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Do Preschoolers Align Their Preferences With Those of a Powerful Individual?

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Very early on, children understand the hierarchical dimension of the social environment and use a variety of cues to guess who has more power in an interaction. A crucial aspect of power perception lies in the evaluation of high-power and low-power individuals. The current study examined the evaluation of power by preschoolers through social influence. Past research has shown that preschoolers take social category information into account when expressing their preferences. In particular, they tend align their preferences with those of same-gender and same-age individuals. In the current study, 4- and 5-year-old children were presented with a power interaction between two children through body postures and were asked whether they would prefer the same items as those preferred by the high-power child or those preferred by the low-power child. Overall, the participants did not choose the items preferred by the high-power child significantly more often than those preferred by the low-power child. However, unexpected gender effects were found and indicated that the power asymmetry influenced more male than female participants. Indeed, when they saw a power interaction between two boys (Experiments 1 and 2), male participants aligned their choices with those of the high-power boy more than with those of the low-power boy. However, when male participants saw an interaction between two girls (Experiment 3), an opposite pattern was observed: they aligned their choices with those of the low-power girl more than with those of the high-power girl. In contrast, in the three experiments, there were approximately as many girls who aligned their preferences with those of the high-power child as there were girls who aligned their preferences with those of the low-power child. The current study reveals the importance of taking gender into account, both at the level of participants and stimuli, in the evaluation of power by preschoolers.

Keywords: power, social evaluation, preschoolers, gender, social perception, hierarchy

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INTRODUCTION

From an early age, children experience asymmetrical relationships not only with adults who exercise various forms of authority over them but also with their peers. In nursery school and kindergarten, resource conflicts abound and often lead to unequal distributions between children. Social life thus often manifests itself through dominance relations in which one child has priority over another in accessing toys or specific places. In this context, the social interactions of toddlers and preschoolers often involve physical aggression, threats, coercion, and power displays where

one child tells another what to do. Several studies carried out on children ranging in age from 1- to 6-years-old showed that dominance relationships are frequent, quite stable over time, and rather transitive (Sluckin and Smith, 1977; Charlesworth and La Freniere, 1983; Strayer and Trudel, 1984).

Very early on, children understand the hierarchical dimension of their social environment, even when they are in a bystander position. They use a variety of cues to guess who the boss is or to predict who will win in a conflict. Before the age of one, infants expect that an agent of larger size or one with more allies will prevail in a conflict of goals over a smaller agent or an agent with fewer allies (Thomsen et al., 2011; Pun et al., 2016). In addition, preschoolers take into account differences in age, wealth and physical postures to predict who the boss is (Keating and Bai, 1986; Brey and Shutts, 2015; Charafeddine et al., 2015; Terrizzi et al., 2019). They are also sensitive to different forms of behavioral asymmetries: imposing one's choices, being imitated and setting norms for others are associated with more power (Over and Carpenter, 2013; Charafeddine et al., 2015; Gülgöz and Gelman, 2017).

Social Influence on Preschoolers' Preferences

Copying the behaviors and choices of others helps children develop their skills and preferences, and strengthens social bonds with them (Nielsen and Blank, 2011; Over and Carpenter, 2013). Insofar as children have a good understanding of power relations, one may ask whether they consider high-power individuals as more reliable models to copy from than low-power individuals. Answering this question helps to better identify the mechanisms and criteria that children use to evaluate information from their hierarchical social environment.

Not all members of a social group offer the same benefits in terms of social learning. It is indeed more advantageous to learn from successful, competent and highly regarded individuals (Henrich and Gil-White, 2001). Power, defined as the ability to get one's own way and control the actions of others, may be a relevant criterion for model selection. First, powerful individuals are central in a group (Hawley, 1999), which potentially makes their behaviors and preferences more salient. Second, getting one's way may be seen as a desirable social skill in itself, which others may wish to acquire through imitation. Finally, people may be motivated to affiliate with the powerful in order to benefit from their protection and their resources. They may therefore use imitation to ingratiate themselves with them. In the current study, we asked whether preschoolers align their preferences toward unfamiliar items with the preferences of a high-power individual.

Empirical findings reveal that the integration of social information in the expression of preferences emerges early. For instance, studies have reported that preschoolers tend to favor food items that were previously chosen by their peers (Duncker, 1938) and even change their initial preference to match those of their peers (Marinho, 1942). More recent research indicates that social influence is also present with more abstract stimuli (Hennefield and Markson, 2016) and emerges during infancy; for instance Mumme and Fernald (2003) found that 12-month-old infants avoided interacting with a novel object toward which an adult expressed a negative affect.

The level of influence also varies according to the social categories of others. Social similarity is a relevant cue because it somehow indicates that others belong to the same group as oneself. They are therefore likely to share equivalent norms or preferences and cooperate more than out-group individuals. From very early on, children are inspired by similar others when making a choice. For instance, 10-month-old infants prefer a toy offered by a speaker of their native language than a toy offered by a foreign language speaker (Kinzler et al., 2007; Shutts et al., 2009). A key piece of social information that children take into account in their decision is gender. When children are told that boys and girls prefer particular unfamiliar objects or toys, they tend to align their own preferences with those of their gender category (Martin and Little, 1990; Martin, 1999). This own-gender bias also arises when the gender category is not explicitly labeled but visually emerges from social stimuli (Shutts et al., 2010). Other social categories, such as age and race, also convey social similarity. Three- and 4-year-old preschoolers prefer objects and activities favored by same-age children rather than those favored by adults, but at this age, their preferences do not appear to be influenced by those of same-race children (Shutts et al., 2010; Krieger et al., 2016). However, older children (5–6 years old) prefer toys offered by own race individuals over toys offered by other race individuals (Kinzler and Spelke, 2011).

