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Children's Allocation of Resources in Social Dominance Situations

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Children's Allocation of Resources in Social Dominance Situations

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Two experiments with preschoolers (36 to 78 months) and 8-year-old children (Experiment 1, $N = 173$; Experiment 2, $N = 132$) investigated the development of children's resource distribution in dominance contexts. On the basis of the distributive justice literature, 2 opposite predictions were tested. Children could match resource allocation with the unequal social setting they observe and thus favor a dominant individual over a subordinate. Alternatively, children could choose to compensate the subordinate if they consider that the dominance asymmetry should be counteracted. Two experiments using a giving task (Experiment 1) and a taking task (Experiment 2) led to the same results. In both experiments, children took dominance into account when allocating resources. Moreover, their distributive decisions were similarly affected by age: Although 3- and 4-year-old children favored the dominant individual, 5-year-old children showed no preference and 8-year-old children strongly favored the subordinate. Several mechanisms accounting for this developmental pattern are discussed.

Keywords: social cognition, distributive justice, dominance, moral development

When navigating their social environment, children encounter a number of asymmetrical situations in which the interests of some people prevail over the interests of others. An individual can impose her preferences on someone else, give her orders, or

monopolize resources that both of them covet. Such situations are typical cases of dominance relationships and are frequently observed, in more or less coercive forms, not only between adults, but also between young children. Whereas field observations established early on the existence of dominance relationships in kindergarten (e.g., La Freniere & Charlesworth, 1983; Strayer & Strayer, 1976), it is only recently that cognitive studies have started describing how the understanding of dominance develops. These studies found that preschoolers can make explicit dominance judgments on the basis of a wide range of physical and non physical cues, such as physical superiority, body postures, decisional power, age, or amount of resources held (Brey & Shutts, 2015; Lourenco, Bonny, & Schwartz, 2015; Charafeddine, Mercier, Clément, Kaufmann, Berchtold, Reboul, & Van der Henst, 2015). Moreover, infant studies also suggest that sensitivity to dominance develops very early in life. For instance, when confronted with a situation in which two agents have conflicting goals, 10-month-old infants expect an agent with a larger body size to prevail over a smaller agent (Thomsen, Frankenhuis, Ingold-Smith, & Carey, 2011). A study by Mascaro and Csibra (2012) also indicated that 15-month-old infants use conflict over resources to predict social asymmetry. In particular, they expect an agent who had prevailed over another in a conflict involving a specific type of resources (e.g., territorial resources) to also prevail in a conflict involving another type of resources (e.g., a desirable object; see also Mascaro & Csibra, 2014). Finally, asymmetry in resources is not only seen as an indicator of power, but also as one of its consequences: When preschoolers are presented with an

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individual who gives orders to another individual, they expect the former to have more resources than the latter (Charafeddine et al., 2015).

In the current study, we go one step further and investigate the evaluative stance that children adopt toward dominance using resource allocation tasks. In particular, we examine whether preschoolers' distributions reflect a status quo-oriented stance or a more compensatory behavior. The former possibility would lead the children to give more to the dominant, whereas in the latter case they would give more to the subordinate. In the remainder of the introduction, we review various mechanisms that result in two opposite predictions. On the one hand, we describe work showing that young children have ethical concerns about equality that would lead them to compensate for the dominance asymmetry. On the other hand, we describe mechanisms that may lead children to maintain the social advantage of the dominant and thus reinforce the initial inequality. Finally, we review literature suggesting that the tendency to counteract dominance-based inequality might increase with age.

Resource Allocation, Equality, and Prosociality

Resource allocation tasks have been used to investigate the development of other-regarding preferences, fairness, and social evaluation more generally. Experiments use either first-party tasks, in which children distribute resources between themselves and another agent, or third-party tasks, in which they distribute resources between other agents. A striking fact revealed by this research is that preschoolers' distributions are driven by equality concerns. Three sorts of findings illustrate the importance of this phenomenon. First, in third-party tasks, when children are given the opportunity to allocate resources either equally or unequally, equality is favored regardless of the behavior and characteristics of the recipients (Baumard, Mascaro, & Chevallier, 2012; Kenward & Dahl, 2011; McGillicuddy-De Lisi, Watkins, & Vinchur, 1994; Olson & Spelke, 2008; Peterson, Peterson, & McDonald, 1975). Of particular relevance are recent studies showing that school-age children but also preschoolers can correct a resource inequality in order to equalize the final amount of resources held by the recipients (Li, Spitzer, & Olson, 2014; Shaw & Olson, 2013).

Second, infant studies, which use the violation of expectation paradigm, show that the preference for equal distributions emerges very early in development. For instance, in Schmidt and Sommerville's study (2011), 15-month-old infants watched movies in which an individual divided resources between two recipients equally (two crackers vs. two crackers) or unequally (one cracker vs. three crackers). The infants looked longer at the recipient who had divided the resources unequally, suggesting that they expected agents to perform equal distributions (see also Sloane, Baillargeon, & Premack, 2012, Experiment 1). Other research has also reported that 16-month-old infants prefer agents who perform equal rather than unequal distributions (Geraci & Surian, 2011).

Third, even in first-party tasks, the oldest preschoolers (i.e., the 5-year-old children but not the 4-year-old children) show signs of a preference for equality in their sharing behaviors (Fehr, Bernhard, & Rockenbach, 2008; Gummerum, Hanoch, Keller, Parsons, & Hummel, 2010; Lane & Coon, 1972; LoBue, Nishida, Chiong, DeLoache, & Haidt, 2011; Rochat et al., 2009; Thompson, Barresi, & Moore, 1997).

The preference for equal distributions has been interpreted as a manifestation of fairness and egalitarian concerns (Geraci & Surian, 2011; Kenward & Dahl, 2011; Schmidt & Sommerville, 2011; Sloane et al., 2012; Thomson & Jones, 2005), which could have straightforward consequences within a dominance context. Because a dominance relationship entails inequality in favor of the dominant, giving more resources to the subordinate could be a step toward counteracting inequality. Given that preschoolers can correct inequality by giving more resources to a recipient who has initially fewer resources (Li et al., 2014), they might also do so when presented with a dominance-based inequality.

In addition to a preference for equality, empathic concerns for victims and vigilance toward antisocial behavior could lead children to provide more resources to the subordinate. In experimental settings in which children cannot distribute resources equally, preschoolers take into account the social behavior of protagonists by favoring prosocial actions over antisocial actions (Hamlin, Wynn, Bloom, & Mahajan, 2011; Kenward & Dahl, 2011; Olson & Spelke, 2008). For instance, in Kenward and Dahl's study (2011), 4.5-year-old children distributed fewer biscuits to a puppet that was hindering a protagonist struggling to achieve a goal than to a helping puppet. Preschoolers' empathic concerns can also lead them to share more of their resources with an individual who experiences distress than with an emotionally neutral individual (Williams, O'Driscoll, & Moore, 2014; Paulus & Moore, 2014). Moreover, other paradigms than resource allocations tasks show that toddlers and infants prefer agents who engage in helping behavior and dislike those who act in an antisocial way (Hamlin & Wynn, 2011; Hamlin, Wynn, & Bloom, 2007; Hamlin et al., 2011). Preschoolers also display concern for victims of harmful acts (Kanakogi, Okumura, Inoue, Kitazaki, & Itakura, 2013; Vaish, Carpenter, & Tomasello, 2009), protest against these acts (Vaish, Missana, & Tomasello, 2011) and are less likely to provide help to perpetrators of harm (Vaish, Carpenter, & Tomasello, 2010). In a dominance relationship, the dominant imposes his will against the subordinate's interest and preferences. He can therefore be viewed as acting in a selfish and antisocial manner, whereas the subordinate can be perceived as a victim of the dominant's actions. Granted that preschoolers are sensitive to antisocial behavior and show concern for victims, they may favor the subordinate over the dominant in their resource allocation.

