Social status modulates prosocial behavior and egalitarianism in preschool children and adults

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Humans are a cooperative species, capable of altruism and the creation of shared norms that ensure fairness in society. However, individuals with different educational, cultural, economic, or ethnic backgrounds differ in their levels of social investment and endorsement of egalitarian values. We present four experiments showing that subtle cues to social status (i.e., prestige and reputation in the eyes of others) modulate prosocial orientation. The experiments found that individuals who experienced low status showed more communal and prosocial behavior, and endorsed more egalitarian life goals and values compared with those who experienced high status. Behavioral differences across high- and low-status positions appeared early in human ontogeny (4–5 y of age).

social status | social hierarchies | altruism | prosocial behavior

Social hierarchies are ubiquitous and can be found between individuals and groups, be it between occupations, neighborhoods, social class, age, and race groups. The position individuals occupy in the social hierarchy has a marked influence on their cognition and behavior. Members of disadvantaged social groups, such as ethnic minorities, women, and individuals with low socioeconomic status (SES), are socially more attentive and affiliative compared with their advantaged counterparts (1–3). For example, individuals with low SES can better identify the emotional states of others compared with those with high SES (3). Immigrants have more complex and differentiated social group perceptions than national citizens of the same socioeconomic background (4). Ethnic minorities, such as Black people and Hispanics, are more interdependent and less individualistic compared with Caucasians (5). Women affiliate more and endorse more benevolent values than men (2). Interestingly, rank differences in social investment have also been observed in other primate species. Low-rank monkeys and apes follow more the gaze of others (especially of high-rank animals), groom more, yield more space, and show more appeasing displays and less aggression than their high-rank counterparts (6, 7). In this article we test a new account for hierarchy differences in human social investment, based on the causal effects of status independently of the specific contributions of ethnicity, SES, or sex.

The origins of hierarchical differences in social investment are multifaceted. These differences can derive from disparities in education, income, culture, opportunities to exercise power, and the genome, all of which can impact social cognition and behavior. To illustrate this point, during development parents from low SES emphasize respect and conformity in their children, whereas those at the high echelons emphasize self-direction (8). These differences can affect egalitarianism (3, 9), and subsequently the extent to which individuals care for the welfare of others (3). Furthermore, high SES typically endows individuals with financial resources, known to increase their social power (1, 10). Social power refers to tangible control over others and resources, and increases the ability to pursue organizational and personal goals (11), while decreasing the need to pay attention and care for other individuals (12). Therefore, power holders' prosocial orientation depends on their active goals (13). It is therefore not surprising that income, a component of SES that affords power, decreases benevolence or the extent to which individuals value the welfare of others (9). In summary, individuals who differ in SES (similarly to those who differ in ethnicity or sex), typically traverse a cluster of unique experiences throughout their lives that jointly affect the extent to which they are oriented toward the needs and welfare of others (1). These influences affect behavior through the application of mental operations, such as the activation of goals and values, used to fulfill the needs of the individual in the social context. A crucial task for social scientists is, therefore, to identify the core triggers of the motivational programs that affect altruism, including those that are responsible for commonalties observed across disparate social hierarchies. This is one of the aims of the present article.

Across domains, hierarchical positions typically covary with social prestige, reputation, and esteem that individuals hold in the eyes of others: that is, their status (14). For example, White people enjoy more social regard and are less discriminated against than Black people, men attain more prestigious social positions than women, and people with high SES benefit from higher deference and reputation than those with low SES (15, 16). Status differences are a common thread across these groups and could underlie the altruism differences found in correlational evidence. Here we hypothesize that status has a causal role in the extent to which individuals invest socially and, in particular, the extent to which they are prosocial: that is, benefit others and care for others' well-being. Importantly, status is a distinguishable component of hierarchy. For example, individuals with high SES (e.g., bankers, the *nouveau riche*) and high power (e.g., dictators) are often despised. Through experimental work we investigate status-specific determinants of prosocial behavior and related mental representations in different phases of human development.

Status could play a role in altruism because of its privileged value in human interactions, and the benefits of prosocial

Significance

Even though humans are the most altruistic species, disparities in prosocial orientation are common and occur across social groups that vary in education, sex roles, biology, and financial resources. In the present research, using different manipulations of social status—defined as the level of social prestige and reputation enjoyed by individuals in the eyes of others—we show that mere incidental low status triggers a prosocial orientation manifested in helping behavior, signaling communal intent, and the endorsement of egalitarian goals and values. These effects start to appear early in human ontogeny. The findings suggest that humans have basic cognitive and motivational programs that they use flexibly as they navigate unstable hierarchies typical in human societies.

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behavior. A great deal of research has shown that humans need to be socially valued. Humans automatically track their evaluative rank in social contexts and identify another's rank in incidental observations, as shown in differential activity in the ventral striatum of the brain (17), as well as in physiology (18). In performance domains, knowledge of one's inferior status (or social evaluation) triggers physiological threat responses in the perceiver (18). Implicit signals of low status in small groups, via feedback about one's lower performance in relation to others, temporarily reduce the IQ, and lead to associated brain responses [amygdala and dorsolateral prefrontal cortex (19)]. In addition, temporarily induced changes in the relative prestige and reputation of one's social groups markedly affect self and intergroup perceptions, as well as behavior (20).