Developmental literature has also examined how social status influences children's choice. Often individuals with high status are endowed with a range of traits that might be associated. They may simultaneously have more power, more prestige, attract more attention, and display more pro-social skills at the same time. Whether and how these different aspects of status shape social influence is difficult to disentangle. In an observational study Abramovitch and Grusec (1978) found that children who were assessed as dominant by their teachers tended to be imitated more by their peers. However, as indicated by the authors themselves, dominant children also received more attention and were more active which could explain why they were imitated more. In the same vein, Russon and Waite (1991) studied a group of infants in a childcare facility and found a weak correlation between dominance status, based on the number of wins in conflicts, and being imitated. However, again, the dominance status could not be distinguished from age and competence. A study by Brody and Stoneman (1985) aimed to disentangle the effect of status and the effect of competence in children's imitation. Participants had to choose foods that were liked by other individuals with different levels of competence and different ages. They found that in the absence of a competence information, children imitated same-age models more than younger models. However, children chose to align their preferences with those of younger models if the latter were presented as more competent. In line with the idea that social status information guide imitation processes for children, Chudek et al. (2012) showed that social influence is dependent on prestige. The authors characterized a prestigious individual as one who receives the greater amount of attention from

bystanders and found that preschoolers were more likely to align their choices of artifacts with the prestigious model than with a model who did not receive attention from bystanders. Finally, 5-year-old children have been found to imitate high-status adults (teacher and head of the school) more than familiar and unfamiliar low-status adults (McGuigan, 2013).

The Evaluation of Powerful Others

Although the results described above indicate that children take social status into account when expressing preferences, they do not provide evidence that power, regardless of other status-related attributes, has such an influence. However, another literature suggests that children may be influenced by powerful individuals when it comes to selecting among objective information. For instance, in Bernard et al. study (2016), children watched an interaction showing a character winning in a conflict of resources or imposing their choice in a decision-making process toward another character. Next, the two characters provided contradictory statements about the localization of an animal or the names of novel objects. Preschool children endorsed the statements of the dominant character more than those of the subordinate character (see also Castelain et al., 2016). However, this effect was not replicated with children living in a more egalitarian culture, such as Norway (Fonn et al., 2019), and in Japan, a culture that places high value on modesty and subordination, preschool children have even been found to believe the testimony of the subordinate character more than that of the dominant character (Charafeddine et al., 2019).

In the current study, we aim to investigate whether children take power into account when they are asked to align their preferences with those of other individuals. By examining the influence of power, rather than prestige or other aspects of status, we address a more antisocial dimension of hierarchy, which may therefore limit participants' alignment with the high-ranking individual. Indeed, early on children are sensitive to antisocial others when making their choice. For instance, Hamlin and Wynn (2012) found that 16-month-old infants do not align their food choices with those of a puppet that prevents another from accomplishing its goal, while they do so when the puppet helps another. Moreover, preschool children are well aware of this antisocial dimension of power as they detect power more easily when it is expressed in malevolent way than in a benevolent way (Gülgöz and Gelman, 2017), and attribute more power to an individual who does not help an individual in need (Terrizzi et al., 2020).

Also relevant to the current issue is research that investigates more directly how children evaluate individuals of different power status. In a study by Thomas et al. (2018), 21- to 31-month-old toddlers observed an interaction in which two characters aimed to go in conflicting directions and bumped into each other, but at some point, one prevailed over the other who deferred. When they were asked "which one do you like?," they largely chose the winning character. However, when the winning character used coercive force and knocked down the other who did not want to defer, toddlers chose the losing character, which suggests that they were sensitive to the antisocial behavior of the former. In another study, Enright et al. (2020) showed vignettes representing various dimensions of social status (physical dominance, decision power, prestige, and wealth) to preschool children and observed that they tended to like the higher status character more in all dimensions. However, Charafeddine et al. (2018) found than only 3-year-old children, but not 4- and 5-year-olds, preferred a character who imposed their choice. Moreover, in the study by Enright et al. (2020), when the preference question was asked after an identification question (who is in charge?), no clear preference emerged, which suggests that the inclination toward the dominant can be quite tenuous with such a procedure (see also, Bernard et al., 2016; Charafeddine et al., 2016, but see Castelain et al., 2016). Other research has also investigated how children allocate resources according to power and reported a tendency to counteract inequality with age. Charafeddine et al. (2016) and Enright et al. (2020) found with age children were more likely to give a greater amount of resources to the low-power character than to the high-power character. Interestingly, this developmental effect is consistent with field studies showing that after the age of five, children are less tolerant of coercive and aggressive behavior from their dominant peers (Hawley, 1999).

The Power Relation in the Current Study

In the current study, power was implemented through an interaction in which one child imposes their will on another who complies. To illustrate the interaction, we used photos of two children facing each other, one displaying a dominant body posture and the other displaying a subordination posture. There were two reasons for this. First, preschoolers easily associate these postures with positions of high or low power (Brey and Shutts, 2015; Charafeddine et al., 2015, 2019; Terrizzi et al., 2019, 2020). Second, the use of a photograph makes the interaction between the two characters visible throughout the experiment so that the children did not need to remember who had power and who did not. We thus presumed that this would reinforce the accessibility of the status differences between the characters.

EXPERIMENT 1

Method

Participants

Sixty-three preschoolers from two age groups participated in this experiment. To be included in the data set, participants had to provide at least one answer for each type of item (food or play). Two participants did not meet this requirement and were thus excluded from the data set. The final sample included 14 girls and 17 boys in the 4-year-old group ($Mean_{age} = 4.62$ years, SD = 0.23, range = 4–5.23 years) and 17 girls and 13 boys ($Mean_{age} = 5.53$ years, SD = 0.29, range = 5.1–6.08 years). Two schools in the suburbs of Lyon (France) located in mixed-SES neighborhoods, took part in the study. The study was granted approval by the French Ministry of Education (Inspection Académique and Coordination Académique Recherche-Développement Innovation et Expérimentation). Written informed consent was given in accordance with the Declaration of Helsinki.

