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Social Status Alters the Transmission of Selfish, but not Altruistic, Behavior in Sex-specific Ways

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Abstract

This article examines how altruistic and selfish behaviors are transmitted based on model status. Investigating how the status of behavioral models influences copying of prosocial and antisocial actions by observers is vital to expanding our understanding of the cultural transmission of socially desirable and undesirable behaviors. In our study, 462 participants partook in a resource allocation game in which they observed a prestigious, dominant, or neutral status digitally simulated player make an altruistic, selfish or fair decision regarding how much money to take from a collective pot. Following this, they decided how much to take for themselves. We found evidence of transmission effects, observing altruistic behavior reduced participant resource-taking by roughly 10 percentage points, while observing selfish behavior increased it by about 13. For male participants, selfish behavior was amplified if the selfish simulated player was dominant or prestigious. Conversely, for females, copying of selfishness was less pronounced if the simulated player was prestigious. The transmission of altruistic behaviour did not interact with model status. These findings reveal that both altruistic and selfish behaviour are readily copied, that model status amplifies the copying of selfishness among men, but prestige does not appear to increase the copying of altruistic acts.

Introduction

Social learning is one of the principal mechanisms through which human behavior is transmitted across individuals and generations. Within this broader process, learning biases shape which models are preferentially attended to and imitated. Characterisations of human social status distinguish between prestige and dominance. Prestige is grounded in skill and expertise resulting in voluntary deference based on the capacity to confer benefits to others; conversely, dominance is grounded in coercion, intimidation, and the capacity to impose costs on others.

A central line of work in behavioural transmission studies has focused on prestige bias, the tendency to preferentially learn from or copy prestigious individuals [1]. Adult laboratory work shows that prestige cues can drive the spread of new techniques and innovations [2], and more recent work finds that the bias is not indiscriminate: it is largely confined to the domain in which a model's prestige was acquired [3]. Prestige biased behavioural transmission is thought to play a critical role in shaping human behavior, facilitating the transmission of practices and cultural norms across generations [1, 4, 5]. The evolutionary history of this psychological bias runs deep. Evidence from non-human primates suggests that preferential copying of higher-ranking individuals is, to some extent, evolutionarily conserved [6, 7]. Price and Van Vugt [8] argue that prestige-based leadership itself may have evolved in humans as it facilitated reciprocal relationships with information and resource sharing, benefiting both leaders and their group members.

Almost all of the experimental work in the prestige-bias literature has concerned the transmission of skills, techniques, or items of knowledge. Far less is known about the transmission of more general behavioral tendencies such as altruism and selfishness that regulate cooperation in everyday life. Understanding this is particularly important because prestige-biased transmission has been posited as a possible mechanism underpinning the evolution of cooperative behavior, which is one of the most longstanding areas of investigation among evolutionary scientists. Whilst this has been explored theoretically [1], empirical testing of this evolutionary pathway to cooperation is scarce relative to studies of kin selection, reciprocity, signaling, and punishment. The notion that prestige and prosociality are linked is lent support by the fact that generous and altruistic actions have been shown to increase the perceived prestige of an individual [9]. However, there are many determinants of prestige, and highly skilled or knowledgeable individuals may be prestigious but this does not mean that all of their actions are prosocial. Henrich and Gil-White [1] also hypothesised that dominance biased learning is associated with the transmission of aggressive, competitive, and selfish behaviors, particularly in environments where such traits are advantageous for securing resources or social standing. In this article, we investigate the extent to which social status of behavioural models moderate the immediate transmission of altruistic and selfish behaviour, and possible contribution of status-based learning biases to the 'hypercooperative' tendencies observed in our species.

A second open question is whether the effect of model status on transmission is symmetrical across observer sex. Men and women face partly different incentives in status contests. Selfish behavior by a high-status peer indicates to observers that the resources may be scarce, which in turn may cue competitive behaviors [10, 11]. While selfish behaviour by peers may also signal resource scarcity, individuals are likely especially attuned to the behaviors of high status individuals. Additionally, high status individuals generally have greater access to resources and are thus more greatly insulated from fluctuations in resource variability than other individuals. Therefore, if even high status individuals are behaving selfishly, it may signal resources are especially limited. Due to their higher intra-sexual fitness skew, males in particular may be especially sensitive to competitive cues, and have a lower threshold at which they themselves respond competitively in reaction to those cues. Therefore, we also asked whether male observers might be more inclined than female observers to match selfish behavior when that behavior is performed by a high-status model.