To sum up, both preference for equality and prosocial concerns could lead children to allocate more resources to subordinates, at least in paradigms where the resources to be allocated cannot be allocated equally. However, this prediction presupposes that dominance is perceived as arbitrarily unequal, unfair and antisocial. Other arguments support an alternative view and lead to the prediction that children will allocate more resources to the dominant individual.

Perpetuating Inequality

When children allocate more resources to an individual than to another they do not do so only on the basis of moral or prosocial concerns. For instance, previous work has shown that preschoolers are sensitive to other social attributes such as group membership and distribute more resources to ingroup than to outgroup members (Dunham, Baron, & Carey, 2011; Fehr et al., 2008; Zinser, Bailey, & Edgar, 1976; Zinser, Rich, & Bailey, 1981). They

allocate more resources to their friends (Knight, Berning, Wilson, & Chao, 1987; Moore, 2009) and expect others to share more with friends than with nonfriends (Olson & Spelke, 2008; Paulus & Moore, 2014). This suggests that the recipient's social value is important and that children are likely to take into account certain social properties when they decide how to share goods. Social dominance may actually be one of these valued social traits. By definition, dominance provides many advantages. In children, the high value given to a dominant position is reflected by the tendency to overestimate their own dominance position within their peer group (Edelman & Omark, 1973; Strayer, Chapeskie, & Strayer, 1978). Moreover, at the interpersonal level, dominant individuals receive more attention from others (La Freniere & Charlesworth, 1983) and are often viewed as being more competent even when there is no other evidence of their competence (Anderson & Kilduff, 2009; Bernard et al., 2016; Castelain, Bernard, Van der Henst, & Mercier, 2015).

Another reason to allocate more resources to the dominant might be the will to favor potential social partners who can offer the best opportunities. Giving more to dominant individuals could be a means to please them to benefit from the advantages associated with dominance and to neutralize their hostile behavior. Support for the existence of such a mechanism comes from ethological studies showing that primates target their grooming toward high-status individuals to obtain rank-related benefits (Schino, 2007; Seyfarth, 1977; Tiddi, Aureli, & Schino, 2012) and from research on implicit attitudes revealing that individuals tend to display an unconscious positive bias toward individuals from high-status groups (Jost, Pelham, & Carvallo, 2002; Rudman, Feinberg, & Fairchild, 2002). Olson, Dweck, Spelke, and Banaji (2011) found evidence of children's perpetuation of inequality in the context of groups that might not only reflect a tendency to consider such inequality as justified and well-founded, as those authors suggest, but also reflect their self-interested desire to ingratiate themselves with powerful groups. Children from 3.5 to 11.5 years of age were presented with members of a group who systematically had more cookies than members of another group (Blacks vs. Whites, Asians vs. Whites, individuals wearing orange vs. green t-shirts). When asked to allocate cookies to new members of each group, in most circumstances children favored the member of the advantaged group, thereby perpetuating the initial inequality. Our study differs in three respects from that of Olson et al. (2011). First, we investigated an inequality between individuals rather than groups. Second, this inequality is more relational as it was grounded in a dominance relation between two individuals. Third, in the tasks used in the current study, the original inequality is not based on resource asymmetry.

Greater Concern for Fairness and Equality at School Age

In the current experiments, children are given the choice to allocate an unequal amount of resources to a dominant and a subordinate. In this context, favoring the subordinate can be seen as a moral choice, guided by deontic concerns about equity or equality. Previous research suggests that a shift toward more moral behavior arises at approximately 7 or 8 years of age. For instance, in first-party resource allocation tasks, 7- or 8-year-old children are much more likely to share equally than are preschoolers, (Blake et

al., 2015; Fehr et al., 2008; Smith, Blake, & Harris, 2013). Moreover, the investigation of children's social values through interdependency situations shows that 8- to 10-year-old children favor more equality than 6- to 7-year-old children and that the former do not differ from adults (Knight & Dubro, 1984). Seven- or 8-year-old children are also reluctant to accept arbitrary advantageous distributions: In a modified version of the ultimatum game, which involved face-to-face interaction, Blake and McAuliffe (2011) observed that 8-year-old children often rejected unequal offers when they were advantageous to themselves (four candies for themselves vs. one candy for their peer), whereas 4- to 7-year-old children almost never did (see also McAuliffe, Blake, Kim, Wrangham, & Warneken, 2013; Sheskin, Bloom, & Wynn, 2014).

Even more relevant to the current study are third-party tasks showing that young school-age children are more averse to inequity than are preschoolers and prefer discarding a resource rather than distributing it unequally (Shaw & Olson, 2012). They also react to inequality in more subtle ways by taking into account the value of the resources they distribute (Shaw & Olson, 2013) and counteract an existing inequality to a greater extent than do younger children (Olson et al., 2011). In particular, Olson et al., 2011, Experiment 1) observed that when exposed to a group-based inequality between Black and White individuals, older children (from 7.5 to 11.5) were significantly more likely to allocate resources to an individual from the underprivileged group, whereas younger children (from 3.5 to 7.5) were more likely to favor the individual from the privileged group. Given their greater sensitivity to inequalities, school-age children might be more likely to counteract a dominance-based inequality.

Research has also shown that school-age children adopt a more critical stance toward authority. They reject an authority when it commands to fight to a greater extent than preschoolers (Laupa, 1994; Laupa & Turiel, 1986; Laupa & Turiel, 1986). Furthermore, while preschoolers tend to take the desire of an authority as an obligation for the subordinate, school-age children consider that the subordinate should not strictly act in accordance with the authority's desire, especially when initial obligations contradict this desire (Kalish & Cornelius, 2007, Experiment 3).

Taken together these findings suggest that in a resource distribution task, school-age children should be more likely to compensate for a dominance asymmetry, by favoring the subordinate, than should preschoolers. The main goal of the present study was to investigate the development of resource allocation behavior in a dominance context. In light of prior data on the development of moral behavior, we chose to test not only preschoolers, but also school-age children (8 year olds).

Experiment 1

In Experiment 1, children watched two puppets as a dominance asymmetry was conveyed by a series of interactions in which one puppet held power over another. Puppets represented two boys who disagreed over which games to play together on three occasions. Each time the same puppet imposed his choice. Yet the whole interaction was playful and peaceful. Children then had to allocate to the two puppets an unequal amount of resources: a large and a small piece of chocolate. The task did not allow for an equal allocation of resources as a wide range of results have shown that children systematically favor equality over inequality regardless of

the social context (Baumard et al., 2012; Hook & Cook, 1979; Sigelman & Waitzman, 1991). For example, in Baumard et al.'s (2012) study on merit, it is only when preschoolers were forced to distribute resources unequally that they gave more to the hard-working individual.