Material

Photographs of interacting children were used to show power relations. The relation was conveyed through children's body postures along with a dialogue in which the high-power individual imposed their will on the low-power individual who complies. Four 5-year-old children, two girls and two boys, agreed to participate in creating the stimuli after their parents volunteered and gave informed consent. Two same-gender children had to imitate two postures shown to them by an adult, including one posture of dominance and one posture of subordination (see **Figures 1**, **2**). Each actor posed in each posture once, thus producing four photos (Girl 1 > Girl 2; Girl 2 > Girl 1; Boy 1 > Boy 2; Boy 2 > Boy 1). The positions of the dominant and subordinate on the picture were counterbalanced across participants. In addition, photos of unknown toys and foods were used to represent items preferred by the high-power child and the low-power child (see **Figure 1** for snapshot examples).

Procedure

Induction Phase

Children were individually tested in a quiet room in their school. The experimenter began by asking the children whether they agreed to participate and, if so, introduced the session. Each participant saw printed versions of one of the two photos representing the power interaction. In line with earlier studies, the gender of children on the photo matched that of the participant (Gülgöz and Gelman, 2017; Enright et al., 2020). The two photos were counterbalanced across participants. While presenting the photo to the participant, the experimenter read a short text that described a power interaction between the two characters shown in the picture. The experimenter initially introduced the two characters, explained that both children were the same age as the participant but went to another school, and informed the participant about the nature of their interaction:

> "You know what? The two girls/boys are talking, and I can hear what they are saying; do you want me to tell you? Oh! One of the girls/boys is saying:
> '*I choose everything! I decide everything! I tell you what we have to do! You do as I tell you! Okay?*'
> Do you think that the other girl/boy is okay with that? Oh yes, she/he is okay; she/he is saying:
> *'Okay, I'm not choosing anything at all! I will do everything you say!*'"
> The experimenter then asked two comprehension questions (order counterbalanced):
> "Show me who is saying *'I choose everything! You do as I tell you'.*"
> "Who is saying *'Okay, I will do everything as you say'?*"

Choice Phase

The story was followed by four choices about food items (two choices) and play items (two choices) following a procedure similar to that in the study by Shutts et al. (2010). The experimenter informed the participants that they would show them toys and food items that they had not seen before and that she would tell them which ones are preferred by each of the two girls/boys in the picture. The experimenter then told the participants that they would have to indicate which items they preferred. Items were labeled with pseudowords and appeared under each child in the picture (see **Figure 1**). Two food items were introduced in the context of breakfast: "at breakfast, one of the girls/boys likes to eat GRITU, and the other girl/boy likes to eat TRABE"; and two food items were introduced in the context of snacks: "for a snack, one girl/boy likes to eat BLITON, and one girl/boy likes to eat FLUCA." Two toys were presented in the context of outdoor play: "when they play outside with their friends, one of the girls/boys likes to take her/his BLEBU, and the other girl/boy likes to take her/his TRADON"; and two toys were presented in the context of indoor play: "when they play in their rooms, one of the girls/boys likes to take her/his CLUSA, and the other girl/boy likes to take her/his TRETU." Food and play items were alternated. The presentation order of the food items was fixed so that breakfast items always came before snack items. The order of play items was counterbalanced across participants. A picture of each character's preferred items was presented under their photo (see **Figure 1**). Participants were asked to choose between them by pointing to the picture: "what would you rather play with/eat? [item's name] like this girl/boy or [item's name] like this girl/boy?" The items preferred by the high-power and low-power character were counterbalanced.

Statistical Analysis

When participants selected the dominant character's preferred item, their answer was coded as 1, and when they selected the subordinate's preferred item, their answer was coded as 0. For each participant, an alignment score was calculated as the ratio of the sum of the resulting scores to the total number of answered trials. An alignment score higher than 0.5 indicated that the participant aligned their choices more with the high-power individual than with the low-power individual. The Wilcoxon signed-rank test was used to analyze the alignment score. According to Shieh et al. (2007), to detect a true difference in medians higher than 40%, with a power of 0.8 using (type I error rate $\alpha = 0.05$), the estimated sample size is $n = 47$. This minimum sample size was used for Experiments 1, 2, and 3. Statistical analyses were performed using JASP Team (2020) and R Core Team (2019). The data of the three experiments are available at https://osf.io/bz8j6/?view_only=27b94c32ca754d90a0922c65302b4b10.

RESULTS

Comprehension Questions

Fifty-four participants (88.5%) correctly matched the high-power and low-power postures with the corresponding statements, a rate that was significantly greater than chance level [binomial test, 95% CI [77.78, 95.26], $p < 0.001$]. This proportion did not significantly differ according to children's gender [X^2 (1, 61) $= 0.002$, $p = 0.998$]. Among the 4-year-old group, 82.75% of the children correctly identified the postures (binomial test, $p < 0.001$, 95% CI [64, 94]), and among the 5–6-year-old group, 93.75% of the children correctly identified the postures (binomial test, $p < 0.001$, 95% CI [79, 99]). There was no significant

FIGURE 1 | Examples of stimuli with female and male characters in Experiment 1.