Despite the acknowledged importance of social prestige and reputation, whether they affect prosocial behavior independently of factors associated with chronic low status, such as education, culture, income, ethnicity, or sex roles, remains largely unknown. We propose that individuals automatically monitor their relative prestige and respect in social interactions as they navigate the social world, and that their position modulates their prosocial behavior and related mental representations. Thus, contrary to the common notion that people differ in generosity and altruism based solely on their social background and personal dispositions, we propose that they also flexibly care for the welfare and needs of others, depending on their prestige and reputation in the current situation, which they eagerly monitor, even on the basis of incidental signals. Furthermore, we predict that status affects the broad spectrum of behavior and cognition, spanning from prosocial acts to signaling behavior, to life goals and values.

These predictions derive from the detrimental effects of low status for individuals, and the compensatory benefits of prosocial behavior and egalitarian ideologies. Low social status is associated with substantial disadvantages that hinder human's optimal social coordination strategies. Individuals with low status experience social discrimination and ostracism (15, 16, 20), have less access to valuable social models to learn from, and have fewer opportunities (14). Chronic low status, associated with low SES or ethnic minority membership, leads to stress, decreased well-being, and poor health, including increased mortality (21), as well as cognitive underperformance when low status is salient (15, 22).

Low-status individuals could prioritize prosocial behavior and associated goals and values as a way to regulate social interactions and construe a niche that best fits their needs and counteracts their disadvantages. Niche construction is a process originally documented in evolutionary biology whereby organisms change their environment in ways that affect their fitness (23, 24).

Prosocial behavior is a powerful signal of positive intentions and confers a number of immediate benefits. Altruistic acts enhance status in the eyes of others (25), increase the potential for support and coalition formation, and protect individuals from ostracism and threat (23). Prosocial behavior could be particularly adaptive for low-status individuals as a way to increase their status, social support, and the possibility of forming alliances.

Given that social rank affects social investment in nonhuman primates, in humans, basic forms of status-related social investment may not necessitate complex social cognition, and could emerge early in ontogeny. This should be seen in rudimentary prosocial acts, independently of moral reasoning and before values have been formed. With increased cognitive abilities, in adulthood status could affect individuals in more fundamental ways, transforming their planning, life goals and value systems. These symbolic means are used to make sense of the social environment, guide behavior, and create a socially shared reality.

We propose that incidental signals of low status automatically affect adult mental representations, pulling individuals toward social fairness for all. This proposition differs from the Machiavellian hypothesis of cognitive evolution (26), which posits that cooperation evolved as a manipulative strategy to beat other group members in a complex and competitive social world. A change in life goals and values would not be consistent with such self-serving, competitive strategies.

Status is freely afforded to individuals who have valuable attributes, such as expertise and competence (27). Therefore, high status confers various advantages, such as social support and easier access to opportunities. Given these advantages, high-status individuals may invest in maintaining their hierarchical positions, for example by signaling competence and by endorsing and disseminating values that maintain the status quo (16, 27).

Status-related prosocial behavior could derive from the application of algorithms that use cognitive and motivational specializations flexibly (28, 29), as individuals navigate the dynamic social relations that characterize human societies. The nature of prosocial behavior and underlying cognitive and motivational processes should vary across the lifespan. For example, whereas preschool children could show rudimentary forms of prosocial behavior and empathy that are not determined by moral considerations and values (30, 31), adults could set long-term goals, engage in signaling behavior, and endorse values that help guide behavior (2, 9) and shape the social environment (23, 24). Importantly, across levels of development low status should consistently increase prosocial behavior, the crucial adaptive strategy to low-status positions proposed here.

Four studies tested the hypotheses that low status increases prosocial behavior, signaling of prosocial intentions, and benevolent life goals and values, and that the behavioral effects of status are already present in preschool children. In adults, status was manipulated by giving participants false feedback regarding their social prestige and reputation, using a variety of methods established in past research. In preschool children, status was manipulated through ownership of a valuable resource that afforded prestige. Upon the status manipulations, participants were given the opportunity to help a person in need, report their life goals and values, or interact in groups.

Study 1

Study 1 examined unsolicited helping behavior in adults. Participants were 44 undergraduate students (9 male; mean age was 20.30 y, SD = 2.58). They were randomly assigned to the between-subjects condition status (high vs. low), by receiving false feedback regarding the ranking of their department, in terms of prospective professional prestige, in relation to other departments of the same university (see *Supporting Information* for all methodological details). In the high-status condition, participants read an article with a table indicating that their department (i.e., Psychology) was ranked second among nine departments. In the low-status condition, their department was ranked eighth. Helping behavior was measured outside the laboratory after completion of cognitive tasks and after the study had allegedly ended. The experimenter, who was unaware of the status conditions, pretended to accidentally drop a pack of 20 pens on the floor. The number of pens that participants helped pick up from the floor was counted as a measure of unsolicited helping behavior (32).

