not a significant difference based on the status dimension (Wald chi-square = 5.71,  $p = .13$ ).

### **Discussion**

Taken together, this work suggests that 3-year-old children have some understanding of social status and will sometimes use social status to inform their social judgments. In particular, 3-year-old children overall identified high-status characters as “in-charge” at rates above chance and had preferences for high-status characters. Three-year-old children were at chance in who they chose to give a resource to. For all three questions, we found no evidence that 3-year-old children were treating these four status dimensions differently, which was consistent with what we found for 4-, 5-, and 6-year-old children on the same questions.

Overall, it appears that we may also be seeing some developmental shifts. Across studies, children at all ages showed an ability to map status onto “being in-charge” and tended to favor those high in status, but we saw some shifts in their use of status information for allocation decisions. Younger (3- to 4-year-olds) tended to be at chance and slightly older children (5- to 6-year-olds) favored the lower status targets in their allocation decisions.

### **General Discussion**

Across five studies, we demonstrated that 3- to 6-year-old children recognize social status differences and prefer high- over low-status people. Further, by 5-6-years of age, children will give a resource to a low-status person rather than a high-status person; 3- to 4-year-old children are at chance in their allocation. Across studies, we found no significant differences across the four status dimensions tested on how children use status to impact their social judgments. The only dimension-based difference found was a difference in the degree to which children ranked

high- and low-status characters on the ladder task in Study 2. Answers to our four driving questions and theoretical implications of this work are discussed below.

***Do children map the dimensions of wealth, physical dominance, decision-making power, and prestige onto social status?***

Taken together with past work, we replicated the finding that young children map wealth (Charafeddine, et al., 2015; Gülgöz & Gelman, 2017), physical dominance (Castelain, et al., 2016; Charafeddine et al., 2015; Gülgöz & Gelman, 2017), and decision-making power (Brey & Shutts, 2015; Gülgöz & Gelman, 2017) onto social status. We expanded this literature by showing that children also map prestige onto status (Study 1 and 5) and demonstrated that children map all four dimensions onto a physical social status ladder (Study 2). We found minimal age variation in the identification of status in 4- to 6- year-olds. Additionally, we found that even 3-year-olds identified high-status people at rates above chance.

The consistency in findings across different methods (Studies 1 and 2) and relative consistent results across dimensions suggest that children may have an underlying representation of social status, but more evidence would be necessary to know how deep this representation is. While less parsimonious, it is possible that children just have distinct concepts of wealth, physical dominance, decision-making power, and prestige individually and coincidentally treated all dimensions generally similarly.

However, one possible concern, with the interpretation of our results about children's understanding of social status is that we, like past researchers, defined social status to participants as "being in-charge" and/or "being the boss". While this type of power differential is certainly a part of an adult conceptualization of social status, it is not as nuanced and leaves out other aspects of social status. Being in-charge may also be truer of some dimensions of status

(e.g., decision-making) than others (e.g., prestige). Therefore, an open question is whether children have a deeper understanding of social status beyond the power aspect and how one might assess if this is the case with young children.

***Do children use social status as the basis for social judgments (preferences and allocation behavior)?***

We found that children use social status to inform their social judgements. Specifically, children throughout the 3- to 6-year age range held preferences for high- over low-status people, though we failed to observe this effect when children were first directly asked to identify who was higher versus lower status (Study 1). Nonetheless, when asked either separately or first, the finding that children use status to inform their preferences was robust across age and dimension. This replicated past findings on wealth (Ahl & Dunham, 2017; Li, et al., 2014; Shutts, et al., 2016) and physical dominance (Castelain et al., 2016), and was the first study to our knowledge to show children's preferences for high-status decision-makers and prestigious people.

Children's use of social status to inform their allocation decisions suggested a possible developmental change, mirroring one reported in the literature on wealth (Li et al., 2014; Paulus, 2014) and decision-making power (Charafeddine et al., 2016). We found that across dimensions, 5- to 6-year-old children (but not 3- to 4-year-old children) selectively gave more to low- over high-status people.