Method

Participants. One hundred 46 preschoolers (ranging in age from 36 to 71.9 months) and 30 8-year-old children (93 girls and 83 boys) participated in this experiment. Preschoolers were tested in three public kindergartens, and 8-year-old children were tested in two public elementary schools. Written parental consent was provided for all children. Three children were excluded from the analysis: One child refused to complete the task, 1 child was excluded due to an experimenter error, and 1 failed to correctly answer the two preliminary comprehension questions (see the following section). The final set of participants involved 173 children from four age groups: 3-year-olds (36 to 46 months, $M_{age} = 42$ months; 23 girls and 17 boys), 4-year-olds (48 to 59 months, $M_{age} = 55$ months; 28 girls and 23 boys) 5-year-olds (60 to 71.9 months, $M_{age} = 65$ months; 30 girls and 22 boys) and 8-year-olds (from 98 to 104 months, $M_{age} = 104$ months; 12 girls and 18 boys).

Material and procedure. Participants were presented with two identical boy puppets named Léo and Nico and were told the following introductory instructions (all materials translated from French):

I am going to tell you the story of two children. They are both [age of the participant] years old, they go to the same school, and have the same teacher. They are like twins except that they are friends. Soon, you will see them playing together in the park. You will have to look carefully and listen to what they are saying to each other.

Children were then shown a small box containing two plastic chocolate pieces of unequal sizes. They were told that these chocolates can only be eaten by puppets and were asked few questions:

Look at what I have in this small box. What are these? (All children answered that the box contained chocolate.) Yes, chocolate pieces. However, do you know what? These are magical chocolate pieces because only puppets can eat them. And puppets are so very fond of chocolate. They are also really greedy; they like it when they have a lot of chocolate. The more they have, the happier they are. Is there a big piece and a small piece of chocolate here? (All children answered yes.) Show me which is the bigger one? And which is the smaller one? (All children pointed correctly to the respective chocolates.) Which one would the puppets rather like to have? And which one would they not want to have? (All children indicated that puppets would prefer the larger piece over the smaller one.)

Then the children watched the two puppets while making opposing suggestions about which games to play together. One puppet expressed the desire to play a game (e.g., to play with the ball), whereas the other puppet wanted to play a different game (e.g., jumping). The disagreement occurred three times, and on each occasion, the same puppet—the dominant—imposed his will. The other puppet—the subordinate—explicitly agreed to play the game proposed by the dominant, and the two puppets were then shown playing that game. The dominant character never explicitly

claimed to be the boss, nor did he act bossy (see Appendix A for details of the dialogue). No markers of dominance were present during the game (e.g., to win or to jump higher). The spatial position of the dominant and subordinate puppets, their turn of speech, and the games they proposed were counterbalanced. After the puppets had played the three games, children were asked two comprehension questions, in a counterbalanced order, to make sure that they understood the story properly:

Which puppet was the one who always chose the games?

Which puppet never played his favorite games?

When children ($n = 3$) were unable to answer these questions, the experimenter told a simpler version of the story and asked the same two questions again. Two of the 3 children gave a correct answer on the simpler version of the story; the data of the remaining child was removed from the final results.

In the test phase, children were asked to distribute the chocolates to the two puppets with the following prompt:

Please take both chocolate pieces in your right hand. Now you should choose which puppet gets which piece. You should think and decide to whom you want to give the bigger piece and to whom you want to give the smaller piece.

After the distribution, participants had to justify their choice: “Why did you give this one the bigger chocolate and this one the smaller chocolate?” Then, the puppets pretended to eat their chocolates, which were therefore no longer visible, and they warmly thanked the child. Children were then asked to identify both the dominant and the subordinate to confirm that they correctly recalled the dominance asymmetry. In French, the questions were “Qui commande?” and “Qui ne commande pas?” (order counterbalanced). This could be translated by “Who is leading/not leading?” or “Who is in charge/who is not in charge?” The four age groups largely provided the correct answer (90% of the 3-year-olds, 86% of the 4-year-olds, 98% of the 5-year-olds, and 100% of the 8-year-olds). Finally, a preference question was asked: “With which puppet would you like to play with and be friends with?” All participants were tested in their schools.

Coding. Two independent coders categorized all the justifications ($N = 173$). A first distinction was made between irrelevant and relevant justifications. The absence of answer and the production of circular or idiosyncratic answers were considered as irrelevant justifications (e.g., “I don’t know,” “because I wanted to,” “my mom always buys me chocolate”). Relevant justifications were classified into four categories. The first category referred to the dominant’s higher status and his greater decision power (“Preservation of dominance”), whereas the second category included justifications mentioning the subordinate’s previous misfortune (“Compensating for dominance asymmetry”). The third category contained justifications related to the puppets’ ages, a trait which is relevant to dominance but which was not present in the scenario (“Age related justifications”). Finally, the fourth category included justifications that did not mention asymmetry (“Serving the puppets’ interests”). Interrater reliability reached 95% ($\kappa = .93$). Disagreements between coders were resolved through discussion. Following is the detailed description of each of these categories.

Preservation of dominance. Children referred to the higher status of the dominant puppet or to his greater decisional power to justify giving the bigger chocolate to this puppet. Examples include, “Because he always chose the games,” “Because he is the boss” (The French word for boss, *chef*, is very frequently used by French-speaking children to refer to someone who gives orders or who decides what should be done; see Charafeddine et al. (2015) “He decides, so he’s the boss,” “Because he chose to play the games that he wanted,” and “Because the other one did not even play with the spinning top.”

Compensating for dominance asymmetry. Children justified the allocation of the bigger chocolate by referring to the impossibility for the subordinate to play his games (“Because he never got to choose the game” and “Because he deserves more because he couldn’t get to play”) or more generally by referring to the inequality between the two puppets (“Because this one decides and this one doesn’t. It’s bad!” and “Because he had less luck than the other one.”)

Age-related justifications. Even if the puppets were said to be the same age as the children, these children justified their unequal distribution by mentioning asymmetry in age. These comparisons were as likely to occur when favoring the dominant or the subordinate. Examples include, “He is older,” “He seems older,” “This one is very tall.”

Serving the puppets’ interests. The fourth category includes justifications that did not refer to the dominance scenario or to any explicit comparative characteristics but to factors such as will, taste, desire, or the interests of one or both protagonists. Examples include, “because he wanted it”; “because he likes chocolates”; “both of them adore chocolate”; “this one adores the small one, and this one adores the big one”; “that way, they could share”; and “that way, they won’t quarrel.”

Results

Resource distribution. The association of resource allocation patterns with age group and gender was tested using a log-linear model (Agresti, 2002). This analysis allowed us to test for simple associations as well as possible interactions between the three variables. Starting from the saturated model and after automatic deletion of unnecessary high-order effects on the basis of the Bayesian information criterion (BIC), the resulting model was one in which only the association between age class and resource allocations best fit the results (Aikake information criterion [AIC] = 131.77).