During what was allegedly the actual experiment participants completed a central executive task and a lexical decision task. Executive functions (i.e., cognitive functions that coordinate and manage information necessary for appropriate actions and planning) (33) are often compromised in chronic low-status group members (e.g., ethnic minorities, women) particularly when their low status is salient (e.g., under stereotype threat) (15, 22). The cognitive strain of low status could accentuate the need to establish social bonds, and was therefore measured. The lexical decision task examined the accessibility of constructs related to sociability (aggressive, sociable) and agency (efficient, knowledgeable). After finishing, participants were dismissed, and the measure of helping behavior was taken outside the laboratory.

Low-status participants (mean = 14.45, SDs = 1.43) helped the experimenter pick up significantly more pens from the floor than high-status participants (mean = 11.68, SD = 1.99), $t(42) = -5.31$, $P < 0.001$, $d = 1.16$. Enhanced prosocial behavior in low-status

individuals was not dependent on the accessibility of agency or sociability constructs, nor central executive ability. Nevertheless, similarly to chronic low-status positions, momentary states of low status taxed central executive functions (mean = 18.91 vs. 17.76; SDs = 1.19 vs. 1.58), $t(41) = 2.70$, $P < 0.05$, $d = 0.72$. Status did not affect differentially the relative accessibility of agency and sociability, $F(1, 42) = 0.21$, $P = 0.64$.

Study 2

Study 2 focused on behavior during social interactions with individuals of the same rank level. Past research has extensively examined the signaling of dominance and subordination, which occurs through open and expanded or constricted poses, respectively (23). Such signaling has emerged as a strategy to avoid costly fighting and conflict escalation in agonistic encounters. Whereas dominance and subordination signaling are functional in dominance- (i.e., power) based hierarchies, we reasoned that prestige-based hierarchies would be associated with the signaling of prestige-related and prosocial traits that serve the adaptive strategies of high- and low-status individuals, as they manage the impressions that others form of them. One strategy could consist of costly signaling (34) or the signaling of behavior that is costly to the self. Such behavior can increase the chances of being chosen as a sexual or coalition partner, and should be particularly relevant for low-status individuals. By showing the wish to please others and sacrifice self-interest to benefit others, low-status individuals could increase their perceived status and more easily form alliances. Such behavior can be seen in chronic low-status groups. For example, women, who typically occupy lower-status positions in society than men, tend to smile more, and signal more appeasement in social interactions than men (35). Furthermore, this tendency increases in times of threat (36).

The second strategy is associated with an emphasis on competence. High status is often afforded to those who are competent (37). To maintain their status positions, high-status individuals may signal competence; this may occur even if they are not necessarily more competent.

Status-related behavior strategies could contribute in part to the emergence of stereotypes of high- and low-status groups. Disadvantaged social groups who do not compete for resources (e.g., the elderly) are often perceived in paternalistic ways: warm but not competent. In contrast, advantaged social groups (e.g., rich people) are perceived by society at large as competent, but often not warm (27). Stereotypes can in part be inductively learned from signaling behavior (38).

In Study 2, participants were assigned to a minimal high- or a low-status group and were asked to complete a decision-making task. The participants then introduced themselves to the group and engaged in a group discussion with same-status partners. Participants were videotaped by hidden cameras and the videotapes were coded by trained observers.

Status was manipulated using a minimal group paradigm. Participants performed a relatively meaningless visual task and received bogus feedback about their group standing compared with another group. The participants first estimated the number of dots on displays (39) and were then randomly assigned into one of two perceptual styles (figural or background). They were informed that one style allegedly performs better than the other style on dot-estimation tasks. Subsequently, participants completed an unrelated task in which they read information about potential apartments and roommates and chose an apartment and a roommate. The roommates and apartments varied in number of positive and negative attributes, so that decision-making quality could be measured (40). Participants were then invited to move and sit together with other participants of the same style, introduce themselves to the group, and discuss their roommate preferences.

Given the strong association between status, competence, and warmth in the stereotypes held by society at large (27), we inspected whether status affected decision-making quality as a proxy for competence, and whether this was related to prosociality. High-status participants did not make better decisions compared with low-status participants, $\chi^2(1, n = 82) = 0.78$, $P = 0.37$, nor did they differ in the types of attributes they preferred in roommates, $F(1, 80) = 2.49$, $P = 0.13$.

Four trained coders, who were unaware of status, rated group members on 14 attributes associated with social investment (e.g., number of smiles, supportive, friendly, approachable, empathic, extrovert), competence (e.g., competent, knowledgeable, knows what he/she is doing, capable), agency (takes initiative, task oriented), and self-enhancement (signals high status). (The average interrater reliability was $r = 0.73$ for the social and $r = 0.63$ for the competence dimensions.)

The 14 attributes were subjected to a principal component analysis to identify status-specific behavior signaling. This analysis revealed two factors accounting for 85% of the variance in the variables. One factor concerned communal and prosocial behavior, and the other competence, agency, and the signaling of status.