Why might children prefer high-status people but not choose to allocate a desirable resource to a high-status person? Past work has suggested that preferences may be driven by affective tagging (Sigelman, 2013; Olson, Dunham, Dweck, Spelke, & Banaji, 2008), or the idea that people automatically and often unconsciously evaluate people with a simple affective association. Evidence for affective tagging has come from studies of patients with difficulty

forming explicit memories (Johnson, Kim, & Risse, 1985) and those who have trouble overriding evaluative information (Tranel & Damasio, 1993). These studies have demonstrated that even in the absence of any explicit memory for having met a person, people evaluate those individuals based on unconscious or implicit evaluations they formed previously. Li and colleagues (2014) argued that a similar process might occur when children see people of high or low wealth. Children may simply associate the person with greater wealth with more positivity (i.e., they may tag a person with a positive affective tag automatically because wealth is evaluated positively) and therefore, when their preferences are assessed, they report greater liking for those with greater wealth. Li and colleagues also found the present pattern wherein children allocated a resource to a lower wealth individual. They argued that the allocation decision drew on more deliberative processing. To test that possibility, in one of their studies, children completed the allocation decision under cognitive load (via a memory task) and in this case, children instead allocated to the higher-wealth target. Li and colleagues argued that this change in behavior occurred because participants were not able to consciously remember which child had more resources, but they were able to rely on that affective tag that had occurred upon introduction to the targets. Thus, the deliberative decision to favor the lower status person was overridden by the automatic preference for the higher status person. A similar process could be occurring here wherein children rely on affective tags when asked about their preferences, but when asked to allocate resources, children perhaps draw on more explicit norms about being fair. Similar findings have been observed in adults: Adults will say they will correct inequities in studies when they have time to think about status (Lamm & Schwinger, 1980), but when forced under a cognitive load or a time crunch, adults will sometimes perpetuate inequities and give more to high-status individuals (Van Berkel, Crandall, Eidelman, & Blanchard, 2015).

Affective tagging could explain why children prefer higher status targets. However, when they have unlimited cognitive resources to inform their decision why might older children allocate resources to lower status targets? Adults actively teach children to share with people who have less and teaching this behavior to children has been found to increase sharing in some children (Gelfand, Hartmann, Cromer, Smith, & Page, 1975). Perhaps children in our study and others (e.g., Charafeddine et al., 2016; Li et al., 2014; Paulus, 2014) see the lower status person as being disadvantaged, thereby warranting a resource to make things more equal (Rochat & Robbins, 2016). Anecdotally, some children spontaneously stated that they wanted to be fair when giving to the low-status individual or referenced correcting inequities. One child mentioned he wished the eraser was a house on one of the wealth vignettes, hoping to even out the unequal wealth distribution. Future research is needed to further test whether affective tagging, combined with explicit reasoning about fairness, might explain these results.

An alternative or additional explanation for the resource allocation results is empathy. Past work has found that young children and even infants care about others' feelings (Eisenberg, Spinrad, & Sadovsky, 2006; Roth-Hanania, Davidov, & Zahn-Waxler, 2011) and will try to comfort or alleviate others' distress (Vaish, Carpenter, & Tomasello, 2009; Zahn-Waxler, Radke-Yarrow, Wagner, & Chapman, 1992). Children may have believed the low-status individual was sad or upset at the difference in wealth or not getting attention in the prestige stories, and children may have been trying to alleviate this by giving more to the low-status individual. Anecdotally, children also mentioned they wanted to make children happy when giving the resources. Future studies can continue to investigate these possibilities.

Importantly, these findings of a dissociation between liking and allocation speak to the broader theoretical debate about what might or might not underlie social status judgments. While

a halo effect or simply mapping status onto goodness may explain preferences, the allocation responses suggest a general affective explanation or halo effect cannot explain this in full. Instead, children appear to have a more nuanced response to status. Further, this pair of findings demonstrate why it is critical for studies to examine multiple dependent variables.

***Do children treat social status dimensions similarly?***

An ongoing discussion in the literature is whether social status is a unified construct or whether different dimensions of status are distinct. Our data are more consistent with the possibility that children treat social status as a unitary construct, though of course more work in this area is needed. Overall, we found minimal differences in children's identification, no significant differences in children's preferences, and no significant differences in children's giving behavior across the four social status dimensions presented to children.

How might this unified concept of status work? One possibility is that children have a superordinate category or sense of social status as a larger construct. Perhaps when children identify that construct as relevant, they treat all examples of social status similarly. Consistent with this idea, other work has suggested that children link different status dimensions with one another. For example, 3- to 5-year-old children expect individuals who are physically dominant to have more resources than individuals who are not physically dominant (Charafeddine et al., 2015) and 17-month-old infants expect physically dominant people to get more resources (Enright et al., 2017). These findings could indicate that children see each of these status dimensions as related and perhaps indicative of a broader underlying status dimension, though importantly, as discussed above, they do not appear to be mapping status onto an even more general good-bad dimension.