We report a behavioral experiment in which 462 UK adults (254 men, 208 women) took part in an economic game where they decided how much money to take from a collective pot after having observed the choice of a simulated player. The simulated player's behavior was manipulated at three levels (altruistic, equal share, and selfish) and their displayed status was manipulated at three levels (dominant, prestigious, and neutral control), in a between-subjects 3 × 3 factorial. The primary analysis tests the main effects of simulated player's action and status on participants' allocations, and, importantly, their interactive effects; the secondary analysis asks whether these interactions are moderated by observer sex.

Results

Main effects and Status × Action interactions

In all regression models, the reference condition to which coefficients are compared is a neutral status simulated player taking their equal-share of £25. The effect of the simulated player's behaviour on participant allocation decision were large and significant (Fig. 1). Observing altruistic behavior from the simulated player reduced how much participants took for themselves by approximately 10 percentage points ($b = -10.32$, $p = .002$); and observing selfish behavior increased it by approximately 13 percentage points ($b = 13.02$, $p < .001$). The effects of the simulated player's status on participant behavior were not significantly different from zero (Dominance: $b = -1.44$, $p = .652$; Prestige: $b = 2.36$, $p = .460$). Of the four Status × Action interactions, only Dominance × Selfish was significant ($b = 11.62$, $p = .012$): that is to say that the participant selfishness induced by observing a selfish simulated player was even more pronounced if that simulated player was of dominant status. Participant age carried a small negative effect on self-allocation ($b = -0.16$, $p = .004$), while SES carried no significant effect. See Table 1 for full results.

Table 1

Huber's T robust regression of participant's self-allocation on sex, age, SES and simulated player's status, action, status × action interaction..

Predictor	b (SE)	p
Intercept	43.18 (3.90)***	< .001
Sex (male)	2.81 (1.56)	.072
Dominance	-1.44 (3.21)	.652
Prestige	2.36 (3.19)	.460
Altruistic	-10.32 (3.39)**	.002
Selfish	13.02 (3.23)***	< .001
Dominance × Altruistic	2.42 (4.64)	.602
Prestige × Altruistic	-5.42 (4.61)	.240
Dominance × Selfish	11.62 (4.62)*	.012
Prestige × Selfish	2.97 (4.64)	.522
Age	-0.16 (0.06)**	.004
SES	0.17 (0.64)	.791

Note: Reference categories: Neutral profile, Equal share (£25), Female. SES encoded as an ordinal variable (1 to 5). N = 462. * p < .05, ** p < .01, *** p < .001.

Sex-stratified analyses

Within the male subsample (N = 254), both Dominance × Selfish (b = 34.13, p < .001) and Prestige × Selfish (b = 26.45, p = .009) were large and positive. Male participants matched selfish behavior far more strongly when the simulated player was high status, regardless of whether this status took the form of dominance or prestige. Conversely, whilst altruistic behaviour of a neutral simulated player did reduce selfishness, this transmission effect wasn't significantly changed when the simulated player was prestigious or dominant (see Table 2 for full results).

Table 2
Robust regression on the male subsample

Predictor	b (SE)	p
Intercept	54.51 (8.10)***	< .001
Dominance	-7.49 (6.81)	.272
Prestige	-6.13 (6.79)	.367
Altruistic	-17.30 (7.60)*	.023
Selfish	-2.02 (7.25)	.780
Dominance × Altruistic	9.01 (10.18)	.376
Prestige × Altruistic	-0.71 (10.15)	.944
Dominance × Selfish	34.13 (9.90)***	< .001
Prestige × Selfish	26.45 (10.16)**	.009
Age	-0.19 (0.12)	.117
SES	1.27 (1.42)	.373

Note: Reference categories: Neutral profile, Equal share (£25). SES encoded as an ordinal variable (1 to 5). N = 254. * p < .05, ** p < .01, *** p < .001.

