Children expect leaders to oust intruders, refrain from unprovoked aggression, but not to be
generally prosocial

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Research Highlights:

- Children have expectations about how high-ranking individuals will treat low-ranking individuals.
- 3- to 5-year-old children do not expect high-ranking individuals to commit unprovoked acts of aggression.
- 6- to 8-year-old children expect high-ranking individuals to be less likely to commit unprovoked acts of aggression.
- Children of all ages expect leaders to provide at least one benefit: protection from hostile outsiders

Abstract

Humans in every society encounter social hierarchies. Previous research has shown that children use various cues to say who is, “in charge”. In the present studies we ask how children think those who are in charge treat others. In Studies 1 and 2, children heard stories and saw drawings of social groups where one character wore a crown and sat on a throne (Study 1) or just wore a crown (Study 2) and three other characters stood alongside with no special clothing or markings. The children were told about an action, and then had to guess who had done it. When asked who pushed someone down, most 6- to 8-year-old children guessed that one of the uncrowned characters had done the pushing, while 3- to 5-year-old children seemed to consider the crowned and uncrowned characters equally likely to push someone. When asked who kicked out a hostile intruder, children of all ages chose the crowned character more often than an uncrowned character. Study 3 asked whether children expect crowned characters to put themselves in harm’s way to protect uncrowned characters and whether they expect crowned characters to be actively prosocial. Here, neither the older nor the younger children expected the crowned characters to put themselves in harm’s way to protect the others, and they thought the crowned character was less likely than others to perform prosocial actions such as helping someone up or sharing a cookie. These data suggest that children expect leaders, at least in this context, to provide specific benefits such as expelling hostile intruders, but not to be more prosocial than other people overall. These data are consistent with the hypothesis that children use inferences about social roles to predict people’s behavior.

Key Words: social hierarchy; social development; prestige; dominance

Humans across societies and in many different social settings find themselves in social hierarchies (Fiske, 1992; Boehm, 1999). In order to navigate hierarchies, humans must be able to recognize relative social rank and use information about rank to predict people's behavior (Kaufmann & Clément, 2014). In practice, social rank can be grounded in different systems, broadly referred to as dominance hierarchies or prestige-based hierarchies (Fiske, 1992; Henrich & Gil-White, 2001). Hierarchies are referred to as dominance hierarchies when high-ranking people are deferred to because they are perceived to be more dangerous than others (e.g., stronger or more aggressive; Pratto et al., 1994; van Vugt & Tybur, 2014). For example, a stronger sibling might maintain control over the television because their weaker sibling does not want to risk getting hurt in a fight for the remote. This form of hierarchy occurs not only in humans but also in many other species where rank is a function of an individual's potential to inflict harm on others (Boehm, 1999; Cummins, 2005; Huntingford, 2013; Smith & Price, 1973; van Vugt & Tybur, 2014). Dominant individuals in both human hierarchies and hierarchies in other species often maintain their rank through threat of violence. For example, in some non-human primate species, high-ranking individuals act like school-yard bullies, committing unprovoked acts of aggression which helps them maintain their social rank (Silk, 2002).

Hierarchies are referred to as prestige-based hierarchies when people are deferred to because others perceive them as able and willing to provide benefits such as knowledge, material resources or protection (e.g., Cheng & Tracy, 2014). People who hold high rank through prestige are often held to a higher standard of behavior than low-ranking people. For example, in societies that rely on hunting for food, the best hunters often enjoy more decision-making power. However, to maintain this status, the best hunters must also provide benefits by sharing most or all their meat with lower-status people (von Rueden et al., 2014). Of course, dominance and prestige cannot always be clearly distinguished. Take, for example, the relationship between an employer and an employee. While the employee may perceive their boss as someone who provides benefits in the form of guidance and resources, the employer can inflict harm on the employee by taking away income or opportunities. Because each person's rank is defined in relation to other people, the ultimate determinants of 'dominance' and 'prestige' are the perceptions of the lower-ranking people in the relationship and their expectations about how the higher-ranking people will treat them.

Both dominant and prestigious individuals are often seen as stronger than others, but prestigious people are expected to use their strength for their group's good, such as to protect subordinates or enforce rules (Fiske, 1992; Fiske & Rai, 2014). In contrast, dominant individuals are expected to use their strength to get what they want. The actions of dominant and prestigious individuals' also influence perceptions of them: A dominant individual who is especially aggressive may instill fear in subordinates, whereas a prestigious individual who is notably non-aggressive may instill trust in subordinates (Fiske, 1992; Fiske & Rai, 2014).

In the current study, we ask whether children (visitors to a science museum in Southern California), have expectations about how high-ranking individuals (hereafter, 'leaders'¹) will treat other individuals. While much prior work in developmental psychology has focused on how children understand others in terms of their traits (e.g., Heyman & Gelman, 1998; Hamlin & Steckler, 2015) or group membership (e.g., Dunham, 2018; Gelman & Taylor, 2000), less work has focused on children's understanding of relationships (see, for example, Afshordi & Liberman, 2020; Olson & Spelke, 2008), including whether they use existing relationships to predict behavior. Thus, the first question the current studies set out to test is whether children use an existing hierarchical relationship to predict behavior. Second, these studies investigate whether children expect leaders to act in ways that agree more with dominance or prestige-based hierarchies. That is, without information about whether a high-ranking person is high-ranking because of dominance or prestige, would children nonetheless expect them to act more in line with one of these models? Thus, the actions we use in the current study were chosen with the distinction between dominance and prestige in mind, however as noted above, these types of social rank cannot always be cleanly distinguished. In line with prestige-based hierarchies we specifically ask, do children expect leaders to provide certain benefits? If so, what types of benefits? In line with dominance-based hierarchies, we ask, do they expect leaders to be responsible for unprovoked aggression? These studies can shed light on whether children are biased to see leaders, at least in this context, in line with one of these two models.