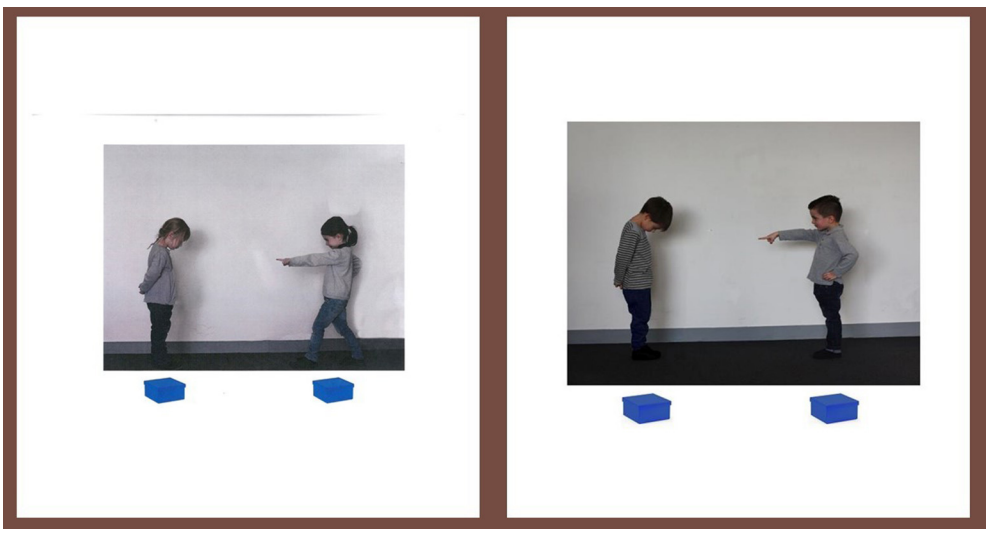

FIGURE 2 | Examples stimuli with female and male characters of Experiments 2 and 3's.

difference between age groups [X^2 (1, 61) = 0.9, p = 0.3]. The remaining analyses only included the subset of children who correctly answered the comprehension questions.

Preference Alignment

Children's choices for individual trials were analyzed using generalized logistic mixed models with subject as a random effect factor (Agresti, 2013). Fixed effect factors were age, gender and item type (food or play). While there was no significant effect for age and item type (Wald Chi-square = 0.01; p = 0.920 and Wald Chi-square = 0.440; p = 0.507, respectively), the model revealed a significant effect for children's gender (Wald Chi-square= 5.494; p = 0.019). The estimate of this effect is positive for boys, meaning that boys have accrued probability of choosing the same items as high power characters. Precisely, this probability is accrued by 1.903 times for boys relative to girls (95% CI = [1.095, 3.307]).

Further analyses were performed on alignment scores to look for a general effect of the character's status and to compare scores of gender and age groups. Scores are discrete values, and the distribution of answers did not meet the requirements for normality (Shapiro-Wilk test of normality, W = 0.922, p < 0.001). Hence, non-parametric rank-based tests were used for median score comparisons (Hollander et al., 2013). The Wilcoxon signed-rank test showed that participants did not significantly align their choices with those of the powerful character or with those of the subordinate character (Median = 0.5, MAD = 0.025, V = 271.500, p = 0.892). Although male participants aligned their preferences with those of the high-power child more than female participants, this difference did not reach significance (Mann-Whitney U test, W = 261.000, p = 0.064). There was no significant difference between the older and younger participant groups' scores (Mann-Whitney U test, W = 366, p = 0.92).

DISCUSSION

The results did not show that children aligned their preferences with those of the high-power individual. This may suggest that power is not a social dimension that influences children's

preferences to the same extent as social similarity (gender, age, or language) and prestige do. However, one possibility is that children only considered the physical properties of the items presented (their color, shape, or arrangement) in making their choices and overlooked the power status of the individuals to whom these items were related. This would not necessarily imply that power is irrelevant to children and it could simply mean that the physical dimension preempted the power dimension. Moreover, the unfamiliarity of the items might have encouraged the children to focus more on the objects than on the characters. Their unknown shapes and names may have prompted the children to try to identify them and relate them to more familiar items. One way to increase the possible influence of power on children's choices would therefore be to reduce the saliency of the physical dimension of the items. The aim of Experiment 2 was precisely to address this point. The items were supposed to be in closed boxes and were therefore no longer visible to children, a method that was also used by Hennefield and Markson (2016). Therefore, children had to decide whether they preferred items favored by the high-power individual or those favored by the low-power individual without having the opportunity to see these items. Moreover, in Experiment 2, the items did not have an abstract name; they were designated by the category to which they belonged. The statistical analysis also suggests that male and female participants were differentially influenced by the high-power child, a result that was unexpected. Experiment 2 could therefore allow us to examine whether this difference is maintained or is a chance effect.

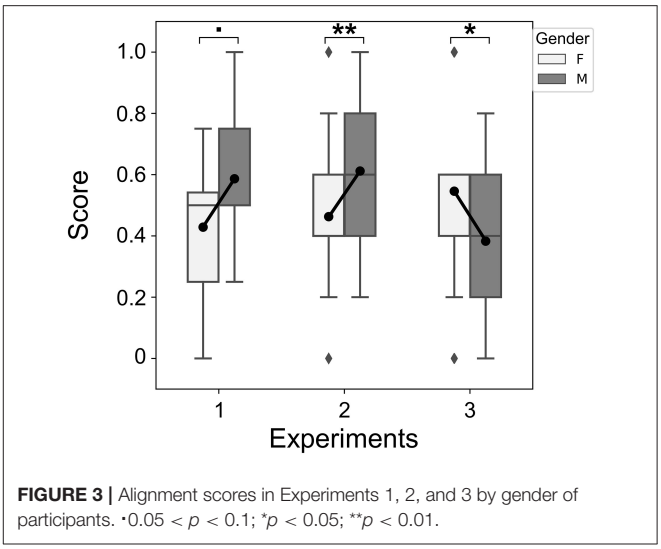

FIGURE 3 | Alignment scores in Experiments 1, 2, and 3 by gender of participants. ·$0.05 < p < 0.1$; *$p < 0.05$; **$p < 0.01$.

EXPERIMENT 2

Method

Participants

Eighty-eight participants (46 girls and 42 boys) from two age groups participated in this experiment: 47 4-year-old children (24 girls; $M_{age} = 4.49$ years, SD = 0.260, range = 4.02–4.97 years) and 41 5–6-year-old children (22 girls; $M_{age} = 5.47$ years, SD = 0.397, range = 5.01–6.28). Two schools in the suburbs of Lyon (France) located in mixed-SES neighborhoods, took part in the experiment. Written informed consent was given in accordance with the Declaration of Helsinki.