Table 3
Robust regression on the female subsample

Predictor	b (SE)	p
Intercept	38.84 (3.43)***	< .001
Dominance	1.49 (2.73)	.586
Prestige	4.63 (2.73)	.090
Altruistic	-8.26 (2.71)**	.002
Selfish	20.84 (2.58)***	< .001
Dominance × Altruistic	-1.22 (3.82)	.749
Prestige × Altruistic	-4.63 (3.80)	.223
Dominance × Selfish	-5.15 (3.94)	.191
Prestige × Selfish	-8.41 (3.86)*	.030
Age	-0.11 (0.05)*	.021
SES	-0.07 (0.54)	.902

Note: Reference categories: Neutral profile, Equal share (£25). SES encoded as an ordinal variable (1 to 5). N = 208 * p < .05, ** p < .01, *** p < .001.

Within the female subsample (N = 208), a different pattern was observed. The only Status × Action interaction that reached conventional significance was Prestige × Selfish, with a negative effect (b = -8.41, p = .030). This means that female participants displayed a behavioral pattern opposite to that displayed by male participants (Fig. 2). That is to say, the selfishness induced when observing selfish behaviour of the simulated player was less pronounced if the simulated

player was prestigious compared to of neutral status. Whereas for men, the transmission of selfishness was more pronounced when the selfish simulated player was prestigious (or dominant) compared to one of neutral status.

Formal test of sex moderation A single model including all Sex × Status × Action three-way terms provided a formal joint test of whether sex moderates the Status × Action interaction. The four three-way terms were jointly significant (Wald $\chi^2(4) = 24.36$, $p < .001$), driven primarily by Sex × Dominance × Selfish and Sex × Prestige × Selfish. The amplifying effect of status on imitation of selfish behavior is concentrated among male participants. The Prestige × Selfish interaction revealed significant sex differences in participant behavior, with males self-allocating significantly more money and females self-allocating significantly less money relative to the neutral-status condition.

The model-estimated marginal means for each Sex × Status × Behavior condition, evaluated at the sample means of age and SES, revealed broadly similar predicted allocations for both males and females across non-neutral prestigious altruistic conditions, while males took more when observing a dominant altruistic model. After observing a dominant simulated player act altruistically male participants took 31.56% of the remaining pot while females took 26.26%. Similarly when female participants observed prestigious models behave altruistically they took 24.62% of the remaining pot while males took 24.68%. Much greater sex differences were uncovered under the selfish conditions. When male participants observed simulated players behave selfishly they took about 78.04% of the remaining pot when that player was dominant and 61.36% when they were prestigious, while female participants took about equal amounts under both conditions (dominant 51.55%, prestigious 53.07%; Table 4).

Table 4
Model-estimated percentage of the remaining pot taken, by participant sex, for dominant and prestigious simulated players after altruistic or selfish behavior.

Simulated-player behavior	Participant sex	Dominant simulated player	Prestigious simulated player
Altruistic	**Male**	**31.56**	**24.68**
Altruistic	**Female**	**26.26**	**24.62**
Selfish	**Male**	**78.04**	**61.36**
Selfish	**Female**	**51.55**	**53.07**

Note: Predictions from the full Huber's T model including all Sex × Status × Action terms, evaluated at the sample means of age (44.8) and SES (2.86). N = 462.

Sensitivity analysis

Re-estimating all models as fractional logits (Tables S6 and S7) supported the main results with two exceptions. The two action effects held (altruistic b = − 0.53, p = .006; selfish b = 0.53, p = .012), as did the sex-specific pattern: among men both Dominance × Selfish (b = 1.27, p = .005) and Prestige × Selfish (b = 0.98, p = .033) remained positive and significant, among women Prestige × Selfish remained negative (b = − 0.95, p = .015), and the four Status × Action × Sex terms remained jointly significant (Wald $\chi^2(4) = 13.36$, $p = .010$). The pooled Dominance × Selfish interaction did not reach significance under fractional logit (b = 0.48, p = .117), which is consistent with its being an average of a large positive male effect and a smaller, non-significant negative female one. The women's fractional-logit model additionally returned a Prestige × Altruistic term (b = − 0.94, p < .001) that is not significant in the primary model (b = − 4.63, p = .223); this term is produced by the fair/prestigious reference cell rather than by any difference between the altruistic cells, and we do not treat it as evidence of prestige-biased transmission of altruism.

