

# **Supplemental Materials**

**For**

## **The Ancestral Logic of Politics: Upper-Body Strength Regulates Men's Assertion of Self-Interest Over Economic Redistribution**

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### **Methods**

Cross-cultural consistency was crucial to validating our hypotheses, and so we collected data on upper body strength, SES and political positions in three countries: Argentina, US and Denmark. These countries were particularly appropriate because they are considerably different in terms of welfare state policies and economic history. Below we provide details about sampling and information about the measurement of the core variables of interest. The exact wording of all core items appears in this supplementary information, while information about the control variables is available from the authors.

### *Samples*

Each study was geared to maximize the internal validity of either upper body strength or SES. In the studies conducted in Argentina (113 males, 110 females, average age = 21.00) and the US (211 males and 275 females, average age = 19.1), we relied on samples drawn from university communities (Universidad de Buenos Aires and University of California, Santa Barbara, respectively). Due to the accessibility of the subjects, trained research assistants were able to obtain direct and highly reliable measures of the subjects' upper body strength. To provide proxies of SES in these samples, we rely on the two main approaches in extant studies of college samples: Measures of subjects' own subjective sense of SES (Argentina) and objective measures based on the SES of the parents (US). Our final study was conducted in Denmark. Using a survey agency, measures were collected over the internet from a nationally representative sample of Danish citizens. Subjects were drawn from YouGov Zaper's standing webpanel based on quota sampling such that the sample was nationally representative on sex, age and geographical location. The response rate was 34%. This sample allows us to get a highly reliable and varied measure of SES directly based on subjects' own income, living conditions and education. The Danish subjects were instructed on how to self-measure upper body strength (421 males and 372 females returned strength measures, average age = 48.04). The studies in Argentina and Denmark were conducted in 2008, while the US study was conducted in 2009.

### *Measuring upper body strength*

As a measure of upper body strength we relied on the flexed biceps circumference of our subjects. Intensive analyses indicate that the best single predictor of upper body strength (as assessed on standardized weight-lifting machines in the gym) is flexed biceps circumference, which alone

accounts for 55% of the variation in weight-lifting ability.<sup>1</sup> In Argentina and US, flexed bicep circumference of the dominant arm was measured to the nearest millimetre.

In Denmark, a protocol was devised and presented to the subjects over the internet instructing them on how to measure their biceps correctly. The protocol included an image of a male measuring his biceps in the correct way. In addition, subjects were presented with the option of skipping the task to avoid false reporting. The wording of the protocol was the following: “To answer this question you need a ruler and a piece of string. If you have a soft tape measure, it is even better. The purpose of this task is to get a precise measure of the circumference of your upper arm, when you have flexed your upper arm muscle (also called the bicep). The picture shows how to achieve the measure. Use the string or tape measure to measure around your arm where the flexed muscle is thickest. Please measure directly at your arm and not outside your clothes. Make sure the string or tape measure is tight and straight around the arm. If possible, you can use a mirror or get another person to help you. If you are using a string you can subsequently measure the circumference using the ruler. Write the measure in centimeters as precisely as possible. For example: If the circumference is 31 centimeter and 5 millimeter, write 31.5.” The measures of three subjects were removed because their self-reported bicep circumferences were unrealistic (3, 250 and 295 cm).

### *Measuring socio-economic status*

In the Argentinean sample, we relied on subjective SES measures in order to get a valid measure from a student population. The SES measure consisted of four individual items. Subjects were asked to rate on 7-point scales, first, their current economic situation and, second, the economic situation in the house in which they were raised. Third, they were asked to rate from 0-100 how easy it is for them compared to others to get enough money to live. Fourth, subjects were asked to

provide their monthly income. In the US sample, we used information about parents' SES to get more objective measures of SES from the student population. To measure SES, questions were asked about the level of the education of the subject's mother and father, the personal income in 2009 of the mother and the father and whether at least one of them owned their house. The Danish sample was a nationally representative sample, which allowed us to build a measure of SES based on objective indicators that directly related to the subjects' own SES. To form the index, subjects were asked about their level of education, their degree of ownership of their house (rented, partly owned, owned) and their income (questions on personal and household income were separately asked and averaged). In all three samples, items were z-scored and then added together to form the final index of the subject's SES.