To further analyze the associations between the relevant variables, chi-square independence tests were performed. The gender variable was not associated with the resource allocation pattern for all age groups combined, $\chi^2(1, N = 173) = 1.66, p = .197$. Regarding the effect of age, a chi-square test indicated that the resource distribution pattern significantly differed between age groups, $\chi^2(3, N = 173) = 32.15, p < .001$ (Cramer’s $V = .4$; see Figure 1). More specifically, the partition of the chi-square into degrees of freedom indicated the following: that the 8-year-olds were more likely to allocate the big chocolate to the subordinate puppet than all the other children (Partition 1: $\chi^2[1, N = 173] = 26.9, p < .001$; Cramer’s $V = .39$); that the 5-year-olds were more likely to allocate the big chocolate to the subordinate puppet than were the 3- and 4-year-olds (Partition 2: $\chi^2[1, N = 143] = 5.18,$

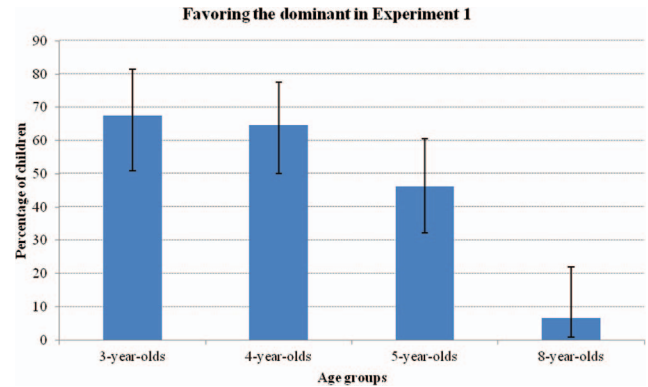


Figure 1. Percentage of children who allocated the big chocolate to the dominant by age group. Bars represent 95% confidence intervals. See the online article for the color version of this figure.

$p = .023$; Cramer’s $V = .19$); that the 3- and 4-year-old groups did not significantly differ from each other (Partition 3: $\chi^2[1, N = 91] = .07, p = .791$). The analysis by age group revealed that while the 3- and 4-year-olds were more likely to give the big chocolate to the dominant puppet (3-year-olds: 27 for the dominant vs. 13 for the subordinate, two-tailed binomial test, $p = .04$; 95% CI [50.87, 81.43]; 4-year-olds: 33 for the dominant vs. 18 for the subordinate, two-tailed binomial test, $p = .049$; 95% CI [50.06, 77.56]), the 5-year-olds were at chance (24 for the dominant vs. 28 for the subordinate, two-tailed binomial test, $p = .67$; 95% CI [32.23, 60.53]), and nearly all 8-year-olds allocated the big chocolate to the subordinate puppet (2 for the dominant vs. 28 for the subordinate, binomial test, $p < .001$; 95% CI [0.81, 22.07]).

Justifications. For 3- and 4-year-olds, justifications were pooled together because both groups showed a similar pattern of responses in the distribution task and both exhibited a high level of irrelevant justifications. In line with previous studies, the rate of irrelevant responses decreased with age (3- and 4-year-olds: 50%; 5-year-olds: 25%; 8-year-olds: 6.7%, $\chi^2[2, N = 173] = 21.93, p < .001$; Cramer’s $V = .35$). Given the high proportion of irrelevant justifications among the 3- and 4-year-olds, we analyzed whether the ability to provide justifications affected the resource allocation pattern in this group. No significant difference was found between those who provided relevant justifications and those who did not, $\chi^2(1, N = 91) = .006, p = .9$.

More important, a relatively high proportion of justifications explicitly referred to the dominance asymmetry (the first and the second category) in the three age groups and the rate of such justifications increased with age (3- and 4-year-olds: 45.7%; 5-year-olds: 82%; 8-year-olds: 96.4%, $\chi^2[2, N = 113] = 25.34, p < .001$; Cramer’s $V = .47$). Table 1 shows the distribution of the relevant justifications in the four categories.

Preference. One hundred 63 children designated either the dominant or the subordinate puppet as the puppet they would prefer to play with, and 10 children designated both or none of the puppets. The group comparison was highly significant, $\chi^2(3, N = 163) = 23.47, p < .001$ (Cramer’s $V = .35$), and indicated that the preference for the subordinate puppet increased with age. More specifically, the partition of the chi-square into degrees of freedom indicated the following: that the 8-year-olds were more likely to

Table 1
Categories of Justifications in Experiment 1 (in Percentages)

Advantaged puppet	Justification category			
	1. Preservation of dominance	2. Compensating for dominance asymmetry	3. Age-related	4. Serving the puppets' interests
3- and 4- year-olds (<i>n</i> = 46)				
Dominant	38.7	0	19.3	41.9
Subordinate	0	60	20	20
Total	26.1	19.6	19.6	34.8
5-year-olds (<i>n</i> = 39)				
Dominant	81.2	0	6.3	12.5
Subordinate	0	82.6	13.4	4.35
Total	33.3	48.7	10.3	7.7
8-year-olds (<i>n</i> = 28)				
Dominant	96.4	0	0	3.6
Subordinate	0	0	0	0
Total	96.4	0	0	3.6

prefer the subordinate than the other children (Partition 1: $\chi^2[1, N = 163] = 16.37, p < .001$; Cramer's $V = .29$); that the 5-year-olds were more likely to prefer the subordinate than the 3- and 4-year-olds (Partition 2: $\chi^2[1, N = 134] = 6.82, p = .009$; Cramer's $V = .22$); that the 3- and 4-year-old groups did not significantly differ from each other (Partition 3: $\chi^2[1, N = 85] = 0.278, p = .598$). No gender difference was observed, $\chi^2[1, N = 163] = .497, p = .483$. The analysis by age group did not reveal any significant difference in the 3-, 4-, or 5-year-olds (3-year-olds: 24 for the dominant vs. 14 for the subordinate, two-tailed binomial test, $p = .14$; 4-year-olds: 27 for the dominant vs. 20 for the subordinate, two-tailed binomial test, $p = .382$; 5-year-olds: 18 for the dominant vs. 31 for the subordinate, two-tailed binomial test, $p = .085$). The 8-year-olds, however, largely preferred the subordinate puppet (3 for the dominant vs. 26 for the subordinate, two-tailed binomial test, $p < .001$, 95% CI [0.02, 0.27]). Thus, the answers to the preference question parallel those of the distribution task. An analysis of children's answers using a chi-square independence test shows that they significantly preferred the puppet to which they had given the bigger chocolate, $\chi^2(1, N = 163) = 38.9, p < .001$ (Cramer's $V = .5$).

Discussion

Taken together, the three measures analyzed (resource distribution, justifications, and preferences) revealed that preschoolers' attitudes toward the puppets were not neutral. The 3- and 4-year-olds showed a clear tendency to favor the dominant puppet when distributing resources, the 8-year-olds a clear tendency to favor the subordinate puppet, and, although the 5-year-olds were at chance, their justifications showed that they did take into account the puppets' dominance status in their decisions. Overall, the results suggest that as children grow older, they become more likely to favor the subordinate in resource allocation tasks. The developmental pattern of resource distribution showed that the tendency to favor the dominant in early ages disappeared at approximately 5 years of age and was fully overridden by a tendency to favor the subordinate at 8 years.

The results to the preference question were in line with the distribution results as they indicated an increase of the preference for the subordinate puppet. However, the preference for either the

dominant or the subordinate did not reach statistical significance in any of the preschoolers' groups. Only the 8-year-olds showed a significant preference for the subordinate. Caution is required when interpreting the preference data as the distribution task was presented first and might have biased participants' choice to the preference question, especially as the statistical analysis indicated that most children preferred the puppet to which they gave the bigger chocolate.