It is also notable that children treated social status dimensions similarly for preferences and allocating resources, given that there is differential relevance of particular dependent variables to particular dimension. For example, resource allocation is directly relevant to some dimensions (e.g., wealth) but not necessarily others (e.g., prestige). That is, allocating a resource to someone who has few resources is a more obviously relevant action than allocating a resource to someone who is less popular. Similarly, one might assume that children would like prestigious individuals (i.e., they are by definition popular), but it is less clear why children might prefer a physically dominant person or a person who has decision-making power to their lower status peers. In fact, an adult might view the characters who are physically dominant as bullies or those with decision-making power in our stories as bossy or controlling. For these reasons, it is especially striking that children did not show any differences in their treatment of social status across these status dimensions.

Although our work leans toward children viewing status as a unified construct, it is also possible that it may be coincidental that children treated all dimensions similarly in this work. Perhaps children can and do make important distinctions, but these particular, fairly simple tasks did not tap into their differential reasoning about these dimensions or were not sensitive enough to detect differences. Research with adults suggests that adults differentiate between physical dominance and prestige and treat these forms of social status differently (Henrich & Gil-White, 2001). Specifically, this work argues that adults will preferentially imitate, approach, and stare at high-status prestigious individuals, whereas this is not the case for high-status physically dominant individuals. In contrast, they give physically dominant individuals “furtive glances” and do not choose to approach physically dominant individuals or imitate them when they are not in the physically dominant individual’s pretense. Future work might benefit from testing

theories that predict differences by selecting dependent variables specific to these theories (e.g., testing children's approach and imitation of prestigious and physically dominant people). For now, it remains an open question whether children will treat different dimensions of social status differently or the same.

***Are there age-related changes in the preschool years in children's understanding of social status and use of status in social judgements?***

Overall, we found limited age differences in children's understanding of status and use of status in social judgments during the preschool years. It is possible that age changes would be more apparent if we used a simpler design and could examine children's identification of status or preferences before their third birthday.

The only systematic age-related change we did find was in preschoolers' allocation of resources based on social status. Five- and six-year-old children allocated more resources to low-status people whereas 3- and 4-year-old children were at chance.

The outstanding question is *why* do we see these age-related changes in allocation behavior based on status? One possibility is that older children have learned a fairness principle about social status (i.e., they should try to use resources to make things more fair), whereas younger children are split on whether they view high-status people as "better" or "good" versus have this fairness principle and the two subgroups cancel one another out. Another possibility is that empathy could be driving children's allocation of resources to low-status people. Past work has suggested that with age, children develop a better understanding of others' emotions and are able to take others' perspectives (Bork, 1973; Ricard & Kamberk-Kilicci, 1995). Future work, for example, could intentionally include children from families who emphasize different norms, which could help us understand why we see this age-related change.

### *Limitations*

A difference between these studies and everyday life is how much attention was drawn to social status. Within our studies, we held all other factors constant, thereby drawing attention to targets' disparities in social status. In everyday life, children are likely considering many factors in combination with social status. For example, when choosing to give to or share with others, children could be considering whether the other person is their friend (Paulus, 2016; Moore, 2009), a member of their group (Fehr, Bernhard, Rockenbach, 2008; Yu, Zhu, & Leslie, 2016), and a prosocial person who could or has reciprocated (Olson & Spelke, 2008; Warneken & Tomasello, 2013), among many other factors. Since we stripped down the study to only investigate social status' effects on giving and preferences, we may have exacerbated the effects more than we would find in everyday life.

Alternatively, we may have underestimated the size of these effects because each manipulation was only a two-sentence story. Perhaps in real life, when these differences occur the effects would be bigger. For example, a child might see a rich peer with many cool toys, clothes, and other resources every day at school. Further, these factors may compound in real life such that people who are wealthy or dominant might also get to make more decisions and have more people look up to them. As a result, children may see even more social status cues to draw upon. Because these lab effects could either over or underestimate the effects in an ecologically valid context, one must be careful in generalizing these findings. These findings should instead be taken as evidence that children *can* draw distinctions based on status and *can* use these distinctions to inform their attitudes and behaviors.