Discussion

This study offers important insights into how dominance and prestige influence the transmission of altruistic and selfish behavior using a controlled resource allocation task. By examining participants' responses to simulated players that conveyed dominance or prestige, paired with either selfish, altruistic, or neutral behavior, we gain a clearer understanding of how these status cues shape human decision-making. The findings contribute to the broader literature on status hierarchies and social dynamics, demonstrating how responses to dominance and prestige can be either reinforced or mitigated.

The results revealed notable sex differences in how participants responded to selfish, but not altruistic, behavior. In all cases, it is selfishness, and not altruism, that interacts with status. Amongst men, but not women, the copying of selfish behaviour was significantly amplified if the model was of high status regardless of status type.This is consistent with theories that men are more attuned to competitive cues due to evolutionary pressures emphasizing competition for resources and status [12, 13]. While these findings align with the prediction that dominant figures behaving selfishly would elicit selfish behavior in participants, the finding that men behave more selfishly after witnessing selfish behavior from prestigious individuals has not been predicted by previous literature.

Female participants, by contrast, showed a markedly different pattern. When females observed a selfish model they also behave selfishly, but unlike men, this transmission of selfishness was not as strong when the model wa prestigious. This may reflect a tendency among female participants to distance themselves from the selfish behavior of an admired figure, or a form of prosocial correction in response to a perceived violation of prestige norms.

It is important to note that all the simulated players were male. Therefore, it is possible that the observed sex differences may have been partially driven by intrasexual competition which only applied to male participants. It may also be the case that the observed differences reflect genuine sex differences in how males and females react to selfish behavior. Males may have evolved a psychology which reacts more selfishly in reaction to selfish behavior as differences in resource holding amongst men can result in much greater differences in reproductive success than resource differences amongst women, due to the much higher reproductive skew amongst males, and the importance of male resources holding in mating success [12].

A critical question this research sought to address is how different forms of status impact prosocial versus antisocial behavioral transmission. Answering this question is of central importance to understanding the evolution of cooperation, which is a long-standing area of interest in the evolutionary social sciences.

While the evolution of cooperation in other species can to a large degree be explained through processes such as kin selection and reciprocal altruism, humans cooperate extensively with strangers (ruling out kin selection) and individuals with whom we never interact again (suggesting reciprocal altruism may be insufficient). One possible explanation for these hypercooperative tendencies of humans that has been proposed is that our highly cooperative norms spread culturally through individuals observing and emulating and imitating the cooperative actions of prestigious individuals [14]. However, testsing this hypothesis that cooperative norms may have spread via prestige bias is minimal, especially in comparison with the extensive study of other mechanisms such kin selection, reciprocity, and signalling.

We found that the prestigious simulated models were preferentially copied by men only when they acted selfishly. Moreover, this preferential imitation of selfish behavior seems to be due to the fact that the simulated players were high status rather than prestigious specifically. The only finding which may lend support to evolutionary hypotheses that cooperation may be driven by prestige biased copying of cooperative behavior is the fact that prestige seems to have attenuated the copying of selfish behavior by female participants.

While the findings do not support the notion that prestige bias specifically played a central role in the evolution of cooperation, this is not to say that cultural transmission was not important in the evolution of human cooperation. In general, we found evidence of behavioural cascading, wherein whatever behavior the participant observed they were likely

to copy. In regard to altruism in particular, this study did find evidence of transmission effects on altruistic behavior, it is just that behavior was not impacted by prestige. The stronger transmission of selfish behavior when exhibited by dominant imulated players compared to their neutral counterparts suggests that humans may also possess a “dominance-bias” in social learning. This tendency to copy dominant individuals hashas been described in non-human primates but has been emphasised much less than prestige bias in studies of human cultural evolution [1, 15]. Our findings demonstrate a dominance-bias that extends to the transmission of selfish behavior, and is notable among male observers. Taken together, these findings suggest that under certain circumstances, model status can be more of a hindrance than a catalyst to the spread of cooperation. Rather than statused biased social transmission leading to preferential copying of prosocial behaviour, our results suggest status biased copying can enhance the transmission of antisocial behavior. We stress that this finding calls for further studies which probe whether these results can be replicated and whether dominance-biased social transmission occurs under other conditions which we know to affect social behaviour, such as when participants are being observed or are engaging in repeated interactions [16, 17].