These questions build on previous work asking whether infants and children identify leaders given commonly recognized cues of social rank. Infants are sensitive to cues that relate to

¹ The scholarly literature includes many different terms for high- and low-ranking individuals. Here we use 'leader' for ease of reading. We do not mean leader to be a person who influences a group, as the term has sometimes been used elsewhere (Van Vugt, Smith 2019) here we use it as a shorthand for 'high-ranking individual'.

dominance, such as physical size and coalition size (Pun et al., 2016; Thomsen et al., 2011; Thomsen & Carey, 2013). These dominance cues also influence infants' social evaluations: Infants avoid those who win zero-sum conflicts, suggesting that they may see 'winners' as dominant and thus threatening (Thomas & Sarnecka, 2019). Older children are sensitive to dominance cues as well. They use these cues to decide who is in charge. For example, when children ages 5 and 6 years are shown pictures of two people—one in a dominant posture with hands on hips and chest puffed out, the other in a submissive posture with shoulders rolled forward and hands in front of them—most children say the person with the dominant posture as being 'in charge' (Brey & Shutts, 2015). Related to the current question are studies suggesting that children may associate those who are in charge with antisocial actions. In these studies, children were told about an interaction that included a cue of social rank (e.g., giving permission). Children more consistently identified the high-ranking character when the interaction was bad for the subordinate (e.g., the subordinate asked if they could play, and the high-ranking character said no) than when it benefitted the subordinate (e.g., the subordinate asked if they could play, and the high-ranking character said yes; Gülgöz & Gelman, 2016). Similarly, three to five year-olds also say that a person is 'the boss' if they are stronger, have more resources, or win a conflict, all of which may benefit 'the boss' (Charafeddine et al., 2014).

These studies show that children make inferences about who is in charge. They also suggest that children may think leaders are those who benefit from interactions as opposed to those who provide benefits. In other work, children distinguish dominance from prestige (or at least distinguish aggression from dominance) from a young age. For example, toddlers ages 21 to 31 months prefer those who are deferred to in zero-sum conflicts, but not those who use force to win (Thomas et al., 2018). Toddlers of the same age expect subordinates to follow the directions of absent leaders who were deferred to, but not those who used aggression to impose their will (Margoni et al., 2018). Moreover, infants expect leaders to intervene when one subordinate does something antisocial to another (Stavans & Baillargeon, 2019). Interestingly, older children do not seem to distinguish dominance from prestige in their preferences and resource allocations (Enright et al., 2020). Here we ask whether children expect high-ranking individuals to either provide benefits to others (consistent with prestige-based ranking) or to commit aggression toward others (consistent with dominance-based ranking).

One reason to think that children may expect leaders will provide benefits is that children do expect high-ranking people to provide at least one benefit--information. When a high-ranking person and a low-ranking person disagree about the name of a novel object, children endorse the high-ranking person's opinion (Bernard et al., 2016). However, it is not yet known whether children have general expectations about how high-ranking individuals will treat subordinates, including whether they expect them to be more or less likely to commit unprovoked acts of aggression, whether they expect leaders to provide benefits, and if so, what those benefits might be.

We start by asking the following questions: Do children expect leaders to commit unprovoked acts of aggression? Do children expect leaders to provide protection? Broadly, these studies address the question of whether children expect leaders to use their social status for the benefit of others or to their detriment. All studies were approved by the UC Irvine IRB; protocol number #2013-9945; Titled *Concepts of Social Relationships*. All participants were recruited from a museum in Orange County in Southern California, USA.

Study 1

Method

Participants

In Study 1, we tested 195 children between the ages of 3 and 9 years old who were visitors to a children's museum in Orange County, Southern California. Of these, we excluded data from 12 children who did not answer one or more of the main test questions (e.g., "*Who is in charge*"; "*Who pushed someone down*"; and "*Who kicked someone out*"). Data from 7 other children were excluded because of interference from another child or parent, or because they had seen another child do the experiment before doing it themselves. These criteria were decided ahead of data collection.

This left 176 children in the sample (93 boys, 83 girls, by parental report). This sample included 19 three-year-olds, 32 four-year-olds, 44 five-year-olds, 34 six-year-olds, 29 seven-year-olds, 15 eight-year-olds, and 3 nine-year-olds. Our recruitment goal, decided before testing began, was to test at least 30 children each at ages four, five, six, and seven. Because we recruited participants at a museum, some three-, eight- and nine-year-olds also joined the study, but the sample sizes are smaller for those groups.

Table 1. Parent's response when asked about child's racial background

Racial Background	Frequenc y	Percent	Valid Percent
Asian	38	21.591	38.384
Asian, Black/African American	1	0.568	1.010
Asian, white	9	5.114	9.091
Black, Native American	1	0.568	1.010
Black, Native American, white	1	0.568	1.010
Black/African American	5	2.841	5.051
Black/African American, white	3	1.705	3.030
Native Hawaiian/Pacific Islander	2	1.136	2.020
white	38	21.591	38.384
white, Native Hawaiian/Other Pacific Islander	1	0.568	1.010
No response	77	43.750	
Total	176	100.000	

Table 2. Parent's response when asked about child's ethnic background

Ethnic Background	Frequenc y	Percent	Valid Percent
Another Hispanic, Latino, or Spanish Origin	2	1.136	2.222
Asian	1	0.568	1.111
Cambodian-Chinese	1	0.568	1.111
Central American	1	0.568	1.111
Colombian	1	0.568	1.111
Mexican/ Mexican-American/ Chicano	27	15.341	30.000

Mexican/ Mexican-American/ Chicano; Another Hispanic, Latino, or Spanish Origin	2	1.136	2.222
Mexican/ Mexican-American/ Chicano; Peruvian	2	1.136	1.111
Mexican/ Mexican-American/ Chicano; Puerto Rican	2	1.136	2.222
Mexican/Mexican-American/Chicano; Guatemalan	1	0.568	1.111
Not Hispanic/Latino	45	25.568	50.000
Pakistan Origin	1	0.568	1.111
Peruvian	1	0.568	1.111
Spanish	3	1.705	3.333
No response	86	48.864	
		100.00	
Total	176		0

Materials

Children saw a series of illustrations depicting human characters wearing colored t-shirts. The characters were designed to prevent inferences about race or gender. Each group was introduced with a novel name, e.g., ‘the Wugs’. In the illustration we used to introduce each group there was one leader – a character sitting on a throne wearing a crown, and three non-crowned characters. We illustrated the leader this way because sitting higher than others or wearing something to make oneself appear larger or brighter is a common cue of high rank across cultures (see Fiske, 1992 for review). During pilot-testing, children consistently identified the crowned, throned character as the “leader.”

Illustrations accompanied the spoken stories. For example, the story about pushing featured an illustration of two arms in a t-shirt, pushing a character down. All the illustrations with the critical action were designed to avoid giving hints about the identity of the character doing the action. (See Figure 1 for an example and see <https://osf.io/4vezr/> for all illustrations used in the study.)

Procedure

Participants were recruited from among the visitors to a children's museum during regular business hours. Experimenters approached parents on the museum floor and invited them to participate if their child was in the target age range. Parents filled out a consent form while the experimenter interacted with the child before leading them into the testing room. Before entering the testing room, parents were briefed about the procedure and asked to sit outside the testing room. The testing room had clear glass doors so that parents could watch the procedure without distracting the children or affecting their answers.