It is also important to consider the sample when drawing conclusions. Participants in the current sample were primarily white and high SES. It is unclear if these findings would

generalize to all 3- to 6-year-olds. This concern is particularly important because children's own status could impact their understanding, preferences, and giving based on status. However, while participants in these studies were overwhelmingly high in wealth, one can assume that they might vary on some of the other dimensions (e.g., prestige). That children in these studies treated the dimension of relevance to them (wealth) similarly to other dimensions, it is unclear if one's own status does or does not impact responding. Certainly, more work in this area would be useful.

### *Conclusions*

Understanding early recognition of social status and how it impacts children's preferences and giving behavior is important for determining whether, how, and why social hierarchies are reinforced or dismantled, how individuals who are high- and low- in status are treated, and for understanding the origins and development of intragroup relations. Our findings illustrated that by the preschool and early primary school years, young children recognize many forms of social status, prefer high-status individuals, and with age, will give resources to low-status individuals. Additionally, this work suggests that, at least for identification, preferences, and allocating resources, there are minimal differences between social status dimensions in the preschool years.

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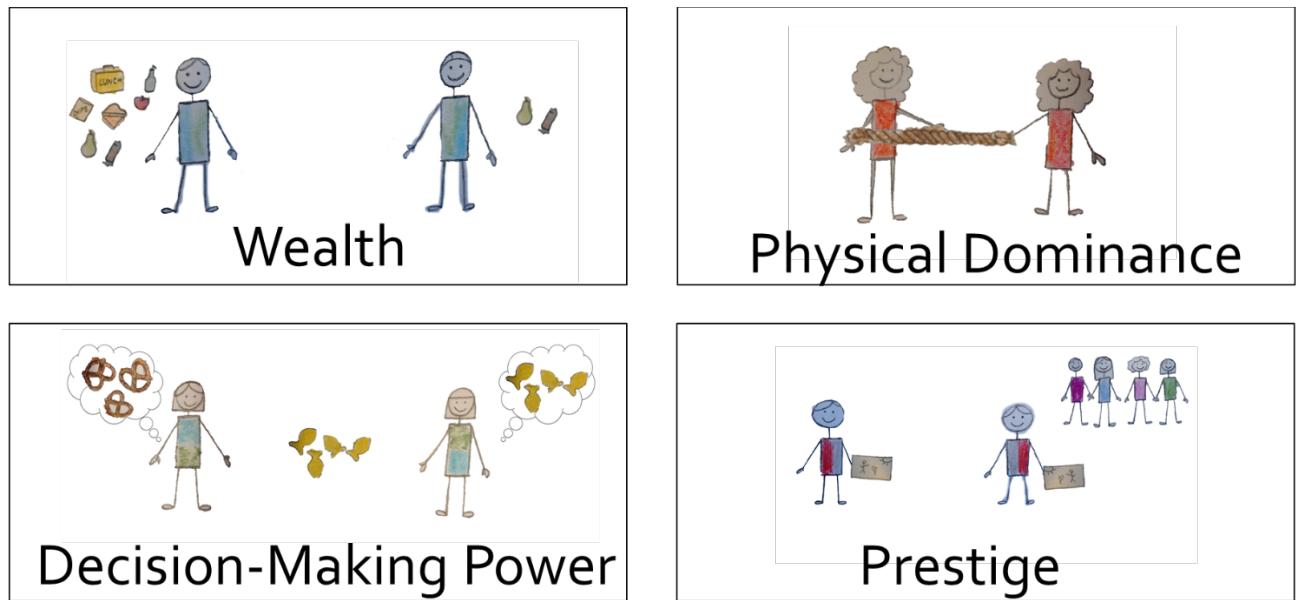
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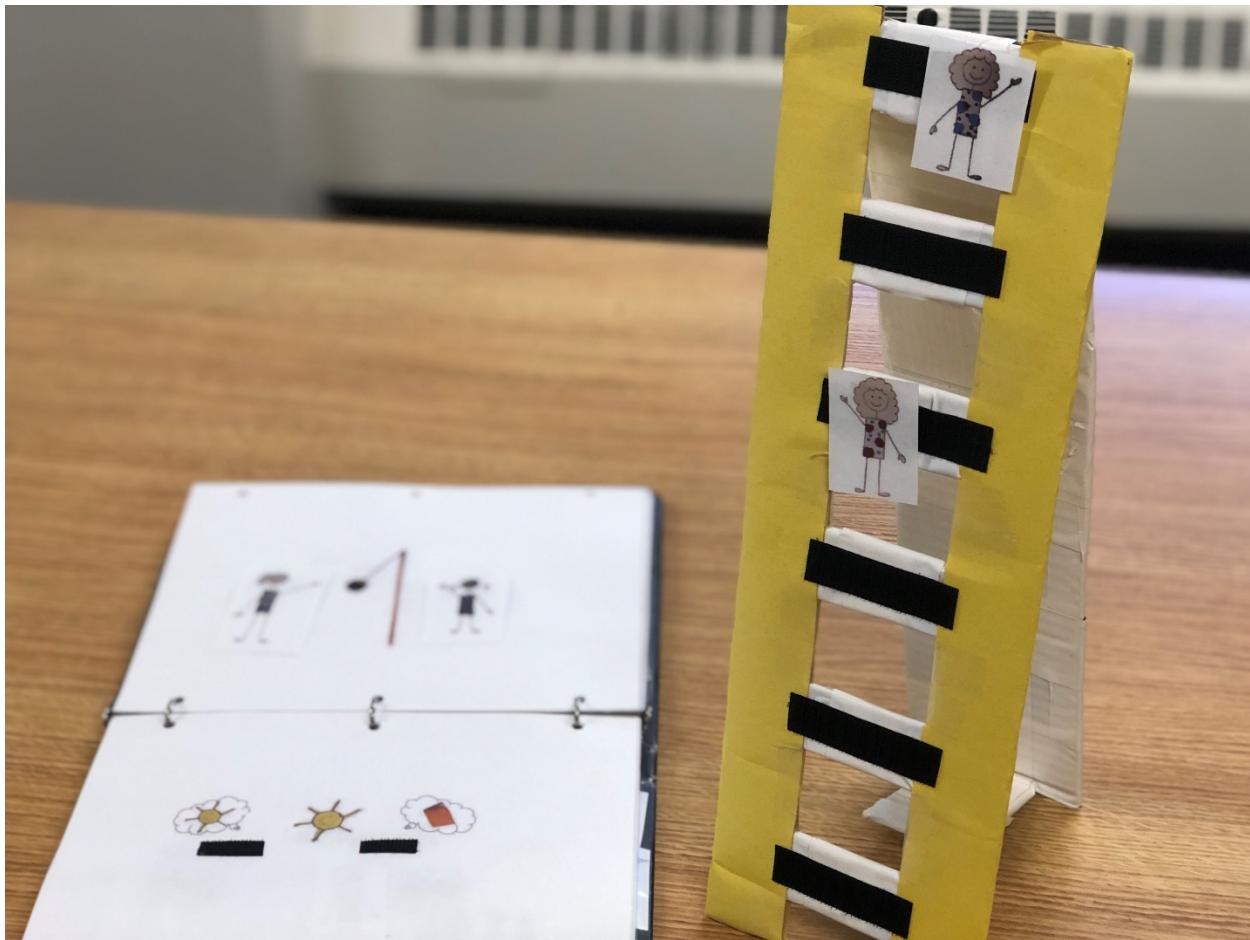