As expected, type of signaling was dependent on status, $F(1, 11) = 17.82$, $P = 0.001$, $\eta_p^2 = 0.62$. (The group was the unit of analysis for

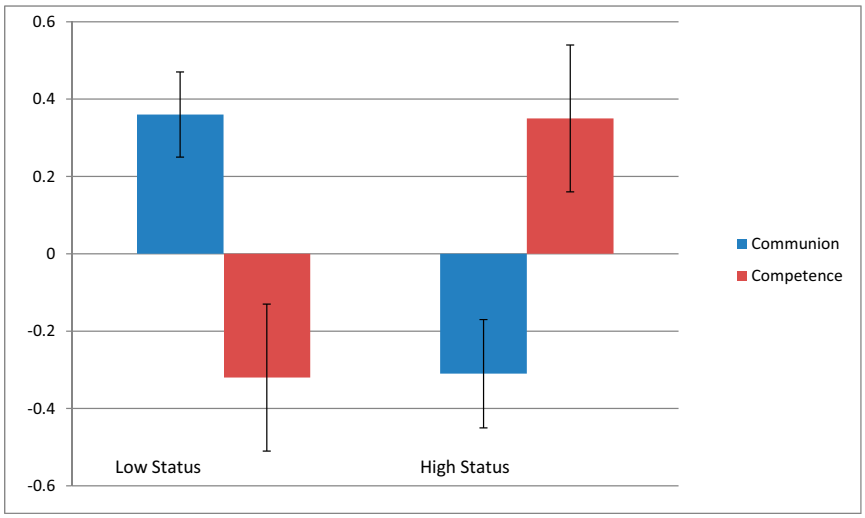

Fig. 1. Mean standardized signaled competence and communion as a function of status, Study 2.

variables assessed after the groups were formed.) High-status participants scored higher on competence and agency (mean = 0.35, SD = 0.69) than on prosociality (mean = −0.31, SD = 0.67), $F(1, 11) = 8.19$, $P < 0.001$, $\eta_p^2 = 0.43$, whereas low status participants showed the reverse pattern (mean = −0.32 vs. 0.36; SD = 0.49 vs. 0.38), $F(1, 11) = 16.41$, $P = 0.002$, $\eta_p^2 = 0.60$. Crucially, low-status participants displayed more prosocial intent than high-status participants, $F(1, 11) = 8.81$, $P = 0.01$, $\eta_p^2 = 0.44$, and high-status participants signaled more competence and agency than low-status participants, $F(1, 11) = 4.85$, $P = 0.050$, $\eta_p^2 = 0.31$ (Fig. 1). In summary, low-status participants showed more communal and prosocial signaling during self-presentations and interactions with same-status individuals compared with high-status participants. In contrast, high-status participants signaled competence, initiative, and elevated status. Competence signaling occurred even though high-status participants did not make decisions of better quality regarding the topic under discussion compared with low-status participants. The results of this study are noteworthy, considering the minimalistic nature of status differences between the groups. The findings are consistent with research showing that high- and low-status groups have often ambivalent stereotypes of warmth and competence (27). The results point out that one reason for the prevalence of ambivalent stereotypes, thereby low-status groups are often perceived as warm but not competent and high-status groups as competent but not warm, could derive, among other factors, from inductive learning of actual behavior.

Study 3

Members of disadvantaged social groups (e.g., females and individuals with low income) endorse more benevolent life goals and values than their high-status counterparts (e.g., males and individuals with high income) (2, 3, 9). Here we examined whether subtle cues of an individual's status position are capable of affecting values in a similar manner.

Low-status individuals could strategically deploy prosocial behavior solely to attain a number of direct benefits for the self. These behaviors could include attaining status or favors driven by reciprocal altruism (41). Low-status individuals could also aim at forming coalitions to outwit the higher echelons, a behavior that would be consistent with the Machiavellian intelligence hypothesis of cognitive evolution (26). Contrary to these claims, we test the hypothesis that low status is associated with more altruistic motives seen in life goals and values.

Values convey what is important in life (2, 9); they are desirable transsituational goals that serve as guiding principles in life. Values motivate action and function as standards of comparison when making judgments about actions. Importantly, different values are not related randomly, some values are compatible and others are incompatible. In particular, power values, which reflect the desire to achieve social status, prestige, and control over resources, conflict with self-transcendent values. Self-transcendent values reflect concerns with helping and nurturing others, as well as seeking justice and tolerance for all.

Values show some malleability and are susceptible to changes that serve adaptation to the environment (42). Subtle variations in status could change values in ways that serve status-specific adaptation. Specifically, we hypothesized that a low-status position would increase self-transcendent values (universalism and benevolence) and decreased power values, whereas the opposite should be true for a high-status position.

Status should also affect more concrete cognitive representations, specifically life goals. Life goals are contextualized intentions that can be considered at a middle level between values and concrete goals (43). We examined effects of status on the major seven life goals (economic, aesthetic, social, relationship, political, hedonistic, and religious). We hypothesized that low status would be associated with the pursuit of professions that serve the community more than high status. Finally, we also explored whether status would affect the desire for offspring as a form of social investment. Fertility is higher in low social classes and minorities (44, 45). Given the increased mortality in some of these groups, increasing the number of offspring would increase social capital, and could be used as a strategy to increase fitness (46).