Material

The same power interaction photos as in Experiment 1 were used, but the item photos were replaced with boxes that were supposed to contain the high- and low-power children's favorite items (see **Figure 2** for examples).

Procedure

Induction Phase

Participants were individually tested in a quiet room in their school. The experimenter began by asking the children whether they agreed to participate and, if so, introduced the session. The experimenter then explained that for their job, they go to many schools to determine what children like to play with and want to know if children at their school like the same things. The experimenter showed the photo of the power interaction to the participants and told them that they would have to decide if they preferred the item chosen by one of the two children or the item chosen by the other child. The remainder of the induction phase was identical to that of Experiment 1: Participants saw one of the two interaction photos that matched their gender and had to answer the same two comprehension questions (order counterbalanced) to ensure that they correctly understood each child's status in the interaction (i.e., high-power vs. low-power).

Choice Phase

On five occasions, participants had to choose between two items, one of which was preferred by the low-power character and the other by the high-power character. The pairs of items included books, pictures, soft toys, toys, and Halloween costumes. Unlike in Experiment 1, items in Experiment 2 were not visually presented and were not designated with a pseudoword. The item preferred by each child in the picture was said to be hidden in an opaque box that was displayed under the child (see **Figure 2**). Participants were informed that they would be told about the objects that each child formerly chose and that they had to make their own choices concerning those objects. Then, each object was introduced in counterbalanced order followed by a question about the participant's choice. For example, in the Halloween costume situation, the experimenter said:

> "These girls/boys had to choose Halloween costumes. This one chose one costume among many others and put it in her/his box. This one chose another different costume among many others and put it in this box."
> "What about you [participant's name]? If you had to choose a costume, which one would you choose? This costume like this girl/boy? Or this one, like this girl/boy?"

The order in which the characters were mentioned in the question and their spatial positions in the picture were also counterbalanced across participants.

Statistical Analyses

All but two participants made a choice for each of the five situations. One participant did not choose any item in the Halloween costume situation, and one participant did not make choices for the soft toy and book situations. For each participant, a score of aligning preferences with the high-power character was calculated as before.

RESULTS

Comprehension Questions

Sixty-nine children (78.4%) correctly matched the power postures with the statements (binomial test, $p < 0.001$, 95% CI [68.4, 86.5]). This proportion did not significantly vary with children's gender (X^2 (1, 88) = 0.307, $p = 0.580$). However, the older age group significantly outperformed the younger age group on this question (66% for the 4-year-old group vs. 93% for the 5-year-old group; [X^2 (1, 88) = 9.239, $p = 0.002$]. Subsequent analyses were performed on the subset of children who correctly identified the power relation in the picture.

Preference Alignment

Children's choices for individual trials were analyzed using generalized logistic mixed models with subject as a random effect factor. The fixed effect factors were children's age and gender, as well as item type. This model revealed a significant effect of children's gender (Wald Chi-square = 8.145; $p = 0.004$), the likelihood for boys to choose the same items as the high-power character was increased by 1.876 times relatively to girls (95% CI = [1.214, 2.899]). No significant effects were found for children's age (Wald Chi-square = 2.311; $p = 0.128$) and item type (Wald Chi-square = 7.239; $p = 0.124$).

The Wilcoxon signed-rank test showed that the median of the *score* was not significantly different from 0.5 (Median = 0.6, MAD = 0.2, V = 1382, $p = 0.276$). Scores did not significantly differ by age group (Mann-Whitney *U* test, W = 705.500, $p = 0.142$). However, the analysis by score revealed a gender effect indicating that boys scored significantly higher than girls ($\text{Median}_{\text{boys}} = 0.6$, $\text{MAD}_{\text{boys}} = 0.2$; $\text{Median}_{\text{girls}} = 0.4$, $\text{MAD}_{\text{girls}} = 0.2$; Mann-Whitney *U* test, W = 372, $p = 0.005$). Moreover, boys' scores were significantly higher than chance, indicating a significant alignment with the high-power character (Wilcoxon signed-rank test, V = 441.500, $p = 0.011$). In contrast, girls' scores did not significantly differ from chance (Wilcoxon signed-rank test, V = 239.500, $p = 0.190$). **Figure 3** illustrates the difference in scores between boys and girls in this experiment.

DISCUSSION

As in Experiment 1, there was no evidence that overall participants aligned their preferences more with those of the high-power child than with those of the low-power child, and no evidence of the reverse pattern was found. Although participants could only rely on the status position of the children to make their choice and not on the physical characteristics of the items, neither the high-power child nor the low power child influenced the participants' preferences more. However, this experiment replicated the unexpected gender effect found in Experiment 1. Again, data obtained with male participants showed a greater influence of the high-power child than data obtained with female participants. This difference could be accounted for by several factors. One possible explanation relates to the gender of the participants. Boys might be more likely to align their preferences with a high-power individual because they view the power of others more positively than girls. Past research with adults reported that males and females differ in their attitudes toward hierarchical constructs. While males tend to value more power and coercion, women tend to value the respect accorded by others more (Offermann and Schrier, 1985; Hays, 2013). The gender effect we found could therefore be a preliminary manifestation of this difference in children.

However, in the current experiment as well as in Experiment 1, boys and girls were not exposed to the same stimuli since the gender of the children shown in the photos matched the gender of the participants. Although this matching gender methodology is commonly used in developmental psychology, it introduces a confound between the gender of the participants and the gender of the stimuli. Therefore, the gender effect we found could be driven by the gender of the characters. In this eventuality, children might consider high-power individuals to be more influential when those individuals were males than when they were females. In other words, children could attribute more valuable power to boys than to girls. Many studies with adults have shown that men and women view female power more negatively than male power and that male power has more influence than female power (Eagly et al., 1992). To disentangle these explanations, we carried out another experiment in which the gender of the children in the photos mismatched the gender of the participants. Hence, in Experiment 3, male participants saw a power interaction between two girls, and female participants saw a power interaction between two boys.