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*Figure 1.* Example of what stimuli looked like in the five studies. Note that the characters in the vignettes were gender-matched to participants' gender. For each of the 16 vignettes, unique corresponding pictures were displayed.



*Figure 2.* Example of the ladder in Study 2. Children saw that there were six rungs on the ladder and could Velcro characters from the vignettes onto different rungs of the ladder.

**Children's Understanding and Use of Four Dimensions of Social Status: Supplement**

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### **Pilot Study**

Before beginning the main set of studies, we conducted a small pilot study ( $N = 30$ , 10 children per age group) to assure that 3-, 4- and 5-year-old children ( $M = 53.0$  months,  $SD = 9.8$  months, 20 male) understood the key dimensions of social status that we aimed to assess in our work (wealth, physical dominance, decision-making power, and prestige). In the pilot study, 20 vignettes were presented to 3-, 4- and 5-year-old children. Each vignette involved reading a short story with corresponding pictures of one high-status individual and one low-status individual. For the wealth vignettes, children were asked “Who has more and better stuff?”, in the physical dominance vignettes children were asked “Who is bigger and stronger?”, in the decision-making power vignettes children were asked “Who gets to decide what to do and eat?”, and in the prestige vignettes children were asked “Who do people pay attention to and follow?”. Five vignettes were pilot tested for each of the four dimensions, and the four vignettes with the highest agreement were used in Study 1. Overall, children correctly answered the pilot questions the majority of the time in accordance with their design (for the four vignettes used in each dimension: 91% correct for wealth, 92% correct for physical dominance, 71% correct for decision-making power, and 76% correct for prestige).