Fifty undergraduate art students (11 males) were randomly assigned to a high- or low-status condition via false feedback regarding the prestige ranking of their school compared with a similar school. This information was conveyed in a bogus article that compared two schools of art. For half of the participants, their school scored higher than the similar school (high-status condition) in a national assessment exercise, whereas for the other half their school scored lower than that school (low-status condition). Participants subsequently completed the major life goals questionnaire (43). Prosocial goals include: helping others in need, working to promote the welfare of others and taking part in volunteer community and public service. Participants also completed a short version of the universal, benevolent, and power values subscales of the Schwartz Value Survey (47).

Desire for offspring entailed two questions: how many children participants plan to have, and how many they would like to have if they could, in their fantasy (from 0 to 6).

High-status participants endorsed more power values (mean = 0.14, SD = 0.64) than self-transcendent values (mean = −0.18, SD = 0.64); low-status participants endorsed more self-transcendent (mean = 0.17, SD = 0.55) than power (mean = −0.13, SD = 0.62) values, $F(1, 48) = 8.74$, $P = 005$, $\eta_p^2 = 0.15$. Furthermore, low-status participants endorsed more self-transcendent values than high-status participants, $F(1, 49) = 4.21$, $P < 0.05$, $\eta_p^2 = 0.08$, but did not differ with regard to power values (Fig. 2). Status also affected prosocial life goals, $F(1, 48) = 5.44$, $P = 0.02$, $\eta_p^2 = 0.10$, but not goals in other life domains. Low-status participants set more goals for their lives that enhanced the welfare of others (mean = 5.39, SD = 0.92) compared with high-status participants (mean = 4.65, SD = 1.27).

Finally, even though temporarily induced status differences did not affect the actual number of children planned for the future, it affected the number of desired children, $F(1, 47) = 5.46$, $P = 0.02$, $\eta_p^2 = 0.10$. Low-status participants wished for more children (mean = 3.08, SD = 1.32) than high-status participants (mean = 2.20, SD = 0.93). Taken together, these results suggest that status has far-reaching consequences for the organization of people's goals and abstract guiding principles. It affects life goals and values in ways that fit the adaptive priorities of high- and low-status individuals, with an emphasis on prosocial investment and increased social capital in low-status individuals. These results suggest that the effects of status are not solely related to wanting to attain reciprocal immediate benefits for the self. Status affects individuals in more fundamental ways.

Study 4

An appreciation of the evolutionary origins of social behavior is aided by an understanding of how social cognition emerges in early development. Study 4 was designed to this end. It focused on preschool children, an age before abstract representations, such as values, have started to form [which occurs at 7–8 y of age (31)]. Hierarchies in children up to the age of 7 are based on coercion and revolve around disputes about property ownership and other forceful behaviors (48).

The study used a paradigm designed to study dominance-based hierarchies in nonhuman primates (49). This paradigm allows an examination of the prosocial correlates of individual differences in social status, as well as the effects of manipulated social status on prosocial behavior, without using high-order symbolic means associated with adult hierarchies. Forty-eight participants (28 male) took part. Mean age was 4.7 y (SD = 0.56). Two children of the same age and sex were presented with a valued and a nonvalued toy and asked to choose one each. The winner of the competition for the valued toy was considered the dominant child. To force a change in status children were regrouped in pairs 2 wk later with a new partner of the same rank, constituting pairs of either two high-status or two low-status

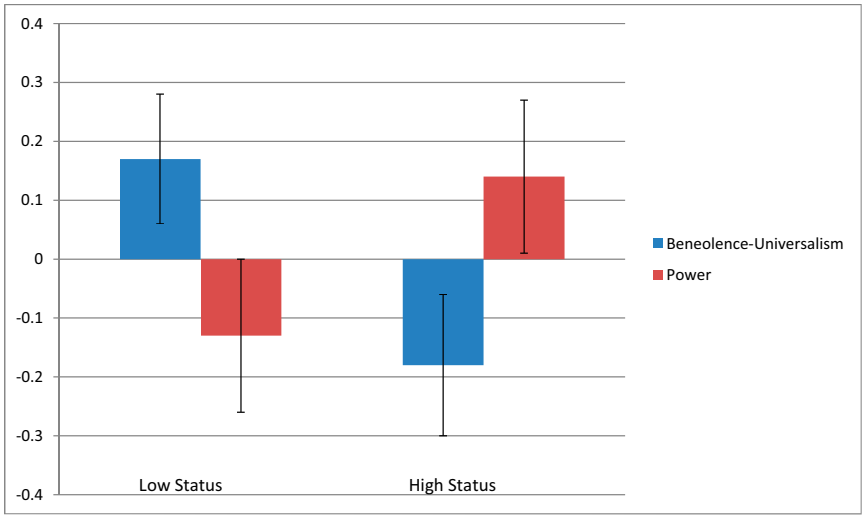

Fig. 2. Mean standardized benevolence/universalism and power values as a function of status, Study 3.

children. The pair competed again for the valuable toy and new hierarchies emerged. Because dominance and empathy in preschool children have been related to cognitive functions (50, 51), and prosocial behavior often depends on moral reasoning (52), we measured the ability to inhibit dominant responses and moral reasoning. To measure helping behavior, children were given five stickers and asked if they wished to donate any of these stickers to a child who was in the hospital and had no stickers (52). Moral reasoning was assessed by asking children to imagine themselves transgressing moral norms (e.g., stealing a bicycle), asking them about whether the transgressions were right or wrong, and what were the emotions elicited in the self and other. Inhibition was measured with a modified Stroop task and a measure of distractor inhibition.