The justifications were informative and indicated a sensitivity to the social asymmetry described in the task. We think that the high rate of irrelevant justifications for the 3- and 4-year-olds (50%) probably indicates trouble in producing sound justifications at this age rather than a difficulty in understanding dominance. Indeed, in the current Experiment 90% of the 3-year-olds and 86% of the 4-year-olds were able to identify the puppet who imposed his choice as the one that was leading. Moreover, there was no significant difference in resource allocation between 3- and 4-year-olds who provided relevant justifications and those who did not. These results are in line with previous research indicating that young preschoolers could have an accurate understanding of social situations and make fair judgment in decision tasks while being unable to justify their choice (Baumard et al., 2012; Kenward & Dahl, 2011; Pillow, 1989; Wiersma & Laupa, 2000).

In Experiment 1, children were requested to perform a positive action by giving resources. Children might have therefore been incited to focus on the positive side of the puppets' behavior. In particular, the younger preschoolers might have considered that the dominant character should be associated with a positive action (i.e., allocating him with more resources) as he succeeded in achieving his goal. In the next experiment, we change the framing of the resource allocation and examine whether the execution of a negative action, taking resources, modifies the pattern of results found in Experiment 1. Adults and preschoolers react differently to identical resource distributions that result from giving or taking (Keysar, Converse, Wang, & Epley, 2008; Vogelsang & Tomasello, 2016). For instance, preschoolers reciprocate more after an act of giving (e.g., a puppet gives 50% of her resources to the child and keeps 50%) than after an act of taking (e.g., a puppet takes 50% of the child's resources for herself and leaves 50% to the child), which indicates concern for the valence of social intentions

driving resource distribution (Vogelsang & Tomasello, 2016). In a third-party task, inflicting a loss on an individual might encourage children to concentrate more on traits that should be punished (e.g., the selfishness of the dominant individual). Hamlin et al. (2011) also argued that, in taking situations, toddlers avoid taking a resource from an individual who has suffered from antisocial actions. Children could thus be more reluctant to take from a subordinate who did not get to play his game and might be more likely to take from the dominant who selfishly imposed his will.

Experiment 2

The resource allocation task used in Experiment 2, which we dubbed the “Robin Hood” paradigm, asked children to redistribute resources between different individuals. As it is the case in taking paradigms (Hamlin et al., 2011; Vogelsang & Tomasello, 2016), the participants were presented with three characters. The three characters were endowed with various amounts of resources that children were invited to reallocate. There were two subordinates and one dominant. The dominant and one of the subordinates had three coins, and the other subordinate had only one coin. In this Robin Hood paradigm, participants were asked to take one coin from either the dominant or the subordinate with three coins in order to give it to the subordinate with only one coin. Another difference from Experiment 1 is that the dominant character could hardly be seen as proposing better games or as being endowed with greater social merit. Indeed, the dominant character explicitly told the two others that he was the “boss” and that this is why they should play his game. A final difference with the previous experiment is that children were divided into only three age groups: the younger group included 3- and 4-year-old children (43 to 59 months), the intermediate group included 5- and 6-year-old children (60 to 78 months), and the older group included 8-year-old children (102 to 108 months).

Method

Participants. One hundred 33 children participated in this experiment. Preschoolers were tested in two public kindergartens, and 8-year-olds were tested in two elementary schools. Written parental consent was gathered for all participants. One child was excluded from the results for interrupting the experiment. The final data set included 132 participants from three age groups: 3- to 4-year-old children (from 43 to 59 months, $M_{age} = 53$ months; 31 girls and 23 boys), 5- to 6-year-old children (from 60 to 78 months, $M_{age} = 69$ months, 23 girls and 24 boys), and 8-year-old children (from 102 to 108 months, $M_{age} = 102$ months, 16 girls and 15 boys).

Material and procedure. The experiment had two phases. The dominance phase consisted of introducing participants to three boys, drawn respectively in green, purple, and blue on a sheet of paper (see Figure 2 and Appendix B). The experimenter said that each boy brought his favorite game to the park and that each wanted to play his game with the other two. In addition, one of the three boys claimed to be the boss and for this reason he dictated that everyone should play his game for the whole afternoon. The other two characters complied with his proposal by indicating their agreement. The experimenter told the participants that the three boys did play the game proposed by the self-proclaimed boss. This

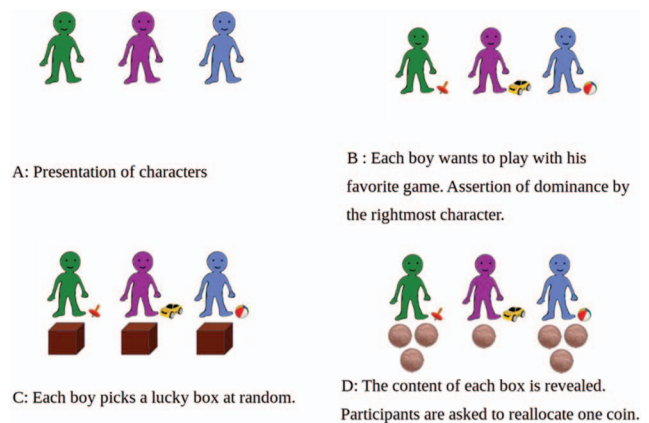


Figure 2. Snapshots of Experiment 2. See the online article for the color version of this figure.

phase of the study was designed to establish the ranks of the three characters: one dominant and two subordinates. The colors of the characters and the games they brought were counterbalanced across participants. One subordinate was always in the middle position and the spatial position (left vs. right) of the other two characters was counterbalanced across participants. At the end of this phase, children were asked to summarize what they saw.

The resource phase consisted in presenting the characters along with their resources (coins). To avoid interpretations of the unequal distribution of resources in terms of merit, the experimenter mentioned a clown who passed by and made the characters randomly choose closed opaque boxes which turned out to contain coins. The left-hand side and the right-hand side characters got three coins from their respective box, whereas the middle character got only one coin. There were thus a rich dominant, a rich subordinate and a poor subordinate. After the content of each box had been revealed, children were asked to allocate one more coin to the poor character by taking it from one of the two rich characters (see Appendix B and Figure 2).

Coding. The same two coders of Experiment 1 categorized the justifications ($N = 132$). Irrelevant justifications included no responses, circular, and idiosyncratic responses. Relevant justifications were classified into four categories (see Table 2), three of which were identical to those in Experiment 1: “Preservation of dominance,” “Compensating for dominance asymmetry,” and “Serving the puppets’ interests.” A novel category of justifications was labeled “Compensating the poor.” These justifications referred to the character that had only one coin and were not related to the dominance asymmetry between the two rich characters (e.g., “because he had only one coin”). Interrater reliability reached 95% ($\kappa = .92$) and disagreements were resolved through discussion.