### **The 16 Vignettes Used in Studies 1-5**

\*Note that the gender of the children in the story was matched to participant gender, and there were four different counterbalance orders.

#### **Wealth Vignettes**

- This is Jessica. This is Rebecca. Jessica has lots of things. Jessica has lots of toys to play with, food to eat, and a place to live. Rebecca does not have very many things. Rebecca only has one toy, does not have a lot of food to eat, and does not have a place to live.
- This is Clarissa. This is Kristin. Clarissa only has one shirt and one pair of pants and she doesn't have many toys. Kristin has new clothes every month and she always has the newest toy.
- This is Emily. This is Amy. Emily goes on vacation with her family every month to a new place, where they get to do a lot of fun activities. Last spring break they went to Disneyworld. Amy and her family don't go on vacation because her parents have to work all the time. Last spring break Amy stayed home and watched tv.
- This is Karen. This is Lydia. Karen has a lot of food to eat and brings her own food to school. Karen has lots of snacks and never goes hungry. Lydia doesn't have a lot of food to eat outside of school food. Lydia does not have snacks to bring to school and is often hungry.

#### **Physical Dominance Vignettes**

- This is Zoe. This is Sydney. Zoe is stronger than Sydney. Zoe and Sydney like to play tug of war and try to get the rope closest to them. Since Zoe is stronger, she always wins and gets the rope.

- This is Mariah. This is Kate. Both Mariah and Kate are playing tetherball. Mariah is bigger and stronger than Kate. Because Mariah is bigger, she can grab the ball and always wins the game.
- This is Beth. This is Grace. Grace is taller than Beth. Both Beth and Grace really wanted to read a book on a tall shelf and tried to get it. Because Grace is taller, she was able to grab the book and read it. Beth didn't get to read the book.
- This is Rachel. This is Anna. Rachel and Anna are playing a game of basketball. Rachel is short and weak. Anna is tall and strong. Since Anna is tall and strong she can always block Rachel from making baskets and always wins the game.

### **Decision-Making Power Vignettes**

- This is Lucy. This is Diana. Lucy and Diana like to play games. Lucy wanted to play hide and go seek and Diana wanted to play tag. They talked about it and decided to play hide and go seek like Lucy wanted. On another day they wanted a snack and Lucy wanted pretzels, but Diana wanted goldfish. They talked it over and decided to eat pretzels like Lucy wanted.
- This is Sandra. This is Carrie. Sandra doesn't get to choose what she'll play because Carrie always decides for her. Carrie always gets to decide what games people will play during playtime, and Carrie always wants to play catch. Sandra and Carrie play catch.
- This is Cassandra. This is Maddy. Cassandra wanted to go outside and play tag. Maddy wanted to stay inside and read a book. Maddy asked Cassandra if they could read books, but Cassandra said they were playing tag. Both Cassandra and Maddy played tag because Cassandra said so.

- This is Tara. This is Helen. Tara and Helen wanted to eat a snack. Tara wanted chips, but Helen wanted to eat Oreos. Tara doesn't get to choose what to eat because Helen always decides. Since Helen wanted oreos, Tara and Helen ate oreos.

### **Prestige Vignettes**

- This is Debbie. This is Mackenzie. Both Debbie and Mackenzie sometimes draw pictures. Almost no one watches Debbie draw or looks at Debbie's pictures. Lots of people watch Mackenzie draw pictures and look at her pictures. Debbie and Mackenzie also like to build with blocks. No one watches Debbie build with blocks, but lots of people watch Mackenzie build with blocks.
- This is April. This is Stacey. April told everyone apples were better than oranges, and other kids now prefer to eat apples. Stacey told everyone that oranges were better than apples, but no one started eating oranges. April also told everyone that goldfish was better than pretzels, but Stacey told everyone that pretzels were better than goldfish. Everyone decided to eat goldfish like April said.
- This is Paige. This is Courtney. Paige used the paper cone as a nose, but no one saw Paige because they were only watching Courtney. Courtney used a paper cone as a hat, and other kids started watching her play with the paper cone. Because Courtney used it as a hat, other kids decided to use the paper cone as a hat. None of the kids used the paper cone as a nose.
- This is Claire. This is Hailey. Claire and Hailey like to read books out loud. Both Claire and Hailey told their class that they were going to read a book. No one listened to Claire read out loud. Lots of people went to listen to Hailey read out loud.