The participating child sat across from the experimenter. Before the experiment began, the experimenter introduced herself and said, "I'm going to tell you some stories and ask you some questions, ok?" Then the experimenter presented the stories in an order that was randomized by shuffling the packs of story cards. (The text of all stories is available at <https://osf.io/4vezr/>)

Each story began by describing a pair of novel groups (e.g., "*These are the Zazzos and these are the Rookas*"). All the stories included two groups because one story talked about the leader ousting an intruder from another group (see below). We introduced two groups in all conditions for consistency. In the illustrations accompanying the stories, each group wore shirts of a single color (See Figure 1). One character in each group was drawn wearing a crown and sitting on a throne. We did not explicitly label this character for the children, but for ease of reference we will hereafter refer to this character as 'the leader.' In Study 1, children heard four stories. Two stories described someone pushing another character down—in Story 1a, an in-group character pushed another in-group character down ("*Uh oh, one of the Wugs pushed another Wug down!*") We used in-group aggression because in dominance-based hierarchies, dominant individuals often use unprovoked aggression toward in-group members to maintain rank. In Story 1b, an out-group character pushed an in-group character down, and was ousted from the group's territory ("*Uh oh, A Wug came and pushed one of the Flurps down! Look! The Wug is leaving, he got kicked out.*") Here we used out-group aggression as a relatively straightforward case of protection. The other two stories involved a character stealing a cookie: In Story 1c, an in-group character stole a cookie from another in-group character ("*Uh oh, one of the Koopas stole another Koopa's cookie!*"). We used an in-group transgression because high-ranking individuals often control resources in dominance-based hierarchies. In Story 1d, an out-

group character stole the cookie of an in-group character and was ousted from the group's territory (*"Uh oh, a Koopa came and stole a cookie from one of the Zazzos. Look! The Koopa is leaving, he got kicked out."*) At the end of each story, we asked the children to point at the character who they thought did the action. Children's answers were coded as 'leader' if they chose the character wearing the crown, and 'subordinate' if they chose one of the other two characters. Children's choices were recorded with pen and paper by the experimenter administering the study, as well as by a second experimenter who was observing and recording the session on video. They compared their recorded answers at the end of each session. If their answers disagreed, a third experimenter decided the answer based on the video recording.

After the test trials came several control questions. We showed children an illustration of a new, novel group with four characters and asked (1) *"Who is in charge?"* (2) *"Who do you think is the nicest?"* and (3) *"Who would you most want to be friends with?"* The first question served as a manipulation check, to confirm that children saw the crowned character as a leader. The second and third questions checked whether children had an overall bias for or against choosing the leader.

Analysis Approach

We analyzed the data using the 'brms' and 'BayesFactor' packages in R (Bürkner, 2017; Morey et al., 2014; R Core Team, 2017). When considering whether children chose the leader more or less often than the other characters, we used the function 'ProportionBF' in the Bayes Factor package to compare the likelihood of the data given the null hypothesis, which was that children chose each character (Leader, Subordinate #1 and Subordinate #2) at the same rate, against the alternative hypothesis that children chose the leader more or less often than the other characters. For the questions that came after the stories about a target action (e.g., 'pushing'), chance was $\frac{1}{3}$ because children chose among three characters (one leader and two subordinates). For the control questions, chance was $\frac{1}{4}$ because children were choosing among four characters (one leader and three subordinates). We used default priors and these choices were decided before analysis was carried out. For ease of comparison with other published studies, we also use frequentist tests, using `binom.test` in R to do frequentist binomial tests.

We used `brms` to test whether a child's age and gender predicted their answers to the questions that came at the end of each story. Based on pilot data we decided to split children into

two age groups. For alternative analyses treating age as a continuous variable, see SM. For each of the main test questions, we asked whether age (in two categories: 3- to 5- year-olds and 6- to 8-year-olds) and gender (as reported by the child's parent), predicted children's answers to the dependent measure questions. To do this, we used the R package *brms* (Bürkner, 2017) in R (R Core Team, 2017) to fit Bernoulli Bayesian regression models with age group and gender as factors. We did not include interactions in the model and did not have random factors. We used default priors and used 6 sampling chains for 5000 iterations with a warm-up period of 1000 iterations. In cases where we found evidence that children in the two age groups answered the questions differently, we report the answers from children in the two age groups separately. See supplemental materials for results broken down by age group and gender for all dependent variables. This analysis was pre-registered (<https://osf.io/p8q7g>), but only after we conducted a different analysis: During the review process, we realized our original analyses were flawed, and the authors had since taken up the practice of pre-registering all their analyses and studies.

Following recommendations by Kass & Raftery, 1995, we consider Bayes Factors of over 10 as strong evidence, over 30 as very strong evidence, and over 100 as decisive evidence, Bayes Factors between 3 and 10 are considered moderate, and Bayes Factors between 1/3 and 3 are considered weak, inconclusive, or anecdotal. All data and R scripts can be found on the open science framework. In these analyses, we include all children who answered the questions in the analysis but see SM for analyses that only include children that answered, "*Who is in charge?*" correctly.

Results and Discussion

Story 1a. "Who pushed someone down?"

When asked which in-group character pushed another in-group character down, children chose the subordinates more often than the leader. Of the 176 children tested in Study 1, only 38 (21.59%) guessed that the leader (i.e., the crowned figure) pushed someone down, as opposed to the other two characters (BF=58.26 in favor of the alt. hypothesis that the children chose leader less than 1/3 of the time; two-sided binomial test, where the null value was $\frac{1}{3}$, $p < .001$, see Figure 2).

We found inconclusive evidence as to whether gender influenced children's answers (BF=1.36 in favor of a model that does not include gender). We found weak evidence that age

group influenced children's answers (BF=3.11 in favor of a model that does include age group, see SM for analysis treating age as continuous).

Looking at the two age groups separately, we found inconclusive evidence as to whether younger children chose the leader less frequently or as frequently as the other two characters: 25 out of 95 (26.3%) of the three- to five-year-old children we tested chose the leader (BF=1.33 in favor of the null; $p=.1037$.) In contrast, we found strong evidence that older children chose the leader less frequently: Only 13/81 (15.11%) of the 6 to 9-year-olds chose the leader (BF=82.26 in favor of the alt. hypothesis that they chose the leader less than $\frac{1}{3}$ of the time; $p<.001$). Thus, older children seemed to think that the leader was less likely to push someone down. It is unclear from these data whether younger children shared this belief or not (see Figure 2).

Story 1b. "Who kicked someone out for pushing?"