The study design allowed us to capture “true” altruism or “pure” selfishness, meaning they acted while not motivated by outside factors. The one-shot nature of the game means that we know participants were not strategically acting altruistically in the expectation of the player reciprocating the favor in the future, while we also know when participants behaved selfishly they were not retroactively punishing another player for having previously acted selfishly in order to enforce cooperative norms. Since the participant’s decision could not in any way impact the outcome of the game for the individual who came before them, when the participants acted selfishly we know they were not doing so out of spite to leave less for selfish individuals. Since the participants' decision could not impact that of the player who went before them and they were also unaware of the identities of the players to follow them, it is also clear they were not competing with those individuals based on knowledge of their identities.

Several limitations to this study must be acknowledged. First, the experimental design involved a single, brief interaction, which limits the generalizability of the results to real-world situations where relationships and social hierarchies develop over time. While participants were given sufficient time to process the simulated players’ behavior, the short-term nature of the experiment likely emphasizes impulsive rather than strategic responses. This also means that a one-shot, single-model design like ours cannot rule out that prestige-biased copying of cooperative behaviors may emerge under repeated interaction conditions. Future research should explore how dominance and prestige influence behavior over longer periods, particularly in situations where participants have ongoing relationships with high status individuals. This would provide more insight into how status signals evolve and affect behavior over time.

Secondly, as discussed above, all of the simulated players were male since it was male profiles which were rated as the most dominant and prestigious in the pilot study. This may have impacted the degree to which their status and behaviors influenced male and female participants, possibly leading to the observed sex differences in the data owing to intrasexual competition. Future studies should investigate these effects by including both male and female behavioral models.

Another limitation of this study is its lack of cross-cultural diversity in the participant sample. Previous research has highlighted important cultural differences in altruistic behavior and standard of punishment [18]; however, this study involved participants from a single cultural context, the UK, limiting the ability to generalize the findings across different societies. Dominance and prestige, as forms of status, are interpreted and valued differently across cultures, and the behavioral responses to these status cues could vary significantly depending on cultural norms, social structures, and values [19, 20]. Including participants from a broader range of cultural backgrounds would improve our understanding how cultural context shapes the influence of dominance and prestige on social behavior. Cross-cultural comparisons would offer deeper insights into the universality or variability of these status mechanisms and help refine theories of social hierarchy formation across different societies.

The observed sex differences may also reflect differences in the social conditioning and life experience of men and women as well as, or instead of, evolved differences. The difficulty in parsing sex differences which are the result of evolution from those which result from experiential and social conditioning differences between the sexes is exacerbated by the limited cross-cultural diversity of our sample; however, greater cross-cultural diversity alone may not resolve this issue due to potentially globally shared trends in the differing experiences of males and females.

One may also reasonably argue that all three simulated players behaved altruistically, since the payoff-maximizing choice for the first player was to take the entire £100. In practice most participants did not: 16% took everything that remained to them in an anonymous one-shot game, though this rose from 4.6% after an altruistic simulated player to 31% after a selfish one (Experimental Design).

Finally, a photo was purposely excluded from the neutral profile in order to avoid unintentionally introducing information which participants may use to attribute status to the individual. The fact that the dominant and prestigious profiles contained photos of the simulated players, while the neutral profile did not, may have also introduced an unintended "photo effect." Despite this, the lack of a photo on the neutral profile does not impact the findings presented here as they focus specifically on the differential effects of prestige and dominance, and how they interact with participant behavior.

This study provides valuable insights into how dominance and prestige interact with observed behavior to influence competitive and altruistic decision-making in short-term interactions. The key finding is that status had no effect on its own and altered transmission only in combination with the model's behavior, and only when that behavior was selfish. Importantly, the combined effects of status and behavior varied by sex, and were primarily driven by stronger responses among male participants to selfish behavior from high status simulated models. Interestingly, no significant sex differences were observed when the simulated player acted altruistically. These findings underscore the importance of how status does and does not shape the transmission of prosociality and selfishness. We believe the insights presented here enlighten our understanding of the pathways to cooperation and competition within structured environments, and extend dominance-biased social learning to the transmission of selfish behavior, setting the stage for future research that more extensively plumbs these dynamics in conjunction with cultural, psychological, and contextual factors.