### Study 1: Additional Analyses

#### Original Pre-Registered Analyses Replaced by GEEs in the Manuscript

*Do children map wealth, physical dominance, decision-making power, and prestige onto social status?* To determine whether it is easier for children to identify some social status dimensions over others, we pre-registered that we would run a repeated-measures ANOVA comparing the number of times children identified the high-status person as in-charge across the four status dimensions. In agreement with the GEE reported in the manuscript, there was no difference in children's identification of high-status people based on status dimension,  $F(3, 141) = .84, p = .48, \eta^2 = .02$ .

We also pre-registered that we would investigate whether children were better at identifying status with age. Across all four dimensions, age was only correlated with identifying who was in-charge in the wealth vignettes,  $r(47) = .29, p = .048$ . Age was not correlated with performance on physical dominance,  $r(47) = .08, p = .57$ , decision-making power,  $r(47) = .15, p = .31$ , and prestige vignettes,  $r(47) = .10, p = .49$ . Additionally, when the four status dimensions were pooled together, children did not identify who was in-charge more (or less) as they got older,  $r(47) = .19, p = .20$ . Note that this is different than the GEE analysis in the manuscript which found that age in months was a significant predictor of children's identification of high-status people overall.

*Do children have preferences for people based on status?* To determine whether children's preferences for high- versus low-status people differed based on status dimension, we pre-registered that we would run a repeated-measures ANOVA comparing the number of times children said they preferred the high-status person across the four status dimensions. Children

did not hold different preferences based on the social status dimension,  $F(3,141) = .70, p = .55$ ,  $\eta^2 = .02$  as we also found in the GEE.

We also pre-registered that we would run correlations between age in months and children's preferences for high-status people broken down for the four social status dimensions. Consistent with the GEE, we found that across all four dimensions of status, age was not significantly related to preferences: wealth,  $r(47) = .01, p = .94$ , physical dominance,  $r(47) = -.07, p = .62$ , decision-making power,  $r(47) = .04, p = .81$ , and prestige,  $r(47) = -.002, p = .99$ . Additionally, when pooling all four status dimensions together, age was not related to liking based on status,  $r(47) = -.01, p = .94$ .

### **Additional Analyses of Order Effects**

*Order Effects for the Identification of Status.* The GEE reported in the manuscript did find an order effect such that children who were first asked, "who is in-charge" identified high-status characters as in-charge more than children who were first asked, "who do you like best" and then asked to identify who is in-charge. However, when running an ANOVA, there was no significant order effect for identifying high-status individuals,  $F(1,46) = 3.20 p = .080, \eta^2 = .07$ .

As mentioned in the manuscript, overall children identified high-status people as in-charge regardless of whether this question first or second. We also found that children identified high-status people as in-charge at rates greater than chance for each of the four dimensions, regardless of question order. Children who were asked "who is in-charge" first identified the high-status person as in charge in all four dimensions: wealth ( $t(22) = 6.42, p < .001, d = 1.34$ ), physical dominance ( $t(22) = 8.16, p < .001, d = 1.70$ ), decision-making power ( $t(22) = 10.66, p < .001, d = 2.22$ ), and prestige ( $t(22) = 5.01, p < .001, d = 1.04$ ). This is also true for children who were asked "who is in-charge" second: wealth ( $t(24) = 2.85, p = .009, d = .57$ ), physical

dominance ( $t(24) = 3.67, p = .001, d = .73$ ), decision-making power ( $t(24) = 3.58, p = .002, d = .72$ ), and prestige ( $t(24) = 3.23, p = .004, d = .65$ ).

*Order Effects for Preferences Based on Status.* The GEE reported in the manuscript also found an order effect for children's preferences based on status. Children who were first asked "who do you like best" *had* preferences for high-status over low-status people, but children who were first asked "who is in-charge" and then asked who they liked best had no preference for high- or low-status people. An ANOVA was consistent with the GEE finding that counterbalance order significantly influenced whether children said they preferred the high- versus low-status character overall,  $F(1,46) = 5.71, p = .021, \eta^2 = .11$ .