When asked who ejected an out-group character for pushing an in-group character down, most children guessed it was the leader: 120 out of 176 (68.68%) children chose the leader (BF>1000 in favor of the alt. hypothesis; $p<.001$). We found inconclusive evidence as to whether children's gender influenced their answers (BF=1.03 favor of a model that includes gender). We did find strong evidence in favor of a model that included age group (BF=340.34 in favor of a model that included age group). However, both age groups chose the leader more often than the other two characters: 54 out of 95 (56.84%) of 3 to 5-year-olds chose the leader (BF>1000 in favor of the alt. hypothesis, $p<.001$) and 66 out of 81 (81.48%) of the 6 to 8-year-olds chose the leader (BF>1000 in favor of the alt. hypothesis, $p<.001$). Thus, it seems that both younger and older children expect leaders to kick someone out for behaving in an antisocial way, suggesting that children see leaders as protecting in-group members from outside aggressors (see Figure 2).

Story 1c. "Who stole someone's cookie?"

In Story 1c (see Figure 3), when an in-group member stole another member's cookie, we found inconclusive evidence about children's expectations: 50 out of 176 (28.44%) of the children chose the leader (BF=1.92 in favor of the null; $p=.174$). We did find strong evidence *against* the idea that children chose the leader more often than the other characters (BF=29.14 in favor of the hypothesis that children chose the leader either as often or less often than the other two characters). Thus, children do not think leaders are *more* likely than subordinates to steal a cookie, but they may think that leaders are equally likely to do so. We found inconclusive evidence as to whether gender (BF=1.25 in favor of a model that includes gender) or age group

affected children's answers ($BF=1.04$ in favor of a model that does not include age group). We found inconclusive evidence as to whether older children chose the leader or subordinate more frequently (22/81, 27%; $BF=1.78$ in favor of the null, $p=0.288$) and weak evidence that younger children chose the leader as frequently as a subordinate (28/95, 27%; $BF=2.76$ in favor of the null; $p=0.445$).

Story 1d. "Who kicked someone out for stealing a cookie?"

In Story 1d (see Figure 4), we asked children who kicked an intruder out for stealing a cookie. Here, as in Story 1b, children were much more likely to choose the leader: 116 out of 176 (65.9%) chose the leader ($BF>1000$ in favor of the alternative, which is considered decisive evidence; $p<.001$). There was inconclusive evidence as to whether gender influenced the children's answers ($BF=1.24$ in favor of a model that did include gender). There was strong evidence that age group affected their answers to this question ($BF=10.61$ in favor of a model that included age group as a factor). Both age groups were much more likely to choose the leader than a subordinate when answering who kicked someone out for stealing a cookie: 56 out of 95 (57.75%) 3-to 5-year-olds chose the leader ($BF>1000$ in favor of the alternative; $p<.001$) and 60 out of 81 (74.00%) 6-to-9-year-olds chose the leader ($BF>1000$ in favor of the alternative; $p<.001$).

Manipulation Check: Who is in charge?

After the children had answered the questions following the four stories, we checked whether they viewed the character who was wearing a crown and sitting on a throne as the leader. To do this, we showed an illustration of a new group of characters and asked, "Who is in charge?" (For this question and the following two questions, the children chose among four characters, so the chance level of responding was 25%.) Overall, children were much more likely to choose the leader than the other three characters: 155 out of 176 (88.00%) children chose the crowned character ($BF>1000$ in favor of the alt. hypothesis; $p<.001$).

There was inconclusive evidence as to whether gender influenced children's answers ($BF= 1.22$ in favor of a model that does include gender), but there was strong evidence that age group influenced children's answers ($BF=57.28$ in favor of a model that does include age group). However, both younger and older children were more likely to choose the leader than the other three characters: 78 out of 95 (82.10%) 3- to 5-year-olds chose the leader ($BF>1000$ in favor of

the alternative; $p < .001$) and 77 out of 81 (95.01%) 6- to 9-year-olds chose the leader ($BF > 1000$ in favor of the alternative; $p < .001$).

Control Question 1: Who is nicest?

Using the same picture, we also asked, children, “Who do you think is the nicest?” Here, there was inconclusive evidence that children chose each character equally often. This suggests that children only chose the person wearing a crown and sitting on the throne in response to specific questions. Of the 170 children who answered this question, 49 chose the leader (28.8%) ($BF = 2.63$ in favor of the null that they chose the leader $\frac{1}{4}$ of the time). We found moderate evidence that age influenced children’s answers ($BF = 4.38$ in favor of a model that does include age group) and inconclusive evidence as to whether gender did ($BF = 1.23$ in favor of a model that does include gender). We found inconclusive evidence as to whether older children chose the leader more often, 28/80 (35%) of them chose the leader ($BF = 1.68$ in favor of the alt. hypothesis that children chose the leader more than $\frac{1}{4}$ of the time), and weak evidence that younger children chose the leader as often as the other characters (28/80; 23%; $BF = 3.18$ in favor of the null)

Control Question 2: Who would you rather be friends with?

Finally, we asked the children, “If you could be friends with anyone, who would you pick?” Here, children chose the leader somewhat more frequently than the other characters. Of the 171 children who answered the question, 56 chose the leader (34.5%; $BF = 2.32$ in favor of the alternative hypothesis; $p = .02$). We found inconclusive evidence as to whether gender influenced children’s answers ($BF = 1.57$ in favor of a model that does include gender). We found strong evidence that age group affected children’s answer to this question ($BF = 11.58$ in favor of a model that does include age group). Older children chose the leader more often than subordinates, 32/78 (41%) chose the leader ($BF = 21.43$ in favor of the alternative, $p < .0015$) while younger children chose the leader as often as the subordinates (24/93 (24%); $BF = 3.48$ in favor of the null, $p = .881$).

Study 2

In Study 2 we checked whether children might be using cues in the illustration to answer the questions. Specifically, children might have thought that the leader was less likely to push another character because the leader was sitting on a throne. Or they might think that the leader was more likely to eject the intruder because the leader was physically closer to the intruder than

the other characters. In Study 2, children heard Stories 1a and 1b from Study 1, but we modified the pictures slightly so that the leader was on the right instead of the left side of the picture and stood next to the other characters instead of sitting on a throne (see Figure 5).

Method

Participants

In Study 2, we tested 175 children between the ages of 3 and 8 years old at the same Museum as in Study 1. We excluded data from 17 children: 10 because they did not answer one or more of the main test questions and the other 7 because a parent or someone else interrupted their testing session or because they had seen another child do the experiment prior to their testing session.

This left 157 children in the sample (84 boys and 64 girls by parental report, 9 parents did not respond). The sample included 28 four-year-olds, 38 five-year-olds, 37 six-year-olds, 44 seven-year-olds, and 10 eight-year-olds. Our recruitment goal, decided before testing began, was to test at least 30 children each at ages four, five, six, and seven. In the end, we tested only 28 four-year-olds, because five 4-year-olds were excluded for failing to answer questions. See Table 3 and Table 4 for racial and ethnic background of the participants and SM for more details about the demographics of the participants.