Methods

Participants

After complete-case filtering on the regression predictors, N = 462 UK adults provided usable data (254 men, 208 women). Participants were recruited online via Prolific recruitment platform and completed the task individually. All responses were collected on 25 December 2023. Of the 493 people who started the study, 27 did not finish it, one finished without making an allocation and three did not give a valid age of 18 or over; responses made through the survey preview link while the study was being set up were not counted as participants. A power analysis treating the nine conditions as a one-way design ($f = 0.25$, $\alpha = .05$, power = .80) indicated that at least 248 participants were required. A sensitivity analysis on the analysed sample, using the equivalent least-squares F tests, shows that the joint test of the four Status × Action terms had 80% power ($\alpha = .05$) to detect effects of $f^2 = 0.026$ (partial $\eta^2 \approx .03$) or larger, and $f^2 = 0.048$ and $f^2 = 0.059$ within the male and female subsamples respectively. We report how we determined our sample size, all data exclusions, all manipulations, and all measures in the study.

Experimental Design

The experiment consisted of a reverse common pool of resources game, in which a group of players are given a collective pool of money and each individual given a sequential turn to extract as much as they please for themselves. We used the game to investigate the impact of a behavioral model's status and behaviour on participants 'decisions regarding how

much money to extract. All behavioral models were fictitious individuals with preprogrammed behaviors, which are referred to as 'simulated players'.

The experiment utilized a between-group design, with participants randomly assigned to one of the nine status X behaviour experimental groups. The simulated player's behavior was manipulated at three levels (altruistic, equal share, and selfish) and their displayed status was manipulated at three levels (dominant, prestigious, and neutral control).

The dependent variable is the participant's take as a percentage of the remainder after the simulated player's take: (participant take / (100 – simulated player's take)) × 100. This normalization isolates behavioral imitation from the mechanical ceiling imposed by the simulated player's own take. Thus, it reflects the proportion of the remaining resources the participant chose to extract for themselves rather than leave for the two remaining hypothetical participants.

Experimental Set-up Procedure

The task was framed as a one-shot decision. The steps are outlined below:

1. **Demographics:** The subjects were first asked to complete an online form in which they were asked questions about their demographic data, including age, sex, and socioeconomic status (SES).
2. **Creation of ID card:** Participants were then given the opportunity to upload a profile picture, specify their occupation, and list their best quality. They were told that these pieces of information, if they chose to enter them, along with their age and sex would go on a digital ID card which would be displayed to other experimental participants during the game they were about to engage in. They were then told to wait whilst they were being matched with three other individuals to play the game; in reality there were no other actual participants in their group (see below).
3. **Task instructions:** Having been assigned to a fictitious group, the participant was told that the group members would take turns to decide how much money to take from a collective pool of £100. The instructions also referred to "an equal share of £25" to ensure the participant would be able to easily assess the choice of the simulated player (see below). They were informed that a randomly selected set of participants would actually be awarded the money they took for themselves in the game.
4. **"Random" Queue Assignment:** The participant was then told the order in which the four players would decide how much of the (remaining) pot to take for themselves was being randomly assigned. Although the allocation of position in the queue appeared random, the participant was always selected to be the second player to take money from the pot such that they would observe a simulated player before making their decision.
5. **The simulated player's turn:** The simulated player was a digitally generated player whose behaviors were pre-programed to be either neutral (taking their equal share of £25), selfish (taking £50), or altruistic (taking £10). The participant also saw the ID card of the simulated player, which contained some combination of the simulated player's facial photograph, age, sex, occupation, and self-described best quality. Each participant saw a single simulated player and therefore a single ID card. Depending on the experimental condition, this was one of three cards (dominant, prestigious or neutral), selected from a larger set piloted for this purpose (see Simulated Player Profiles). In order to enhance the perception that the simulated player was another real individual, there was a time buffer as the simulated player was apparently thinking about and deciding how much money to take from the pot.
6. **Reflection by Participant:** After observing the simulated player, the participant then had to wait 30 seconds before proceeding. The intention of this moment of waiting was to give the participant time to reflect on the simulated player's actions.
7. **The Participant's Decision:** After the reflection period, the participant proceeded to engage in the same resource allocation task, for which they were given 90 seconds within which they had to decide how much of the remaining pot to take.