Additionally, the same pattern of results was found when analyzing the data separately by dimension. Children who were first asked, "who is in-charge" before being asked, "who do you like best", had no preferences for high- or low-status people across the four status dimensions: wealth ( $t(22) = .17, p = .87, d = .04$ ), physical dominance ( $t(22) = .74, p = .47, d = .15$ ), decision-making power ( $t(22) = 1.32, p = .20, d = .27$ ), and prestige ( $t(22) = .47, p = .64, d = .10$ ). However, children who were asked "who do you like best" first did prefer high-status over low-status people across the board: wealth dimension ( $t(24) = 2.22, p = .036, d = .44$ ), physical dominance dimension ( $t(24) = 2.37, p = .026, d = .47$ ), decision-making power dimension ( $t(24) = 2.58, p = .016, d = .52$ ), and prestige dimension ( $t(24) = 2.28, p = .032, d = .46$ ).

**Study 3: Additional Analyses****Original Pre-Registered Analyses Replaced by GEEs in the Manuscript**

*Do children systematically give to high- or low-status individuals?* To assess whether children gave differently depending on the status dimension, a repeated-measures ANOVA across dimensions (wealth, physical dominance, decision-making power, and prestige) was conducted, finding no differences across status dimensions,  $F(3, 147) = .81, p = .49, \eta^2 = .02$ .

### Study 4: Additional Analyses

#### Original Pre-Registered Analyses Replaced by GEEs in the Manuscript

*Do five- and six-year-olds systematically prefer high-status people?* To determine whether children preferred the high- or low-status individuals overall, we added up the total number of times across dimensions (out of 16) that children liked the high-status individual best. Thus, children received a score from 0 to 16. We compared children's scores to chance responding ( $M = 8$ ) with a one-sample  $t$ -test, consistent with our pre-registration. Overall, children preferred the high-status individual significantly above chance ( $M = 10.77$ ,  $SD = 3.33$ ),  $t(47) = 5.77$ ,  $p < .001$ ,  $d = .83$ .

A repeated-measures ANOVA across dimensions (wealth, physical dominance, decision-making power, and prestige) indicated no differences across status dimensions,  $F(3, 141) = 1.90$ ,  $p = .13$ ,  $\eta^2 = .04$  consistent with the GEE reported in the manuscript. Also consistent with the GEE, a correlation between age in months and total preference for high-status individuals indicated that age was not related to children's preferences  $r(47) = -.08$ ,  $p = .59$ . When we separated participants by age, both 5-year-olds ( $M = 10.96$ ,  $SD = 3.03$ ),  $t(23) = 4.79$ ,  $p < .001$ ,  $d = .98$ , and 6-year-olds significantly preferred high-status individuals above chance ( $M = 10.58$ ,  $SD = 3.66$ ),  $t(23) = 3.46$ ,  $p = .002$ ,  $d = .71$ .

*Do five- and six-year-olds systematically give to low-status people?* To determine whether children systematically gave to the high- or low-status individuals overall, we added up the number of times across dimensions (out of 16) children gave to the high-status individual. Thus, children received a score from 0 to 16. We compared children's scores to chance responding ( $M = 8$ ) with a one-sample  $t$ -test consistent with our pre-registration. Overall,

children systematically gave less to high-status individuals ( $M = 4.71$ ,  $SD = 4.90$ ),  $t(47) = 4.66$ ,  $p < .001$ ,  $d = .67$ .

A repeated-measures ANOVA across dimensions (wealth, physical dominance, decision-making power, and prestige) indicated no differences across dimensions,  $F(3, 141) = 1.22$ ,  $p = .31$ ,  $\eta^2 = .03$  consistent with the GEE reported in the manuscript. Also consistent with the GEE, a correlation between age in months and total distribution of resources to high-status individuals indicated that age was significantly related to children's resource decisions,  $r(47) = -.35$ ,  $p = .015$ . Overall, five-year-olds did not differentially give to high- versus low-status individuals ( $M = 6.08$ ,  $SD = 5.47$ ),  $t(23) = 1.72$ ,  $p = .099$ ,  $d = .35$ , but six-year-olds were less likely than chance to give resources to high-status individuals ( $M = 3.33$ ,  $SD = 3.90$ ),  $t(23) = 5.87$ ,  $p < .001$ ,  $d = 1.20$ .