Table 3. Parent's response when asked about child's racial background Study 2

Racial Background	Frequenc y	Percent	Valid Percent
American Indian Alaska Native	3	1.911	3.659
Asian	24	15.287	29.268
Asian, white	9	5.732	10.976
Black African American, Native Hawaiian Other Pacific Islander	1	0.637	1.220
Black African American, white	1	0.637	1.220
Black/African American	3	1.911	3.659
Native Hawaiian/Pacific Islander	2	1.274	2.439

White	39	24.841	47.561
No response	75	47.771	
Total	157	100.00	0

Table 4. Parent's response when asked about child's ethnic background Study 2

Ethnic Background	Frequenc y	Percent	Valid Percent
Another Hispanic, Latino, or Spanish Origin	8	5.096	10.127
East Indian American	1	0.637	1.266
Mexican/Mexican-American Chicano, Another Hispanic, Latino, or Spanish Origin	1	0.637	1.266
Mexican/Mexican-American/Chicano	36	22.930	45.570
Not Hispanic/Latino	31	19.745	39.241
South Asian	2	1.274	2.532
No response	78	49.682	
Total	157	100.00	0

Materials

The materials were the same as in Study 1, except in Study 2 we began with an illustration where one character was wearing a crown, but this time the character stood next to the other characters and was on the left instead of the right side of the picture.

Procedure

The procedure was the same as in Study 1, but children heard only Stories 1a and 1b--the stories where someone pushed someone else down. As in Study 1, children's answers were coded as 'leader' if they chose the character wearing a crown, and 'subordinate' if they chose another character. After the children heard the two stories and answered the questions, they were shown a new group of characters and were again asked, '*Who is in charge?*'; '*If you could be friends with anyone, who would you pick?*' and '*Who do you think is the nicest?*'. The scripts for the stories and all illustrations can be found on the Open Science Framework page for this project, at https://osf.io/4vezr/?view_only=ee2cc6f3154c4264bf0e6b36023b716d.

Results and Discussion

Story 1a. (Study 2) "Who pushed someone down?"

When asked, 'Who pushed someone down?' as in Study 1, in Study 2, children chose the leader less often than the subordinates. However, this time we did not find strong evidence. Of the 157 children we tested in 38 children guessed the leader (24.05%) (BF=4.22 in favor of the alt. hypothesis that the children chose the leader less than 1/3 of the time; two-sided binomial test, where the null value was $\frac{1}{3}$, $p=.0143$).

There were effects of gender (BF=26.28 in favor of a model that does include gender) and age group on children's answers (BF=46.12 in favor of a model that does include age group). These gender effects seems to be driven by the small group of children whose parents did not specify their child's gender (see SM for break down). We found moderate evidence that the younger children chose leader as frequently as the other characters: 23 out of 66 of the three- to five-year-old children we tested chose the leader (BF=3.32 in favor of the null hypothesis that the children chose the leader as frequently as the other two characters, $p=.348$). In contrast, only 15 out of 91 (16.48%) 6 to 8-year-olds chose the leader (BF=118 in favor of the alt. hypothesis that they chose the leader less than $\frac{1}{3}$ of the time, $p<.001$). Thus, as in Study 1, older children

seemed to think that the leader is less likely to push someone down, while younger children did not. However, again, younger children did not think that leaders were more likely to push someone down.

Story 1b. (Study 2) “Who kicked someone out for pushing someone down?”

When asked who kicked someone out, 102 out of 158 children (64.56%) guessed the leader (BF>1000 in favor of the alt. hypothesis that the children chose the leader either more or less than 1/3 of the time; $p<.001$).

We found weak evidence that children’s gender did influence their answers (BF=2.35 in favor of a model that does include gender). We found strong evidence that children in the two age categories answers this question differently (BF=17.17 in favor of a model that included age group). Both age groups chose the leader more often than the other characters: 36 out of 66 (54.54%) 3- to 5-year-olds chose the leader (BF=82.04 in favor of the alt.; $p<.001$) and 66 out of 91 (72.5%) 6- to 8-year-olds chose the leader (BF>1000 in favor of the alt. $p<.001$).

Manipulation Check: Who is in charge

As in Study 1, after children answered the questions about the two stories, we showed them an illustration of a new group and asked, “Who is in charge?” For this question and the two questions that followed, the children chose between four characters, so chance-level responding was 25% for each character. Overall, children were much more likely to choose the leader than the other three characters: 143 out of 157 (91.13%) children chose the leader (BF>1000 in favor of the alt. hypothesis; $p<.001$).

There was an effect of children’s gender on their answers (BF= 6.43 in favor of a model that does not include gender), and an effect of age group (BF=57.87 in favor of a model that does include age group). (See SM for breakdown of results by gender). While both age groups chose the leader more often than the other three characters, older children did so at even higher rates than younger children: 55 out of 66 (83.33%) three-to-five-year-olds chose the leader (BF>1000 in favor of the alternative hypothesis, $p<.001$); 88 out of 91 (96.7%) six-to-eight-year-olds chose the leader (BF>1000 in favor of the alternative hypothesis, $p<.001$).

Control Question 1: Who is nicest

When asked, ‘*Who do you think is the nicest?*’ children chose all characters equally often. Of the 155 children who answered this question, 38 chose the leader (25%; BF=4.37 in favor of

the null, $p=1.0$). We found inconclusive evidence as to whether children's gender affected their answers ($BF=1.23$ in favor of a model that does not include gender) and weak evidence that younger and older children answered the same way ($BF=2.26$ in favor of a model that does not include age group).

Control Question 2: Who would you be friends with

As in Study 1, we again asked, *'If you could be friends with anyone, who would you pick?'* Here we found weak evidence that children chose the leader as frequently as the other characters. Of the 154 children who answered the question, 45 chose the king (29.3%; $BF=2.38$ in favor of the null, $p=.293$). We found weak evidence that age group influenced children's answers ($BF=2.096$) and strong evidence that gender influenced children's answers ($BF>1000$; See SM for more details). However neither age group chose either, older children did so at even higher rates than younger children: 21 out of 66 (33.33%) three-to-five-year-olds chose the leader ($BF=1.24$ in favor of the null); 24 out of 90 (26.6%) six-to-eight-year-olds chose the leader ($BF=3.09$ in favor of the null hypothesis).

Study 3

In Study 3, we investigated several follow-up questions arising from Studies 1 and 2. For example, to what extent do children expect leaders to be protective? Do children expect leaders to put themselves in harm's way to protect others? Do children see leaders as generally more prosocial than subordinates? We included conditions to probe this question because if children did expect leaders to be generally prosocial, then children's expectations of leaders may not stem from an understanding of specific roles based on relative status (i.e., the leader's job is to protect others), but instead from an inference about traits of leaders (i.e., 'leaders are nice people').