Results

Resource reallocation. A log-linear model (Agresti, 2002) was performed to analyze the association of resource allocation, age group, and gender. The three variables are put into a three-way contingency table to test for simple associations as well as possible interactions. Starting from the saturated model and after automatic deletion of unnecessary high-order effects on the basis of the BIC,

Table 2
Categories of Justifications in Experiment 2 (in Percentages)

Advantaged puppet	Justification category			
	1. Preservation of dominance	2. Compensating for dominance asymmetry	3. Compensating the poor	4. Serving the puppets' interests
3- and 4-year-olds (<i>n</i> = 21)				
Dominant	50	0	33.3	16.7
Subordinate	0	66.7	22.2	11.1
Total	28.6	28.6	28.6	14.3
5- and 6-year-olds (<i>n</i> = 30)				
Dominant	86.7	0	0	13.3
Subordinate	0	100	0	0
Total	43.3	50	0	6.7
8-year-olds (<i>N</i> = 31)				
Dominant	100	0	0	0
Subordinate	0	100	0	0
Total	22.6	77.4	0	0

the resulting model was one in which only the association between age class and resource allocations best fit the results (AIC = 86.511).

To further analyze the associations between the relevant variables, chi-square independence tests were performed. The gender variable was not associated with the resource allocation pattern for all age groups combined, $\chi^2(1, N = 132) = .03, p = .842$. Concerning the developmental pattern, as shown in Figure 3, it was similar to that found in Experiment 1. A chi-square test indicated that the resource reallocation pattern significantly differed between age groups, $\chi^2(2, N = 132) = 15.41, p < .001$ (Cramer's $V = .34$). The partition of the chi-square into degrees of freedom indicated the following: that the 8-year-olds were less likely to take a coin from the rich subordinate than the other children (Partition 1: $\chi^2[1, N = 132] = 13.58, p < .001$; Cramer's $V = .32$); that the 5- and 6-year-old group and the 3- and 4-year-old group did not significantly differ (Partition 2: $\chi^2[1, N = 101] = 1.83, p = .176$). The analysis by age group revealed that while the 3- and 4-year-olds were significantly more likely to take a coin from the rich subordinate than from the dominant (36 vs. 18, two-tailed binomial test, $p = .02$; 95% CI [52.52, 78.9]), the 5- and 6-year-olds were indistinguishable from chance level (25 vs. 22,

two-tailed binomial test, $p = .771$; 95% CI [38.08, 67.89]), and the 8-year-olds were significantly less likely to take a coin from the rich subordinate than from the dominant (7 vs. 24, two-tailed binomial test, $p = .003$; 95% CI [9.59, 41.09]; see Figure 3).

Justifications. As in Experiment 1 the rate of irrelevant justifications decreased with age (3–4-year-olds: 61.1%; 5–6-year-olds: 36.2%; 8-year-olds: 0%; $\chi^2[2, N = 132] = 31.35, p < .001$; Cramer's $V = .49$). Given the relatively high proportion of irrelevant justifications among the 3- and 4-year-olds, we again analyzed whether the ability to provide justifications affected the resource allocation pattern in this group. No significant difference was found between those who provided relevant justifications and those who did not, $\chi^2(1, N = 53) = 1.13, p = .29$. As in Experiment 1, the proportion of relevant justifications which explicitly referred to the dominance asymmetry (Categories 1 and 2) was higher for older children (3- to 4-year-olds: 57.2%; 5- to 6-year-olds 93.3%; 8-year-olds: 100%). However, because the expected frequencies cells were too small in several cells, we could not analyze the distribution with a chi-square test. Table 2 shows the distribution of the relevant justifications.

Discussion

Using a taking task, Experiment 2 shows a similar pattern to that of Experiment 1. The 3- and 4-year-olds showed a tendency to favor the dominant over the subordinate character by preserving the resources of the former but not that of the latter. The framing of the experiment, which could have invited participants to focus more on the negative side of the dominant character, did not encourage the younger preschoolers to act more negatively against him. Experiment 2 thus confirms the tendency of 3- and 4-year-olds to favor dominants over subordinate through resource distribution. Regarding the 5- and 6-year-olds and the 8-year-olds, the results were again in line with those of Experiment 1: The 5- and 6-year-olds did not favor one character over the other, and the 8-year-olds clearly favored the subordinate.

General Discussion

In two different tasks, preschoolers and 8-year-old children were presented with dominance situations and were then asked to act in

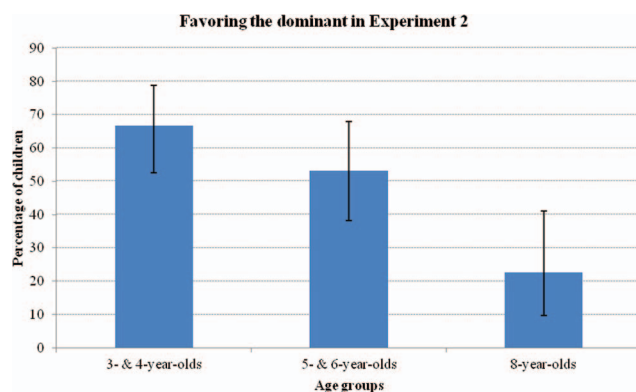


Figure 3. Percentage of children who reallocated the coins in favor of the dominant. Bars represent 95% confidence intervals. See the online article for the color version of this figure.

favor of either a dominant or a subordinate individual. In the chocolate distribution task (Experiment 1), after seeing one of the individuals imposing his choice of game on the other, the children had to choose the individual to which they would like to give a big versus a small chocolate. In the Robin Hood paradigm (Experiment 2), dominance occurred in a more peremptory context because one individual proclaimed himself the boss; then children were asked to remove one coin from either the dominant or the subordinate character to give it to a character with fewer resources. Both tasks yielded similar results: The 3- and 4-year-olds favored the dominant individual, the 5-year-olds exhibited conflicting choices with no overall preference, and the 8-year-olds strongly favored the subordinate. In the next part of the discussion, we consider in greater detail the mechanisms that may account for the greater resource allocation to the dominant observed among the 3- and 4-year-olds and for the growth of compensatory behavior with age. We consider change in social cognition, that is, in the ways children evaluate others' behaviors and relationships, in this case dominance, as well as change in the cognitive resources and abilities that they progressively develop with age.

A first mechanism relates to the development of dominance during childhood and to the way dominant individuals might be evaluated as potential social partners. Observational studies performed in peer groups show that among toddlers and preschoolers, dominance is largely based on agonistic interactions linked to resource control (e.g., toys, locations), and involves a high degree of coercion and aggression regardless of potential negative peer social evaluation (Russon & Waite, 1991; Strayer & Strayer, 1976; Strayer & Trudel, 1984). At around 5 years of age, as children develop more sophisticated relationships and greater concerns for others, compromising, sharing, and helping emerge as means to obtain resources and to increase one's own dominance rank in the group (Hawley, 1999). By the age of 8, the two types of dominance are fully differentiated, with some dominant individuals being uniformly coercive and others combining coercive and other-oriented behavior (Hawley, 1999; Hawley, 2002; this distinction is also made for adults, see Kalma, Visser, & Peeters, 1993). Hence, though antisocial dominance is the only norm of social stratification of peer groups at younger age, this norm tends to decline with age.