EXPERIMENT 3

Participants

Seventy-five children from two age groups participated in this experiment. The younger age group (4-year-olds) had 33 children (18 girls, $M_{age} = 4.614$ years, SD = 0.257, range = 4.03–4.99 years), and the older age group (5- and 6-year-olds) had 42 children (20 girls, $M_{age} = 5.672$, SD = 0.343, range = 5.05–6.27 years). Three schools in the suburbs of Lyon (France) located in mixed-SES neighborhoods, took part in the study.

Material and Procedure

The material and the procedure were the same as those used in Experiment 2 except that the gender of the children in the photos mismatched that of the participant.

Results and Discussion

Comprehension Questions

Seventy-two children of the total 75 (96%, binomial test, $p < 0.001$, 95% CI [89, 99]) correctly understood the power postures in the comprehension question. The remaining

analyses only included those who correctly answered the comprehension question.

Preference Alignment

Children's choices for individual trials were analyzed using generalized logistic mixed models with subject as a random effect factor and gender, age and item type as fixed effect factors. The model revealed a significant effect of children's gender (Wald Chi-square = 8.968, $p = 0.003$). Girls were 1.42 times more likely than boys to choose the high-power's item (95% CI = [1.131, 1.783]). This model also revealed a significant effect of age (Wald chi-square = 4.050, $p = 0.044$). This effect was negative (estimate = −0.386) meaning that with age children were less likely to align their choices with the high-power character. Finally, no effect for item type was found (Wald chi-square = 6.359, $p = 0.174$).

The Wilcoxon signed-rank test on scores did not reveal a general effect of the character's power role on the general choice of items (V = 1101.500, $p = 0.213$). However, as suggested by the above model, children's scores differed by age group (Mann-Whitney *U* test, W = 818, $p = 0.030$), with 4-year-old children being more likely to align their choices with those of the powerful character than 5-year-old children ($\text{Median}_{4-\text{year}-\text{old}} = 0.6$, $\text{Median}_{5-\text{year}-\text{old}} = 0.4$, MAD = 0.2). The tendency to choose the powerful character's item was not significant among the 4-year-old group (Wilcoxon signed-rank test, V = 289.500, $p = 0.4$), but the 5–6-year-old children were significantly more likely to align their choices with those of the subordinate character (Wilcoxon signed-rank test, V = 251, $p = 0.015$). The scores significantly differed by gender: boys were less likely than girls to align their preferences with those of the powerful character (boys: Median = 0.4, MAD = 0.2 and girls: Median = 0.6, MAD = 0.2; Mann-Whitney *U* test, W = 860.00, $p = 0.012$). As in Experiment 2, the girls did not show a significant tendency to prefer the items of one or the other of the characters (Wilcoxon signed-rank test, V = 404, $p = 0.407$). Boys, however, showed an opposite pattern to that of the previous experiment and aligned their choices with those of the low-power character significantly more often (V = 159, $p = 0.008$). The results of this experiment further elucidate the results of Experiment 2. Not only do boys seem to rely more on the power status of the characters in making their decision but they do so differently depending on the gender of the characters: they seem to place positive value on a powerful individual in a male-male interaction but a negative value in a female-female interaction.

Post hoc Analyses

Comparing Experiments 2 and 3

Experiments 2 and 3 followed the same methodology except that in Experiment 2, the gender of the stimuli matched the gender of participants, while in Experiment 3, the gender of the stimuli did not match that of the participants. To better characterize the unexpected gender effects found in Experiments 2 and 3, we conducted a *post hoc* comparison of the two experiments. To this end, a general logistic mixed model for both experiments was computed with subject as a random effect factor and gender, age and experiment as fixed effect factors. Two-way interactions between fixed effect factors were also included in the model. The model revealed a significant effect of children's age (Wald chi-square = 5.909, $p = 0.015$), this effect is negative (estimate = −0.316) suggesting that the same age trend was present in Experiments 2 and 3. The model also revealed a significant interaction between experiment and gender (Wald chi-square = 17.578, $p < 0.001$). No other significant effects were found. Notably, a gender effect was absent (Wald Chi-square = 0.139, $p = 0.709$), this is normal since the gender effect is inverted between the two experiments. **Figure 3** illustrates the difference between Experiments' 2 and 3 gender effects.

The comparison of alignment scores between experiments shows that boys scored significantly higher in the same-gender experiment than in the different-gender experiment (Mann-Whitney *U* test, W = 300.500, $p < 0.001$). Thus, boys significantly aligned their choices with those of powerful boy characters and significantly misaligned their choices with those of powerful girl characters. Girls' scores, however, were not significantly different between experiments (W= 771, $p = 0.139$). Overall, the difference in scores between same-gender and different-gender experiments was not significant (W = 2098, $p = 0.095$).

Bayesian Meta-Analysis of Median Choice Score Distributions in the Three Experiments

In the three experiments of this study, we reported an absence of a general effect of children (boys and girls together) significantly aligning their choices with those of the powerful or the subordinate character. When faced with null results, Bayesian statistical analysis can allow us to better understand this finding by calculating the probability for the null hypothesis to be true. We conducted a Bayesian Wilcoxon signed-rank test on the data from the three experiments to evaluate whether we can conclude a real absence of effect and accept the null hypothesis. This analysis showed that the probability for these data to confirm a real absence of effect was very low (64.64%, W= 9325.500, $\text{BF}_{01} = 1.825$ for h0/h1). Thus, these data do not show that children align their preference according to the power role of the characters but do not provide enough evidence to accept the null hypothesis.