Method

Participants

We tested 212 children for Study 3. Of these, 21 children were excluded: 16 for not answering one of the test questions, 4 because of interference from a parent or sibling, and 1 because of experimenter error (the experimenter read the same story twice). This left 191 children (87 boys, 100 girls, by parent report; 5 were unreported,) to contribute data to the analysis. This included 45 four-year-olds, 45 five-year-olds, 45 six-year-olds, 38 seven-year-olds and 18 eight-year-olds. Again, our target age range was 4 to 7, and we set out to test at least 30

children in each age range but ended up with a larger sample size than planned. No data analysis had been carried out before the end of data collection. We decided to include all the children in the analyses. See Tables 5 and 6 below for participant race and ethnicity, and SM for more demographic information.

Table 5. Parent's response when asked about child's racial background Study 3

Racial Background	Frequenc y	Percent	Valid Percent
Asian	30	15.707	27.778
Asian, Black/African-American	1	0.524	0.926
Asian, Black/African-American, and white	1	0.524	0.926
Asian, white	4	2.094	3.704
Black/African American	4	2.094	3.704
Black/African American, white	2	1.047	1.852
Native Hawaiian	1	0.524	0.926
white	65	34.031	60.185
Missing	83	43.455	
Total	191	100.000	

Table 6. Parent's response when asked about child's ethnic background Study 3

Ethnic Background	Frequenc y	Percent	Valid Percent
Another Hispanic, Latino, or Spanish Orgin	1	0.524	1.136
Another Hispanic, Latino, or Spanish Origin	3	1.571	3.409
Argentinian	1	0.524	1.136
Dutch Indonesian	1	0.524	1.136

Latina	1	0.524	1.136
Mexican/Mexican American Chicano	37	19.372	42.045
Mexican/Mexican American Chicano/ Another Hispanic, Latino, or Spanish Origin	1	0.524	1.136
Not Hispanic/Latino	42	21.990	47.727
Not Hispanic/Latino, Mexican/ Mexican-American Chicano	1	0.524	1.136
Missing	103	53.927	
Total	191	100.00 0	

Materials

The Materials in Study 3 were similar to those in Studies 1 and 2 except that the illustrations depicting the key actions in each condition were modified. (See Figs. 6-10).

Procedure

The procedure was the same as in Studies 1 and 2, except in Study 3 children heard six stories. The first of these stories, Story 3a, was designed to test the extent to which children expect leaders to protect others. In this story, children heard about a character coming to intervene *before* the intruder transgressed and helping that character (*Uh-oh, A Wug is coming over to push one of the Flurps down! But one of the Flurps is coming to help the Flurp! Who do you think came to help the Flurp?*). The next story, Story 3b, was used to probe children's reasoning for their answers in Story 3a. In Story 3b, children were told that a character *wanted* to help someone who was being attacked but was too scared to do so (*Someone wants to help the Blip, but they're too scared. Which one do you think was too scared to help?*). Here we predicted that children would be less likely to choose the leader than a subordinate, since leaders are generally seen as stronger or braver than others. Stories 3c and 3d were meant to test whether children thought leaders were more likely to be prosocial in general: children heard about a character who helped another character who had fallen (*Uh-oh, one of the Gaxas fell down! But look! Someone helped him up! Who do you think helped him up?*) and in Story 3d, heard about a character who shared a cookie with another character (*Look! All of the Phlams have a cookie*

except one! But Look! One of the Phlams is sharing his cookie! Who do you think shared his cookie?). Again, we included these stories to probe whether children might see high-ranking people as generally nicer or ‘good’ versus seeing them as having a specific role because of their rank. Story 3e was designed to test whether children expected leaders to enforce norms (*Look! One of the Larpies is wearing the wrong shirt! Someone didn’t think it was ok, so he made him change it back to the right one! See? Who do you think made him change his shirt?).* Story 3f was designed to probe the reasons behind children’s answers in Story 3e, here someone *wanted* to enforce the norm but did not (*Look! One of the Rookas is wearing the wrong shirt! One of the Rookas didn’t think it was ok but didn’t say anything. Which one do you think didn’t say anything?).* Again, we predicted that children would choose leaders more often in Story 3f and choose subordinates more often in Story 3d. However, the results of these last two conditions were inconclusive.

As in Studies 1 and 2, at the end of Study 3, we again checked whether children saw the character wearing a crown and sitting on the throne as higher ranked using the same procedure as Studies 1 and 2.

Results & Discussion

Story 3a: Who put themselves in harm’s way to protect another?

When, told, “*Uh oh, A Wug is coming over to push one of the Flurps down! But one of the Flurps is coming to help the Flurp! Who do you came to help the Flurp?*”, that is, when children were asked who they thought put themselves in harm’s way to protect another (subordinate) individual (see Figure 6), children did not choose the leader more often than the others, which was not what we predicted. We found inconclusive evidence about whether children chose the leader *less* often than the other characters or whether they chose the leader as often as the other two characters: 53 out of 191 children (27.7%) chose the leader (BF=1.94 in favor of the null.) We found weak evidence that age group affected children’s answers (BF=4.23 in favor of a model that does include age group) and strong evidence for gender (BF=14.99 in favor of a model that does include gender, see SM for details). We found positive evidence that older children were at chance (31/101 of the older children chose the leader; BF=3.33 in favor of the null), and inconclusive evidence as to whether younger children chose the leader more frequently (22/90 of the younger children chose the leader, BF=1.33 in favor of the alternative).

These responses differed from children's responses to the stories in Studies 1 and 2 where the leader ousted an intruder who had already transgressed. In those studies, children overwhelmingly chose the leader as the individual who ejected this outsider. However, it seems that this was not because children necessarily expect leaders to protect others, but because they expect them to expel anti-social intruders. There were two key changes from Story 1a to Story 3a: in Story 1a, the action included ousting an intruder, in Story 3a, the action involved intervention and 'helping', thus it is not clear which of these elements led children to answer differently across the two stories. Indeed, children may have guessed that the leader expelled an intruder, whether the intruder did something anti-social or not before being expelled. It should be noted that although these children were recruited from the same museum using the same methods, they were not the same children so these comparisons should be interpreted with caution (See SM for analyses that only include children that answered, 'Who is in charge?' correctly).

Story 3b: Who was too scared to help a subordinate?