As the nature of dominance changes so does the evaluation of dominant peers. In early childhood, dominant individuals, although coercive, occupy a central position in the group and are the focus of social attention (La Freniere & Charlesworth, 1983; Strayer & Trudel, 1984). Their abilities to control resources and to get what they want make them valuable social partners. As a result, preschoolers find them more likable than their other peers, preferentially affiliate with and imitate and learn from them (Abramovitch & Grusec, 1978; La Freniere & Charlesworth, 1983; Roseth et al., 2007; Russon & Waite, 1991; Strayer & Trudel, 1984). This positive stance toward dominant individuals can be viewed as a self-interested strategy intended to ingratiate oneself with those individuals in order to benefit from the advantages associated with dominance. It can therefore lead the child to act positively toward dominant individuals and to allocate them more resources despite their antisocial behavior.

In addition, a self-interested strategy may also comprise favoring dominant individuals so as not to offend them, for offending a dominant is likely to yield more detrimental consequences than offending a subordinate. A dominant may feel more anger when his social position is weakened and even reversed by a greater allocation

of resources to his subordinate. Hence, to maximize the benefits and minimize the costs of interactions with dominant individuals, preschoolers may choose to favor them and allocate them more resources.

At around the age of 8, antisocial dominance is no longer the norm in peer groups (Hawley, 1999), antisocial dominant peers become comparatively less valuable social partners than those who use prosocial strategies. The advantages of ingratiating oneself with a dominant can be obtained at a lower cost with prosocial dominants who are less selfish and less aggressive. At an age when concern for equality is higher than during preschool years (8 years old), as shown by first-party and third party tasks, children are likely to be repelled by antisocial dominance. For instance, Pettit et al. (1990) reported that whereas first-grade boys preferred dominant peers even they showed high level of antisocial dominance, this was no longer the case among the third graders who tended to dislike antisocial dominance (see also, Dodge, Coie, Pettit, & Price, 1990). The developmental trend observed in the present study may thus reflect the change in dominance evaluation among peer groups.

The previous account focuses on hierarchical relations among peers, but hierarchy is also pervasive in child–adult relations. Parents and teachers represent authority figures on which children necessarily rely. They issue behavior rules and moral precepts that children are requested to follow. However, reliance on authority figures decreases over time. While during infancy and the early preschool years, information, decision-making criteria, guidance, and comfort are provided almost exclusively by adults, this is much less the case for school-age children, who increasingly learn from their peers. Although in each of the current experiments the dominant character was not an adult who was giving orders to a child, participants may have considered that the dominant was endowed with a higher authority status since the subordinates ultimately complied with the dominants' decisions. Previous research has indeed shown that children have no difficulty in accepting that other children can hold authority positions (Damon, 1977; Laupa, 1994; Laupa & Turiel, 1986).

Early on, Piaget (1932) developed the idea that children at a young age tend to align justice with adult authority (i.e., what is instructed by an adult is what is fair) and that they later disconnect the two notions and place justice above authority. In particular, he argued that in situations where equality is in conflict with authority, the youngest (5- to 7-year-olds) incline to authority while older children (8-year-olds and older) incline to equality. For instance, when children were told stories about an authority who asked a child to perform an action that another child was supposed to do (i.e., to go and fetch the bread, to dry the plates), 95% of the 6-year-olds defended obedience to authority, whereas 66.6% of the 8-year-olds were opposed to the authority and defended fairness.

Piaget (1932) also reported that as children grew older they were more likely to request equality with adults in shopping (i.e., they considered it unfair to serve the grown-ups first) and favored solidarity between children over authority (whereas snitching was positively judged by the 6- and 7-year-olds, it was largely condemned by the 8-year-olds and older children). Although more recent work has shown that even preschoolers can conceptualize institutional boundaries to authority figures and disapprove of authority requests, especially when an authority asks to hit another person (Damon, 1977; Laupa, 1994; Laupa & Turiel, 1986; Weston & Turiel, 1980), school-age children are much more likely

to do so (Laupa, 1994; Laupa & Turiel, 1986). The developmental trend observed in the present study may reflect this decreasing reliance on authority figures. By allocating more resources to the dominant, the younger children may acknowledge who is in charge in the interaction and indicate that the authority should be respected and not weakened. By contrast, the 8-year-olds, who are more autonomous, may give higher priority to equality over authority and allocate more resources to the subordinate.

Another developmental mechanism that may account for the greater allocation of resources to the subordinate is the increase of sympathy and empathy across childhood. As children grow older, they show greater concerns for victims and act more positively toward them (Eisenberg & Fabes, 1998). In the dominance relationships presented in the current study, the subordinate can be seen as a victim since he is prevented from doing what he wants to do by the dominant character, which therefore can be viewed as the victimizer. But then, the question is, why would the 3- and 4-year-olds give less to the victim than to the victimizer because it is known that preschoolers understand moral behavior and display negative reactions toward antisocial acts?

A potential explanation lies in the emotions young children attach to the victimizer. Although preschoolers have developed a sophisticated understanding of morality and justice, they are less knowledgeable of the emotional consequences of antisocial actions. The “happy victimizer” phenomenon (Arsenio & Kramer, 1992; Barden, Zelko, Duncan, & Masters, 1980; Nunner-Winkler & Sodian, 1988) shows that preschoolers and early school-age children tend to attribute more positive than negative emotions to the victimizer: the victimizer is happy because he has attained his goal (e.g., acquiring a toy by stealing it). In contrast, older children (at around 8 years of age) are more likely to attribute negative emotions to the victimizer: The victimizer feels sad and guilty because of the harm inflicted to the victim. In other words, the emotions younger children attribute to the victimizer are guided by the outcome of an action and the satisfaction of desires, whereas for older children they are more often guided by the moral evaluation of the action. In the dominance context, focusing on the outcome of the dominant’s actions and less on the negative consequences for the subordinate may have led preschoolers to associate the dominant individual with success rather than with guilt.

So far, the explanations proposed to account for the developmental pattern found in the present study rely on mechanisms related to social concerns, but differences in cognitive abilities might also contribute to this trend. Past research has suggested that cognitive abilities such as memory, proportionality skills, and numerosity can influence social decision tasks and account for age differences in those tasks (Chao et al., 1986; Hook & Cook, 1979; Knight et al., 1987; Knight, Dubro, & Chao, 1985; Lane & Coon, 1972). In particular, Knight and his colleagues (1985, 1987) argued that in social situations that offer a choice between two alternatives, the expression of different social values, such as equality or individualism partially depends upon the differential processing demands associated with those values (Chao et al., 1986). By making a formal task analysis, they show that equality (minimizing the difference between one’s own gain and the other’s gain) taxes more computational resources than individualism (maximizing’s own gain regardless of the other’s gain). Whereas equality requires the manipulation of four quantities (the amount of one’s own gain and the other’s gain under both alternatives) and

three comparisons (the comparison of the two quantities in each alternative and the comparison between the two alternatives), individualism requires the manipulation of only two quantities (the amount of one’s own gain in each alternative) and a single comparison (the comparison of these two quantities). In line with this analysis, they found that: a) the development of the equality value with age was associated with greater processing skills (Knight et al., 1985), b) equality outcomes yielded longer processing time and more errors than individualistic outcomes (Chao et al., 1986), and, c) minimizing task demands increased equality decisions in children (Knight et al., 1987). Hence, although a preference for equality may emerge early, the computational demands of equality in some situations may prevent it from being applied.