Helping was dependent on status and time (T), $F(1, 44) = 4.30$, $P = 0.01$, $\eta_p^2 = 0.23$. As expected, at $T1$ low-status children donated more stickers to a child in need than high-status children (mean = 1.17 vs. 0.37; SDs = 1.57 vs. 0.71). Furthermore, losing status increased donations over time, $F(1, 11) = 6.06$, $P = 0.03$, $\eta_p^2 = 0.34$ (mean $T1 = 0.58$ vs. mean $T2 = 1.33$; SDs = 0.90 vs. 1.43); whereas gaining status had the reverse effect (mean $T1 = 1.08$ vs. mean $T2 = 0.33$; SDs = 1.44 vs. 0.65), $F(1, 11) = 3.34$ $P = 0.09$, $\eta_p^2 = 0.38$. Thus, a manipulated change in status at $T2$ yield the same effects as dispositional status observed at $T1$. Nevertheless, for those who maintained the same status positions over time there was a normalization of helping behavior. When facing the same request, recurrent low-status children helped more than recurrent high-status children at $T1$ (mean 1.25 vs. 0.17; SD = 1.76 vs. 0.39) but the differences between these two groups became nonsignificant at $T2$, $F(1, 22) = 0.11$, not significant.

Helping behavior was not related to differences in moral reasoning, distractor inhibition, and cognitive control. Status did not affect moral reasoning and Stroop performance. There was a tendency for distractor inhibition to decrease over time for individuals who acquired status at $T2$; however, none of the pairwise comparisons were significant for this measure.

Discussion

Four studies demonstrated that status affects prosocial behavior in preschool children and adults. Preschool children, who dispositionally or situationally experienced low status were more likely to help a child in need compared with those who experienced high status, even though helping was costly. Low-status adults were more likely to spontaneously assist another person and signal altruistic intent in interactions compared with their high-status counterparts. In contrast, high-status individuals were more likely to signal competence.

The prosocial behavior of preschool children was not associated with differences in moral reasoning. In adults, status permeated higher-order mental representations, affecting values and the goals that individuals set for their lives, as well as their desire for offspring. Low-status individuals planned for more professional careers that serve the community, and endorsed more benevolent and universal values compared with high-status individuals. These findings are consistent with research carried out in natural settings (1, 2, 16). For example, feelings of superiority of one's group are associated with right-wing ideology and the justification of right-wing–motivated violence (53). Prestige differences could play an important role in such phenomena observed in social hierarchies.

Humans are a cooperative species, and humans' superior altruism appears early in ontogeny. For example, children as young as 3 y of age act more altruistically, sharing resources more equitably with conspecifics compared with chimpanzees (54). Research has started to unravel the nature of altruism in children. Altruism in preschool children has been understood as being largely determined by age. Some studies have, however, suggested that children's prosocial behavior is sensitive to contextual factors, such as reciprocity (55). Here we show, to our knowledge for the first time, that prosocial behavior in preschool children is influenced by chronic and situational status positions. This pattern of relations between social hierarchy and altruism occurred before children had acquired literacy and complex forms of moral reasoning and social cognition, and before they had formed values that could guide behavior. These findings are consistent with the increased social investment found in low-rank nonhuman primates (6, 7).

The findings occurred in association with varied situational cues indicative of relative interpersonal or intergroup prestige and reputation, including minimalistic cues. They point out the importance of social status in human social relations, and suggest that individuals have cognitive and motivational programs that they use flexibly to navigate a complex social world characterized by unstable status relations.

From a broader perspective, the ability to detect and act appropriately upon status cues could have been under evolutionary pressure, and have emerged to solve status-related challenges. In particular, benevolence and affiliative behavior may have been an adaptive strategy for those in low-status positions. In ancestral environments cooperative behavior has allowed humans better prospects in food gathering, mate opportunities, and defense against challenges (56). In today's society, an investment in social relationships is positively associated with household food security, independent of household-level socioeconomic factors (46).

Similarly, in nonhuman primates, such as baboons and chimpanzees, bonding behavior and the signaling of appeasement intentions increase reproductive fitness and seem to have emerged as an adaptive strategy to deal with social threat (6). Individual differences in bonding behavior positively correlate with life span in nonhuman primates (57, 58). Crucially, affiliative behaviors are amenable to social contextual influences, and increase in times of uncertainty both in nonhuman primates and in humans (6, 36).

In the present research status affected not only behavior but also long-term goals and values systems that concern society at large. The heightened endorsement of benevolent values by low-status individuals is inconsistent with the notion that low-status individuals are solely motivated to cooperate to outwit their higher echelons in a competitive environment. Thus, the present findings cast doubts on the Machiavellian intelligence hypothesis of cognitive evolution (26).