8. **Expulsion from Game:** After the participant decided how much money to allocate to themselves, they were removed from the game.
9. **Payment of Participants:** After the study was completed, a randomly selected group of participants was paid the amounts its members chose to take.

Simulated Player Profiles

Three simulated player profiles (ID cards) were created for use in the present study for the purpose of manipulating the perceived status of the simulated player. This involved a pilot study (n = 432 raters) in which 28 candidate ID cards were each rated by a subset of participants on a series of Likert items from a pre-existing scale used to assess perceptions of dominance and prestige [21]; each rater saw one card. The ID cards used in this pilot all identified the individuals as the same age. They included one of two headshots; these were taken from Mileva [22] in which multiple manipulated versions of a facial photograph of the same individual were produced and then shown to be perceived as dominant or prestigious.. In addition to these three contents, some of the ID cards included an occupation or a self-described best quality, or both.

The prestigious and dominant profiles used in the present study were selected from the pilot using a weighted-proportion score, D^2/P for the dominant profiles and P^2/D for the prestigious, where D and P are a profile's dominance and prestige ratings by pilot participants; this favored profiles in which one form of status most clearly exceeded the other. The selected dominant card showed a finance professional with the best quality 'Competitive', the selected prestigious card a medical professional, and we also included a neutral status card which only had age and sex specified. Full details of the methods and findings of the pilot can be found in the **Supplementary Materials**.

Analysis

All inferential models are robust linear regressions with Huber's T M-estimation, which downweights observations with large residuals without removing them. We use it because the outcome is right-skewed with a mass at the ceiling (75 of the 462 participants took everything that remained) and because the sex-stratified cells contain only 17 to 34 participants, so an ordinary least-squares cell mean can move by several points depending on how many ceiling-takers a cell happens to contain. Huber's T gives a location estimate that is less sensitive than the mean to the ceiling-takers in each cell, reducing the weight of observations far from it (in the primary model 143 of 462 observations receive a weight below 1 and 93 a weight below 0.5, the latter group being mostly participants at the ceiling). No single observation is influential in the usual sense (maximum Cook's distance 0.025 in a least-squares fit of the primary model), so the choice concerns which location is estimated rather than the removal of outliers, and the fractional-logit sensitivity analysis described below, which models the conditional mean including the ceiling mass, shows which conclusions depend on it. The primary model regresses the participant's proportion taken on simulated player's status (dominance and prestige dummies, neutral reference), action (altruistic and selfish dummies, equal share reference), a status × action interaction, sex (female reference), age, and SES (ordinal). Parallel models are estimated separately within the male and female subsamples to characterise sex-specific patterns. We also fit a full model including all Sex × Status × Action three-way terms, and test whether sex moderates the Status × Action interaction with a joint Wald test of the four three-way terms. Since the outcome is bounded by 0 and 100, we ran a single sensitivity check in which we rescaled it to 0–1 and re-estimated the primary, sex-stratified and three-way models as fractional-logit models (a binomial generalised linear model with a logit link) with heteroskedasticity-robust (HC1) standard errors, which accommodates the boundary values directly.

Ethics

All procedures were performed in accordance with relevant guidelines and regulations, and approved by the University of Cambridge Department of Archaeology Ethics Review Board, which returned a favourable opinion (reference ARCH-02-2023-05). Informed consent was obtained electronically from all participants before the study began.

Declarations

Competing Interests Statement:

The authors have no competing interests to declare.

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Author Contribution

A.G. and L.M. wrote the main manuscript and conducted the literature review necessary for its drafting. N.C. and G.J. supervised the PhD research this study was a part of, and provided feedback on the study design and drafting of the manuscript. A.G. conceptualized, designed, and carried out the study and its analyses. All authors reviewed the manuscript.

Data Availability

The full anonymized data is available via the Open Science Framework (OSF): https://osf.io/sgk9j/overview?view_only=f1721f315e4244ccb299be7a94b9ad8b The study was not preregistered.