GENERAL DISCUSSION

No Overall Influence of the High-Power Character

In the current work, we asked whether preschool children align their preferences with the preferences of a powerful individual. Taken together, the three experiments did not provide a straightforward answer to this question. Overall, the participants did not choose the items preferred by the high-power child significantly more often than they chose those preferred by the low-power child. This general result should be considered in light of studies on children's attitude toward power. This body of work suggests that the evaluation of power is a subtle mechanism that can be modulated by several factors, such as age, experimental procedure and culture. Some research did find a preference for the character who imposes their choice (Castelain et al., 2016; Thomas et al., 2018; Enright et al., 2020), but others did not (Bernard et al., 2016; Charafeddine et al., 2018). Some found a preference for the high-power character among the

youngest preschoolers only (Charafeddine et al., 2018) and some also found an effect of question position (Enright et al., 2020). Moreover, in testimony tasks, the greater endorsement of the dominant individual's statements was observed in some cultural environments (Bernard et al., 2016; Castelain et al., 2016), but not in others (Charafeddine et al., 2019; Fonn et al., 2019).

Compared to earlier work on social influence, the lack of an overall preference for one of the two characters differs from three types of findings. First, it differs from studies on the influence of social categories, which indicate a marked alignment of children's preferences with those of same-gender and same-age individuals (Kinzler et al., 2007; Shutts et al., 2009). This may be accounted for by the fact that power is not a social category but is mainly a relational and transitory property. In our experiments, the notion of power did not refer to a social trait that could have straightforwardly brought the child's own identity into play. Conformity to a relevant social group was therefore not at stake. Moreover, although children, at least in Western countries, tend to view themselves as more powerful (Omark and Edelman, 1975; Charafeddine et al., 2019), their sense of power is certainly less ingrained than their feeling of being a girl or a boy. Power is a less stable and enduring property than gender, race or even age. Children can occasionally experience power with a specific individual but not with everyone and in all situations. They should thus be less inclined to see a similar other in a powerful child than in a same-gender child. A mechanism of social influence based on similarity is therefore less likely to be operating here. Moreover, children might imagine that choosing the same item as one of the characters implies competing for that item. They could be intimidated by the social position of the powerful and choose to disregard the item to avoid conflict.

Second, our results also differ from those showing social influence of other status related dimensions such as competence (Brody and Stoneman, 1985) and prestige (Chudek et al., 2012). This might obviously be accounted for by the more antisocial dimension of the hierarchy implemented in the current experiment. Although the interaction presented to the participants did not involve threats, attacks, or conflicts, the high-power individual was relatively authoritative and forced the low-power individual to act in a way that was beneficial to themself, thus limiting the autonomy of the low-power individual. Prestige differs from dominance in that prestigious individuals display behaviors and competencies that are valued by others and reach a higher social rank through the assent of others who freely defer (Henrich and Gil-White, 2001; Cheng et al., 2013). A recent study by Kajanus et al. (2020) showed that preschoolers distinguish the affective reactions of a lower status character who interacts with a dominant character vs. a prestigious character. In particular, they predicted that the lower status character would be more fearful of a dominant character who "forces an opinion" and adopts an "aggressive tone of voice" and would prefer a prestigious character who "shares their opinion after being consulted" and adopts "a friendly tone of voice" (Kajanus et al., 2020, p. 26). Moreover, toddlers expect different levels of influence from a leader with respect-based power and from a bully with fear-based power. In particular, Margoni et al. (2018) found that 21-month-old infants expected the subordinate protagonists to obey the leader even in their absence, but when the bully was absent, infants did not expect the subordinates to obey.

In the current study, one aspect of the methodology that might have highlighted the antisocial dimension of the high-power character is the position of the comprehension question. This question was asked before the choice question. The goal was to make the power relationship salient in order to encourage participants to focus more on the power asymmetry than on irrelevant traits of the photographed children in the next phase. However, by prompting conscious reflection on the power relationship, the antisocial aspect of the high-power character might have become more prominent. Hence, by being more aware of this aspect, participants might have been less likely to align their preferences with the high-power child. This issue should be further explored in future research.

Finally, our results also differ from those on testimony. Indeed, while in Norway and Japan preschool children did not believe the testimony of a dominant character more (Charafeddine et al., 2019; Fonn et al., 2019), French participants comparable to the current groups of participants did (Bernard et al., 2016). This suggests that high-power individuals influence children's representation of objective questions more than their desires and aspirations. In other words, they might attribute more knowledge or legitimacy to high-power individuals for objective matters but do not put their subjective preferences in a higher place.

Age and Gender Effects on Social Influence of Dominants

Although we did not find an overall influence of power, we did find that this influence could depend on age and gender. A general age effect for Experiments 2 and 3 indicated that older children tended to align their choices more with the preference of the subordinate character than younger children, which is reminiscent of the age-related shift in resource allocations in social hierarchical contexts (Charafeddine et al., 2016; Enright et al., 2020). This shift occurs at ∼5 years of age when children significantly allocate more resources to the subordinate than younger children. It has been interpreted as reflecting children's emerging concerns for fairness and cooperation. In this experiment, such a normative stance could have precluded children from wanting to resemble the powerful character.

The results of Experiments 2 and 3 show that power asymmetry influenced more male than female participants. When they saw a power interaction between two boys (Experiment 2), male participants aligned their choices more with those of the high-power child than with those of the low-power child. However, when male participants saw an interaction between two girls (Experiment 3), an opposite pattern was observed: they aligned their choices more with those of the low-power child than with those of the high-power child. In contrast, in both situations (Experiments 2 and 3), there were approximately as many girls who aligned their preferences with those of the high-power child as there were girls who aligned their preferences with those of the low-power child.