Values are communicated and shared, and can be used to exert social control. The values of low-status individuals seek equality for all, and will contribute to create egalitarian cultures that treat all people as moral equals, committed to cooperate and show concern for everybody's welfare. Conversely, by endorsing power values those with high status will favor hierarchical cultures. Ultimately, both strategies reflect attempts of niche construction in the form of norms that govern social life.

1. Kraus MW, Côté S, Keltner D (2010) Social class, contextualism, and empathic accuracy. *Psychol Sci* 21(11):1716–1723.
2. Schwartz SH, Rubel T (2005) Sex differences in value priorities: Cross-cultural and multimethod studies. *J Pers Soc Psychol* 89(6):1010–1028.
3. Piff PK, Kraus MW, Côté S, Cheng BH, Keltner D (2010) Having less, giving more: The influence of social class on prosocial behavior. *J Pers Soc Psychol* 99(5):771–784.
4. Guinote A (2001) The perception of group variability in a non-minority and a minority context: When adaptation leads to out-group differentiation. *Br J Soc Psychol* 40: 117–132.
5. Triandis CH (1994) *Culture and Social Behavior* (McGraw-Hill, New York).
6. Sapolsky RM (2005) The influence of social hierarchy on primate health. *Science* 308(5722):648–652.
7. Seyfarth RM, Cheney DL (2003) Signalers and receivers in animal communication. *Annu Rev Psychol* 54:145–173.
8. Hoff E, Laursen B, Tardiff T (2002) Socioeconomic status and parenting. *Handbook of Parenting*, ed Bornstein MH (Erlbaum, Mahwah, NJ), pp 231–252.
9. Schwartz SH (2007) Value orientations: Measurement, antecedents and consequences across nations. *Measuring Attitudes Cross-Nationally: Lessons from the European Social Survey*, eds Jowell R, Roberts C, Fitzgerald R, Gillian E (Sage, London), pp 169–203.
10. Cheng JT, Tracy JL (2013) The impact of wealth on prestige and dominance rank relationships. *Psychol Inq* 24(2):102–108.
11. Guinote A (2007) Power and goal pursuit. *Pers Soc Psychol Bull* 33(8):1076–1087.
12. Fiske ST, Dépret E (1996) Control interdependence and power: Understanding social cognition in its social context. *Eur Rev Soc Psychol* 7(1):31–61.
13. Galinsky AD, Gruenfeld DH, Magee JC (2003) From power to action. *J Pers Soc Psychol* 85(3):453–466.
14. Henrich J, Gil-White FJ (2001) The evolution of prestige: Freely conferred deference as a mechanism for enhancing the benefits of cultural transmission. *Evol Hum Behav* 22(3):165–196.
15. Steele CM, Aronson J (1995) Stereotype threat and the intellectual test performance of African Americans. *J Pers Soc Psychol* 69(5):797–811.
16. Glick P, Fiske ST (2001) An ambivalent alliance. Hostile and benevolent sexism as complementary justifications for gender inequality. *Am Psychol* 56(2):109–118.
17. Zink CF, et al. (2008) Know your place: Neural processing of social hierarchy in humans. *Neuron* 58(2):273–283.
18. Mendes WB, Blascovich J, Major B, Seery M (2001) Challenge and threat responses during downward and upward social comparisons. *Eur J Soc Psychol* 31:477–497.
19. Kishida KT, Yang D, Quartz KH, Quartz SR, Montague PR (2012) Implicit signals in small group settings and their impact on the expression of cognitive capacity and associated brain responses. *Philos Trans R Soc Lond B Biol Sci* 367(1589):704–716.
20. Spears R, Doosje B, Ellemers N (1997) Self-stereotyping in the face of threats to group status and distinctiveness: The role of group identification. *Pers Soc Psychol Bull* 23: 538–553.
21. Sapolsky RM (2004) Social status and health in humans and other animals. *Annu Rev Anthropol* 33:393–418.
22. Johns M, Inzlicht M, Schmader T (2008) Stereotype threat and executive resource depletion: Examining the influence of emotion regulation. *J Exp Psychol Gen* 137(4): 691–705.
23. Boehm C, Flack JC (2010) The emergence of simple and complex power structures through social niche construction. *The Social Psychology of Power*, eds Guinote A, Vescio TK (Guilford, New York), pp 48–86.
24. Laland KN, Brown GR (2006) Niche construction, human behaviour and the adaptive lag hypothesis. *Evol Anthropol* 15(3):95–104.
25. Leary MR (1995) *Self-Presentation: Impression Management and Interpersonal Behavior* (Brown Benchmark, Madison, WI).
26. Byrne RW, White A (1988) *Machiavellian Intelligence: Social Complexity and the Evolution of Intellect in Monkeys, Apes and Humans* (Oxford Univ Press, Oxford).
27. Fiske ST, Cuddy AJC, Glick P, Xu J (2002) A model of (often mixed) stereotype content: Competence and warmth respectively follow from perceived status and competition. *J Pers Soc Psychol* 82(6):878–902.