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Figures

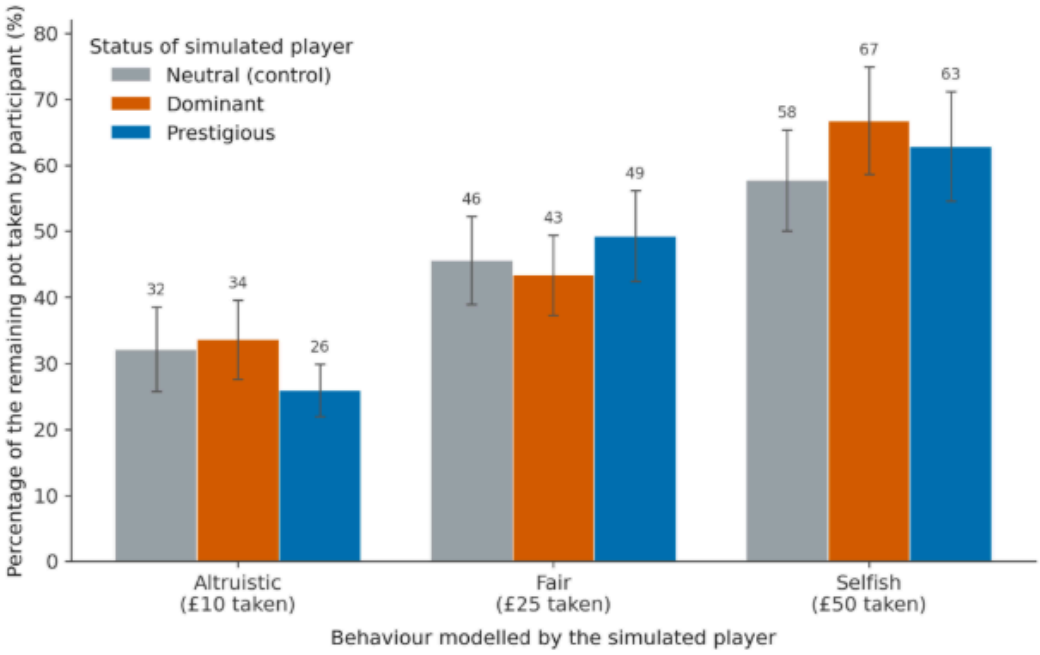


Figure 1

Mean percentage of the remaining pot taken by participants, by simulated player status and behaviour. N = 462. Bars show cell means; error bars are 95% confidence intervals (mean ± 1.96 × SE). Numbers above the bars are the cell means, in percentages of the pot remaining after the simulated player's turn. Cell sizes range from 44 to 57 (Table S1).

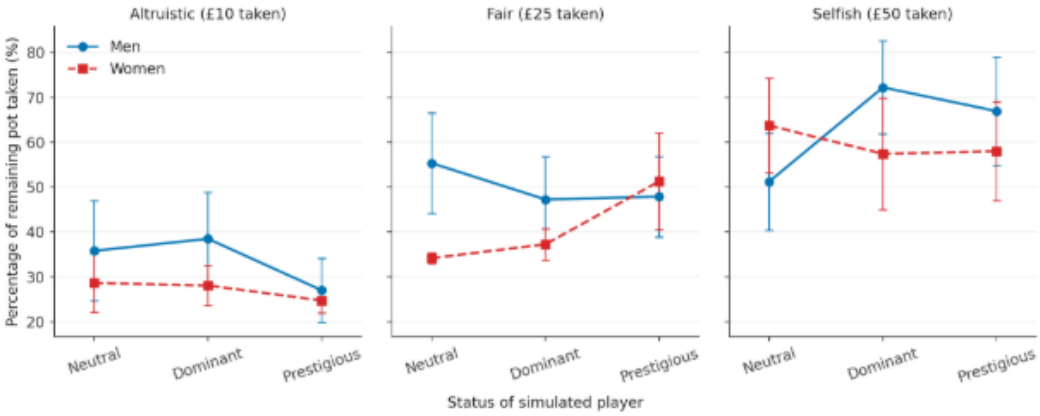


Figure 2

Mean percentage of the remaining pot taken by men and women, by simulated player status, within each modelled behaviour. N = 462 (254 men, 208 women). Points are cell means; error bars are 95% confidence intervals (mean ± 1.96 × SE). Values are percentages of the pot remaining after the simulated player's turn. Cell sizes range from 17 to 34 (Table S2).

Supplementary Files

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