When children heard, "*Uh oh, a Glup is coming over to push one of the Blips down! Someone wants to help the Blip, but they're too scared. Which one do you think was too scared to help?*", children chose the leader less frequently than the other characters: 32 of the 191 (16.75%) children chose the leader (BF>1000 in favor of the alternative hypothesis, $p<.001$). There was inconclusive evidence as to whether age group affected children's answers (BF=1.08 in favor of a model that does include age group) and weak evidence that gender affected their answers (BF=2.32 in favor of model that does include gender). Of the 90 younger children who answered this question, only 16 said the leader (BF=43. 16 in favor of the alternative); of the 101 older children, 16 chose the leader (BF=407 in favor of the alternative model). Thus, it seems that children think that leaders are *less* likely than other characters to be 'too scared' to protect someone. This suggests that children did indeed understand Story 3a. Together with Story 3a, these results suggest that children think of leaders as being braver than other characters but not necessarily more likely to intervene before a transgression has taken place.

Story 3c: Who helped someone who fell?

When asked who helped someone who had fallen (See Figure 7), children chose the leader less often than the other characters. Only 31/191 (16.23%) children said that the leader helped ($BF > 1000$ in favor of the alternative; $p < .001$). Gender did have an effect on children's answers ($BF = 56.77$ in favor of a model that does not include gender), as did age group ($BF = 7.36$ in favor of a model that does not include age group as a factor). Of the 90 younger children, 17 chose the leader, $BF = 20.17$ in favor of the alternative model. Of the 101 older children, 14 chose the leader, $BF > 1000$ in favor of the alternative model. Thus, we found strong evidence that both age groups were less likely to choose the leader than the subordinates.

Story 3d: Who shared their cookie?

When asked who shared their cookie (See Figure 8), children chose the leader less often than the other characters: Of the 191 children we tested, 36 (18.8%) chose the leader ($BF > 1000$ in favor of the alternative hypothesis; $p < .001$). We found inconclusive evidence as to whether age group affected children's answers ($BF = 0.94$ in favor of a model that does not include age group); and weak evidence gender influenced their answers ($BF = 2.32$ in favor of a model that does not include gender). Of the 90 younger children, 17 chose the leader, ($BF = 20.27$ in favor of the alternative hypothesis; of the 101 older children, 19 chose the leader ($BF = 36.57$ in favor of the alternative hypothesis). Thus, we found strong evidence that both older and younger children were less likely to choose the leader.

Story 3e: Who enforced a norm?

When told, "Someone didn't think it was ok, so he made him change it back to the right one! See?" and asked, "Who do you think made him change his shirt?" (See Figure 9), it is unclear whether children were choosing all characters equally often or whether they chose the leader more often: 74/191 (38.1%) of the children guessed the leader ($BF = 1.688$ in favor of the null hypothesis, which is considered inconclusive evidence). There was inconclusive about whether age group influenced children's answers ($BF = 1.35$ in favor of a model that does not include age group as a factor), and positive evidence that gender also did influence children's answers ($BF = 5.52$ in favor a model that does not include gender as a factor; See SM for details).

Story 3f: Who wanted to, but did not enforce a norm?

When the children were told, “One of the Rookas is wearing the wrong shirt! One of the Rookas didn’t think it was ok, but didn’t say anything.” and were asked, “which one do you think didn’t say anything?” (See Figure 10), it is unclear whether children chose the leader equally often or less than the other characters: of the 191 we tested, 51 (26.7%) chose the leader ($BF=1.25$ in favor of the alternative which is considered inconclusive evidence; $p=.041$.) There was inconclusive evidence as to whether age group affected children’s answers ($BF=1.16$ in favor of a model that does not include age group as a factor) and moderate evidence gender influenced their answers ($BF=8.00$ in favor of a model that does include gender as a factor).

Manipulation Check: Who is in charge (Study 3)

After the children had answered the questions for all four stories, we again checked to make sure they viewed the character who was wearing a crown and sitting on a throne as having higher rank than the other characters. When asked who was in charge, children were much more likely to choose the crowned character than the other three (161/191; 84.2% children chose the leader; $BF>1000$ in favor of the alternative; $p<.001$). There was positive evidence that gender did influence children’s answers ($BF=9.93$ in favor of a model that does include gender). We did find that age group predicted whether children guessed who was in charge correctly ($BF>1000$ in favor of a model that does include age groups). Both groups showed the effect, it was just more pronounced in older children. Of the 101 six- to eight-year-olds we tested 95 (94%) chose the leader ($BF>1000$; $p<.001$); while 66 out of 90 (77%) of three to five-year-old children chose the leader ($BF>1000$; $p<.001$).

Control Question 1: Who is nicest? (Study 3)

Unlike in Studies 1 and 2, children in this study were less likely to choose the leader when asked who was ‘the nicest’ than the other characters: 33/191 (17.2%) chose the leader; $BF=5.51$ in favor of the alternative hypothesis; $p=.012$. We found weak evidence that age group did influence children’s answers ($BF=2.18$ in favor of a model that does not include age group as a factor), as did gender (28 in favor of a model that does include gender as a factor). Both groups showed the effect, it was just more pronounced in older children. Only six- to eight-year-

olds showed a preference for the subordinates we tested 15 (14%) chose the leader (BF=5.15 in favor of the alt; $p<.001$); while 18 out of 72 (25%) of three to five-year-old children chose the leader (BF=1.848 in favor of the null).

Control Question 2: Who would you be friends with? (Study 3)

Here, children chose the leader as often as the other characters: 55/191 (28.79%) chose the king (BF=2.59 in favor of the null); There was positive but weak evidence about whether age group influenced children's answers (BF=2.51 in favor of a model that did include age group); positive evidence that gender did influence children's answers (BF=5.36 in favor of a model that did not include gender). When looking at the different age ranges, there wasn't strong evidence in either age group about whether children favored the leader or were choosing them at the same rate as the other characters. 21/89 (23.33%) of the younger children chose the leader (3.19 in favor of the null) and 34/101 (33.63%) of the older children chose the leader (BF=1.41 in favor of the alternative hypothesis; $p=.054$).

General Discussion

Children in this study did have certain expectations about the behavior of leaders, at least in this context in which rank was cued using a crown and throne (Studies 1 and 3) or only a crown (Study 2). Children expected leaders to provide at least one benefit – kicking out an intruder who has done something antisocial (Stories 1b and 1d). Children did not seem to expect leaders to be more *randomly* aggressive than subordinates: In Studies 1 and 2 (Story 1a), three- to five-year-old children thought that a leader was no more likely than a subordinate to push someone down, and older children thought the leader was less likely to do so. These expectations did not depend on the placement of the leader on a throne, nor on their physical placement in the accompanying drawing (Study 2). These findings are interesting considering how dominance hierarchies often work in non-human primates. In many primate species, dominant individuals commit unprovoked aggressive acts on subordinates, which is thought to help the dominant individual maintain rank without engaging in more costly fights (Silk, 2002). This is echoed in the behavior of high-ranking people in human dominance hierarchies, where position is maintained through aggression or fear (Cheng & Tracy, 2014). For the children in this study, it seems that being 'in charge,' did not mean being more likely to commit unprovoked aggression.