28. Kenrick DT, et al. (2002) Dynamical evolutionary psychology: Mapping the domains of the new interactionist paradigm. *Pers Soc Psychol Rev* 6(4):347–356.
29. Cosmides L, Tooby J (2013) Evolutionary psychology: New perspectives on cognition and motivation. *Annu Rev Psychol* 64:201–229.
30. Eisenberg N, Fabes RA, Spinrad TL (2006) Prosocial development. *Handbook of Child Psychology: Social, Emotional, and Personality Development*, eds Eisenberg N, Damon W, Lerner RM (Wiley, New York), pp 646–718.
31. Döring AK, Blauensteiner A, Aryus K, Drögekamp L, Bilsky W (2010) Assessing values at an early age: The Picture-Based Value Survey for Children (PBVS-C). *J Pers Assess* 92(5):439–448.
32. Dovidio JF, Gaertner SL (1981) The effects of race, status, and ability on helping behavior. *Soc Psychol Q* 44(3):192–203.
33. Baddeley AD (1996) Exploring the central executive. *Q J Exp Psychol* 49(1):5–28.
34. Zahavi A, Zahavi A (1997) *The Handicap Principle: A Missing Piece of Darwin's Puzzle.* (Oxford Univ Press, New York).
35. LaFrance M, Hecht MA, Paluck EL (2003) The contingent smile: A meta-analysis of sex differences in smiling. *Psychol Bull* 129(2):305–334.
36. Taylor SE (2006) Tend and befriend: Biobehavioral bases of affiliation under stress. *Curr Dir Psychol Sci* 15(6):273–277.
37. Anderson C, Kilduff GJ (2009) Why do dominant personalities attain influence in face-to-face groups? The competence-signaling effects of trait dominance. *J Pers Soc Psychol* 96(2):491–503.
38. Guinote A, Judd CM, Brauer M (2002) Effects of power on perceived and objective group variability: Evidence that more powerful groups are more variable. *J Pers Soc Psychol* 82(5):708–721.
39. Gerard HB, Hoyt MF (1974) Distinctiveness of social categorization and attitude toward ingroup members. *J Pers Soc Psychol* 29:836–842.
40. Dijksterhuis A (2004) Think different: The merits of unconscious thought in preference development and decision making. *J Pers Soc Psychol* 87(5):586–598.
41. Trivers RL (1971) The evolution of reciprocal altruism. *Q Rev Biol* 64(1):35–57.
42. Bardi A, Buchanan KE, Goodwin R, Slabu L, Robinson M (2014) Value stability and change during self-chosen life transitions: Self-selection versus socialization effects. *J Pers Soc Psychol* 106(1):131–147.
43. Roberts BW, O'Donnell M, Robins RW (2004) Goal and personality trait development in emerging adulthood. *J Pers Soc Psychol* 87(4):541–550.
44. Skirbekk V (2008) Fertility trends by social status. *Demogr Res* 18(5):145–180.
45. Goldscheider C, Uhlenberg PR (1969) Minority group status and fertility. *AJS* 74(4): 361–372.
46. Martin KS, Rogers BL, Cook JT, Joseph HM (2004) Social capital is associated with decreased risk of hunger. *Soc Sci Med* 58(12):2645–2654.
47. Schwartz SH (1992) Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. *Advances in Experimental Social Psychology*, ed Zanna M (Academic, Orlando, FL), pp 1–65.
48. Kalish C (2005) Becoming status conscious: Children's appreciation of social reality. *Philosophical Explorations* 8(3):245–263.
49. Shively CA, Clarkson TB (1994) Social status and coronary artery atherosclerosis in female monkeys. *Arterioscler Thromb* 14(5):721–726.
50. Decety J (2010) The neurodevelopment of empathy in humans. *Dev Neurosci* 32(4): 257–267.
51. Rhoades BL, Greenberg MT, Domitrovich CE (2009) The contribution of inhibitory control to preschoolers' social–emotional competence. *J Appl Dev Psychol* 30: 310–320.
52. Lennon R, Eisenberg N, Carroll J (1986) The relation between nonverbal indices of empathy and preschoolers' prosocial behavior. *J Appl Dev Psychol* 7(3):219–224.
53. Doosje B, van den Bos K, Loseman A, Feddes AR, Mann L (2012) "My in-group is superior!" Susceptibility for radical right-wing attitudes and behaviors in dutch youth. *NCMR* 5(3):253–268.
54. Hamann K, Warneken F, Greenberg JR, Tomasello M (2011) Collaboration encourages equal sharing in children but not in chimpanzees. *Nature* 476(7360):328–331.
55. House B, Henrich J, Sarnecka B, Silk JB (2013) The development of contingent reciprocity in children. *Evol Hum Behav* 34(2):86–93.
56. Buss DM (1991) Evolutionary personality psychology. *Annu Rev Psychol* 42:459–491.
57. Silk JB (2007) Social components of fitness in primate groups. *Science* 317(5843): 1347–1351.
58. Silk JB, Alberts SC, Altmann J (2003) Social bonds of female baboons enhance infant survival. *Science* 302(5648):1231–1234.