A similar argument could be made for the present task. Equality requires the manipulation of different quantities under two alternatives, the combination of different types of inequalities (dominance inequality and resource inequality) and the comparative evaluations of alternatives. Moreover, whereas the perpetuation of status quo is based upon the reality of social dominance that the child has perceived, counteracting the dominance asymmetry requires the ability to imagine alternative possibilities, in this case equality. Given their weaker executive and inhibitory skills (Bloom & German, 2000), 3- to 4-year-old children might be less likely to set aside currently available, salient information, in this case dominance, and to generate an answer based on an alternative counterfactual state of affairs. They might be more prone to a “realist bias” that tends to validate and maintain what is the case and makes it difficult to consider what could or ought to be the case (Mitchell, 1994). The fact that reality inhibition is cognitively challenging might explain why an “ethical stance” grounded in deontic principles such as strong egalitarian concerns and reciprocity expectations develops a bit later in ontogeny (Robbins & Rochat, 2011). If the ethical line of reasoning is too demanding, young participants may simply choose to “stick” to the given situation, which means to focus on the more salient individual, namely the dominant, and to give him the more salient (i.e., the greater) amount of resource.

The explanations advanced above describe the developing tendency to rectify dominance inequality through various types of cognitive and sociocognitive mechanisms. However, these mechanisms are obviously more or less sustained by social and cultural environments, and this may modulate the attitude toward dominance and other types of social inequality. For instance, although Olson et al. (2011) reported a developmental pattern which was relatively similar to ours when children were confronted with a group-based inequality involving black versus white individuals (Experiment 1), their results showed a tendency to perpetuate inequality at all ages (from 3.5 to 11.5 years) when other types of groups were involved (Asians vs. Whites, or groups differentiated by shirt color; Experiments 2 and 3). The authors suggest that children’s perception of inequality between Blacks and Whites might be different from that of the other tested groups because they probably learn more about inequalities and the need to rectify them in the particular context of Black–White comparisons. This could also be the case in the current study, and one cannot exclude that either at school or at home, children learn that dominance-related behavior has to be counteracted. A future research direction would thus be to investigate how cultural and familial environment may modulate the attitude toward dominance.

A limitation of the current study is that children always distributed resources in the presence of an adult experimenter. Such a procedure is largely followed in studies using third-party distribu-

tion tasks. However, several experiments using different tasks have shown that children act more prosocially when they are watched by an observer. They share more resources and tend to be more helpful in the presence of a peer (Buhrmester, Goldfarb, & Cantrell, 1992; Engelmann, Herrmann, & Tomasello, 2012; Leimgruber, Shaw, Santos, & Olson, 2012); they also steal more and cheat more when they are left alone (Engelmann et al., 2012; Piazza, Bering, & Ingram, 2011). This demonstrates that children have reputational concerns and act in way to enhance their reputation by showing their ability to set aside their own interests (Engelmann et al., 2012; Leimgruber et al., 2012). Although in third-party tasks, children's own interests are moderately at stake, the presence of the experimenter may nonetheless encourage them to act more prosocially. In the current experiment, they may allocate more resources to the subordinate by showing off their ability to counteract inequality. Future research should therefore investigate whether counteracting inequality in third-party tasks shows a strive for fairness or a strive to look fair.

Finally, another avenue of research would be to examine implicit attitude toward dominance. A recent study has shown that counteracting a resource-based inequality requires the explicit knowledge of that inequality (Li et al., 2014). In their study, Li et al. (2014) observed that when children explicitly recalled who was advantaged versus disadvantaged, they allocated more resources to the disadvantaged, whereas when they lost explicit memory of the inequality they did favor the advantaged and perpetuate the inequality. According to the authors, such finding suggests that a low-level "affective tagging" mechanism leads to implicitly favor the advantaged. In the present study, participants were explicitly aware of who was dominant and who was subordinate at the time they distributed resources. It might be that in a context where they had lost explicit memory of who was dominant and who was subordinate, the children who counteracted the inequality would not have done so. Future research should explore this issue and more generally investigate the affective mechanisms that underlie the attitude toward dominance.

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(Appendices follow)

Appendix A

The Three Dominance Sequences of Experiment 1

A (subordinate):	Hi Nico!	B:	Ok, let's play something else now; let's jump.
B (dominant):	Hi Léo! What are you playing?		
A:	I'm playing with marbles; do you want to play marbles with me?	A:	No, let's rather run; it's so fun.
B:	Oh no! I do not want to play marbles; I want so much to play with the ball. Come we should play with the ball.	B:	No, let's jump; it's much more fun. Come on!
A:	No, but I like to play marbles; let's play marbles!	A:	Ok! I'm coming.
B:	No, let's play with the ball; it's so much fun! Come on!	They jump together.	
A:	Ok! I'm coming!	B:	See? It's fun to jump!
They play with an imaginary ball.		A:	Yeah, it's fun!
B:	You see, it's so fun to play with the ball.	B:	Ok, now let's play something else. Do you want to play on the swing?
A:	Yeah, it's so fun.	A:	Or, you know . . . we could play hide and seek!
		B:	No, let's play on the swing; it's fun!
		A:	Ok! I'm coming.

Appendix B

Exact Wording of the Story Told in Experiment 2

Dominance Phase

Step 1: Presentation of characters. (While speaking, the experimenter points to the appropriate character in Figure 2A).

Look! There are three boys. They are friends, and they came to the park to play games together. Each boy brought his favorite game.

Step 2: Dominance interaction. (While speaking, the experimenter points to the appropriate character in Figure 2B).

Look at this boy: He brought his spinning top. This boy brought his car, and this boy came with his ball. This one says: "I brought the spinning top because it's my favorite game, and I would like

"so much for" us all to play with the spinning top together." This one said: "I brought the car because it's my favorite game, and I would like so much for all of us to play with the car together." And this one said: "I brought the ball because it's my favorite game, and I would like so much for all of us to play with the ball. Well, and I am the boss! So this is what we are going to do; we are going to play with the ball the whole afternoon!" So this one said, "OK," and this one said, "OK," and that's what happened. The three boys played with the ball the whole afternoon. So, no one played spinning top and no one played cars, they only played with the ball the whole afternoon.

Prompt: Tell me what happened? What did the boys play? Why?

(Appendices continue)

Dominance Phase

Step 3: Random distribution of opaque boxes. (While speaking, the experimenter points to the appropriate character in Figure 2B and then distributes boxes as shown in Figure 2C).

While the boys are playing, a clown passes by with a bag full of boxes. The clown says “Yoohoo! Kids! Do you want to play with magic lucky boxes?” And the boys say, “Yeah! Hurray!” The clown says “Well! Every boy can put his hand in the bag and close his eyes and pull out one box at random! Then we will see what he got inside the box!”

Then this boy pulled out this box at random. This boy pulled out this box at random, and this boy pulled out this box at random.

Do you want to see what each one has got?

Step 4: Resource distribution. (While speaking, the experimenter opens the boys’ boxes and puts the coins under each boy as in Figure 2D).

Let’s see! Oh look this one got three coins. Oh, and look this one got one coin. And this one . . . well this one also got three coins. Do you think that all the boys are happy with what they got?

Test question: Tell me, do you think that one of the boys is not happy with what he got? Which one is it? You could do something for the unhappy boy. You could help him by giving him one more coin, but for that you will have to choose from which of the boys you want to take it away. Do you want to take the coin from him or from him?

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