In fact for older children, it meant being *less* likely to do so. The difference we found between younger and older children's expectations aligns with developmental changes found in other studies. Gülgoz and Gelman (2016) found that younger children did not acknowledge benevolent power (interactions that benefitted the lower-ranking individual) as a cue of who was 'in charge', while older children did. In our study, only older children thought that leaders were less likely to commit unprovoked acts of aggression. Thus, there may be a general trend in which older children see leaders as more benevolent.

As with any null finding in a study with young children, one must ask whether the young children in this study understood what we were asking or whether they answered randomly. It is possible the younger children answered this question randomly, but these younger children did identify the leader correctly when asked who was in charge, and they did choose the leader more often when asked who kicked an intruder out. So, they did have some expectations about the roles of leaders and subordinates, which they were able to express in this study. We take these results to mean that although it might be easier for younger children to identify malevolent leaders as being in charge, they do not necessarily expect leaders to be randomly aggressive.

However, neither did children in our study seem to expect complete benevolence from leaders. When we told children that a character helped another character by putting themselves in harm's way to protect others (Story 3a), children did not choose the leader. This was not because children did not understand this story: when told that someone wanted to help a subordinate but was too scared to do so, children chose the leader less often than the others (Story 3b). Thus, children did not judge that a leader would be more likely than other people to put themselves in harm's way to protect a subordinate, and they did *not* attribute this behavior to the leader being afraid. There were two key changes across Stories 1a and 3a – In Story 1a, the action only included ousting an intruder, in Story 3a, the action involved intervention and 'helping', thus it is not clear which of these elements led children to answer differently across the two stories. One possibility is that the intuition driving children's choices in Studies 1 and 2 (where children identified the leader as the one who ousted an antisocial intruder) was not the intuition that leaders protect their subordinates but rather that leaders protect their group, or that they punish anti-social individuals.

Likewise in Study 3, children chose the leader less often than the other characters when asked who helped someone up (Story 3c), and when asked who shared a cookie (Story 3d). In

other words, children's responses to those questions implied that they considered leaders *less* likely to be prosocial. This aligns with recent work in which young children and adults associate higher social rank with indifference to other people's needs (Terrizzi et al., 2020).

Unlike previous studies, we found mixed evidence as to whether children expect leaders to enforce norms. In Studies 1 and 2 they did expect leaders to oust anti-social intruders. However, when told that one of the subordinates wore the wrong-colored shirt and someone made them change it, we found inconclusive evidence as to whether children chose the leader as frequently or more frequently than the other characters (Story 3e). This diverges from other work on the topic (Gülgöz & Gelman, 2016; Zhao & Kushnir, 2018). It is possible that the mixed findings in our study were due to the norm violation of wearing the wrong-colored shirt being not severe enough to elicit this expectation. Moreover, the norm in our study was implied rather than stated, and thus may have been difficult for the children to recognize.

Future research could explore several questions raised by the limitations of these studies. The first is whether the expectations we found in this study would also be found if social rank was presented in other ways. Here, rank was manipulated by having the leader look like a prototypical king or queen: The character wore a crown, and in Studies 1 and 3 they sat on a throne. We chose these cues because children recognize them and easily identify the crowned, throned character as being 'in charge.' These children's intuitions about royalty undoubtedly are influenced by fictional depictions, such as those in movies and books. Future research could test whether children have similar intuitions about high-status people whose rank is not associated with royalty.

Future research could also ask how children explain the actions of leaders and subordinates. For example, children might think that if a leader is aggressive, the aggression must provide a benefit to the group. If so, this would provide evidence for sophisticated reasoning about the roles of leaders in social groups. Moreover, future research could explore why we found different answers when we asked children who 'kicked out an intruder' and who helped a subordinate who was the target from an intruder's imminent transgression. Another important direction for future research will be to learn how children's own experiences with social hierarchy affect how they expect leaders to act. There is a hierarchical element to children's relationships with peers, siblings, teachers, and parents, but in each of those relationships higher-ranking individuals likely act in different ways. Moreover, since

expectations about leaders vary across cultural contexts, one major limitation of this work is that the population we tested was specific to families visiting a museum in one geographic area. These findings may not generalize across cultures or populations. Future work could investigate how children in different cultural contexts, considered both on large and small scales, expect leaders to act. In as much as there are culturally variable views on leadership, we might expect children's views on leadership to become more culturally divergent with age, as children gain more experience with their specific culture.

Overall, these findings provide evidence that children as young as four have expectations of differing behavior by leaders and subordinates. Whereas previous studies showed that children can infer who is in charge from various cues, the current studies show that children have expectations about how those in charge will treat others. In some ways, children's expectations align with how high-ranking people act in prestige-based hierarchies: Children do not expect leaders to behave like bullies, and they do expect them to provide the benefit of ousting anti-social intruders. In other ways, however, children's expectations did not align with accounts of prestige-based hierarchies--although children expected leaders to be braver than subordinates, children did not expect leaders to put themselves in harm's way to protect others. Moreover, they did not expect leaders to be more helpful or generous than subordinates. In fact, they expected the opposite. Future studies can build on these findings, further probing the intricacies of children's thinking about high-ranking individuals--people to whom they will, throughout their lives, pay a great deal of attention.

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Figure 1. Sets of illustrations used in Stories 1a and 1b in Study 1. [Left Panel] Illustrations used in Story A [Right Panel] Illustrations used in Story B.

Figure 2. Percentage of children who chose the leader. Children chose among three characters, so chance in this case was 1/3. * = $BF_{10} > 10$, ** = $BF_{10} > 50$, *** = $BF_{10} > 1000$

Figure 3. Illustration used in Story 1c where one of the group members steals from another group member.

Figure 4. Illustration used in the story about one of the groups kicking someone out for stealing a cookie.

Figure 5. Example illustration in Study 2 The leader was moved to the right side of the illustration and is standing on the same level as the others.

Figure 6. Illustration used in Stories 3a and 3b: where one character helps a subordinate who gets attacked, and one where someone wants to help with the intruder but was too scared. (The shirt colors of the characters were different across two stories)

Figure 7. Illustration used in Story 3c about someone coming to help someone up.

Figure 8. Illustration used 3d about somebody sharing a cookie

Figure 9. Illustration used in story 3e and 3f, about enforcing norms. (The main color of the shirts were different for these two stories)