To better elucidate the gender effects we have obtained, it is important to clarify how gender has been considered in previous work. Among most studies describing preschoolers' representation of power, gender was not the targeted topic of investigation and was therefore not manipulated in a systematic way. Indeed, some studies have only used stimuli of a single gender, namely, only female characters (Bernard et al., 2016; Castelain et al., 2016, Over and Carpenter, 2015; Terrizzi et al., 2020) or only male characters (Charafeddine et al., 2015, 2016, 2018, Experiment 2, Experiments 1 and 2; Terrizzi et al., 2019). Other studies have matched the gender of the characters with that of the participants, as we did in Experiments 1 and 2, so that male and female participants did not receive the same stimuli (Gülgöz and Gelman, 2017; Enright et al., 2020; Kajanus et al., 2020). Some scholars have made this methodological choice to avoid the influence of beliefs about the link between power and gender (Gülgöz and Gelman, 2017; Enright et al., 2020)[1]. Other studies have also used gender-neutral stimuli (Charafeddine et al., 2015, Experiments 3 and 4; Fonn et al., 2019), and two studies systematically manipulated gender so that both female and male participants saw female-female and male-male interactions (Brey and Shutts, 2015; Charafeddine et al., 2018).

Regarding a potential effect of gender, several studies did not report any analysis of gender (Castelain et al., 2016; Gülgöz and Gelman, 2017; Terrizzi et al., 2019; Enright et al., 2020, Kajanus et al., 2020), while others analyzed gender but found no effect (Brey and Shutts, 2015, Studies 2, 3 and 4; Charafeddine et al., 2015 Experiments 1, 2016, 2018 Experiment 1, 3 and 4; Over and Carpenter, 2015; Bernard et al., 2016; Terrizzi et al., 2020). However, in four studies, gender effects were reported, but they were not systematic across all the experiments within each study (Brey and Shutts, 2015 Study 1; Charafeddine et al., 2015, Experiment 2; Charafeddine et al., 2018, Experiment 2; Charafeddine et al., 2019, Study 2). Charafeddine et al. (2018, Experiment 2) observed that boys were more likely than girls to consider a (masculine) puppet with more resources as the boss. Moreover, Brey and Shutts (2015, Study 1) found that girls were better than boys at identifying the high-power character based on non-verbal cues with female-female interactions but not with male-male interactions. However, this effect was not replicated in their subsequent studies (Studies 2, 3 and 4). More relevant to the current work, is a study by Charafeddine et al. (2018, Experiment 2) reported a gender effect in the context of dominance assessment. It was found that male participants preferred a (boy) puppet who imposed his choice to another (boy) puppet more than girls, who were chance, but this difference was not found in their first experiment (Charafeddine et al., 2018). Interestingly, however, this effect was very similar to the one we found in Experiment 2. Finally, Charafeddine et al. (2019) found that Japanese girls trusted the testimony of a subordinate (female) character more than that of the dominant (female) character. Overall, what emerges from this description is that gender is not always taken into account, but when it is analyzed, its effects are more often absent than present, and in the case of dominance assessment, one effect concurs with the one we reported in Experiment 2 (Charafeddine et al., 2018). Caution is therefore required in the interpretation of the current data.

However, elucidation of our results may come from recent work in which preschoolers' representation of the link between gender and power was the central question investigated. In this type of research, children had to directly compare male and female figures in terms of power status (Charafeddine et al., 2020; Mandalaywala et al., 2020) and some of the results obtained revealed different patterns for boys and girls. While boys attributed more power to a male than a female character in case of decision power and resource control, this was not the case for girls who were as likely to attribute more power to the male as to the female character (Charafeddine et al., 2020, Experiment 3; Mandalaywala et al., 2020, Experiment 1, rope task), a pattern that is reminiscent of the findings obtained in the current Experiments 2 and 3. Hence, it seems that the male-power association is more prevalent among boys than among girls, while for girls, the link between power and a specific gender is less apparent. This suggests that for boys, power may be more justified when it is exercised by male figures than by female figures, which could explain why boys followed the preferences of the high-power boy.

The gender effects we found in this experiment may also be partly explained by the power situation which involved dominance and subordination body postures. At preschool age, not only boys but also girls consider that the physical manifestation of power is a male behavior (Charafeddine et al., 2020). Hence, girls might have been less sensitive to our stimuli, as they might feel less concerned by this expression of power. In contrast, boys who are more concerned with the physical expression of power might consider that only boys should adopt such behavior and may be more reluctant to follow girls adopting it. Further research should test whether the gender effects reported here are also found with other types of power situations.

Whatever the factors that account for the unexpected gender effect we found, the current results show that gender is an important factor to consider when studying children's attitudes toward power. As gender relies on a status distinction (Carli, 1999; Ridgeway and Bourg, 2004), representations and attitudes toward power may depend on the gender of the power holder. For example, when dominance gestures are performed by men, they are more likely to be interpreted by adult subjects as conveying dominance than when they are performed by women (Henley and Harmon, 1985). Similarly, adults evaluate more negatively a dominant style of leadership adopted by women than by men (Eagly et al., 1992). Although the current study remains indeterminate about the specific mechanisms of power influence on preschoolers, it highlights an issue, both methodological and conceptual, that may be important to consider in the description of their attitudes toward power. Namely, power-laden situations may elicit different representations and attitudes according to the gender of the participants and that of the characters in the situation.

[1]Gülgöz and Gelman (2017): "Character gender matched that of the participant, to control for possible preexisting assumptions about power and gender."
Kajanus et al. (2020): "The gender of all three characters was matched to the participant in order to avoid any gender-specific expectations about rank."

DATA AVAILABILITY STATEMENT

The datasets presented in this study can be found in online repositories. The names of the repository/repositories and accession number(s) can be found below: https://osf.io/bz8j6/.

ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin. Written informed consent was obtained from the individual(s), and minor(s)' legal guardian/next of kin, for the publication of any potentially identifiable images or data included in this article. The study was granted approval by the French Ministry of Education.

AUTHOR CONTRIBUTIONS

RC, BT, and J-BV conceived the study. MO and BT collected the data. RC and AF analyzed the data. JE organized and supervised data collection. RC and J-BV wrote the manuscript. All authors contributed to the article and approved the submitted version.

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Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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