#### *Measuring support for economic redistribution*

In all three samples, subjects were asked to state their degree of agreement with a number of statements about redistribution using 7-point scales. Such survey items have been shown to have strong effects on actual behavior such as, for example, voting behavior. To maximize the ecological validity of our measures, the specific items varied from country to country, thereby allowing the items to take into account country-specific factors regarding the political discussions on redistribution. A subset of the US sample was given all of the items from all three samples and analyses reveal that they all form one coherent scale ( $\alpha=.88$ ) (see supplementary discussion in this document). In each sample, answers were averaged to form a scale of support for redistribution ( $\alpha$ : Argentina=.47; US=.81; Denmark=.78). While the  $\alpha$ -value of the scale in the Argentinean sample reveals a high level of random noise, the same scale in the US subsample had an  $\alpha$ -level of .69, suggesting that the items in general have measurement validity (see supplementary discussion in this document). Also, a reliable subscale with an acceptable  $\alpha$ -level ( $\alpha=.65$ ) can be created in the

Argentina sample (based on item 1 and 4) and this replicates the general findings (see supplementary discussion in this document).

In the Argentinean study, the following statements were used: 1) The government should intervene economically to redistribute the wealth from those having more resources to those having less. 2) It is not fair that people have to pay taxes to fund welfare programs (reversed). 3) The government should raise taxes to give more help to the poor. 4) Inequality in the distribution of wealth is very unjust.

In the US study, the following statements were used: 1) We should resist the demands for higher welfare benefits from people with low incomes (reversed). 2) The wealthy should give more money to those who are worse off. 3) Wealth should be taken from the rich and given to the poor. 4) Wealthy people should not be taxed more heavily than others (reversed). 5) The government should intervene economically to redistribute wealth from those who have more resources to those who have fewer resources. 6) The government should increase taxes and thus give more help to the poor.

In the Danish study, the following statements were used: 1) High incomes should be taxed more than is currently the case. 2) We should resist the demands for higher welfare benefits from people with low incomes (reversed). 3) The wealthy should give more money to those who are worst off. 4) The government spends too much money on the unemployed (reversed). 5) The state has too little control over the business world. 6) In politics, one should strive to assure the same economic conditions for everyone, regardless of education and employment.

### **Supplemental Analyses**

All statistical models are linear regression models and are all available in the supplementary tables in this document. P-values for the predicted interaction is one-sided, all others are two-sided. In the main text we provide empirical support for the prediction that strong men who are high in SES

oppose redistribution whereas strong men who are low in SES favour redistribution. Here, in this supplementary information, we test the robustness of this core finding by controlling for a range of potential confounds. All these analyses are displayed in Supplementary Tables 1-3.

Model 1 in Tables 1-3 shows the basic linear regression model used to estimate Figure 1 in the main text. The other models in Tables 1-3 control different potential confounds on the interaction effect. First, in each country, we added three basic controls: subjects' age, BMI and general political ideology in the form of self-placement on the political left-right spectrum (see Model 2, Tables 1-3). Age is a potential confounding variable with regards to flexed bicep circumference (younger people are stronger), BMI as a measure of body fat is another potential confounding variable with regards to flexed bicep circumference (fat as well as muscles increase circumference), while political ideology is the traditional major predictor of political attitudes. Across the three countries, the predicted interaction effect among males is robust to the inclusion of these variables. In the US, the interaction effect is not only robust for the inclusion of these control variables but is amplified by their inclusion (i.e., the variables work as suppressors). By implication, the predicted marginal effects displayed in Figure 1 Panel B underestimate the true effects of upper body strength on support for redistribution in the US sample.

In the US and Danish studies, we measured additional control variables that are more narrowly tied to the issue of redistribution. For example, previous studies have revealed that perceptions of and feelings towards welfare recipients are particularly powerful predictors of support for redistribution. Therefore, we add to the model the subjects' perceptions of the laziness and the intelligence of recipients of social welfare as well as measures of feelings of anger and compassion towards welfare recipients (see Model 3, Tables 2 and 3). The interactive effects of upper body strength on support for redistribution are robust to the inclusion of these variables in both the US (Model 3, Table 2) and Denmark (Model 3, Table 3). Finally, in the Danish study we

included two additional potential confounds of upper body strength: whether the subject is employed as a manual worker and how many hours per week the subject engages in physical exercise. Even in this highly elaborate model, the predicted interaction effect stays significant (see Model 4, Table 3).

### **Scale validation**

The above analyses increase our confidence that the effects of upper body strength on political positions are not spurious but reflect the operations of evolved decision-making mechanisms. To provide further confidence in our results, we now turn towards our main dependent variable, support for redistribution, and provided additional analyses of the validity of our measure.

#### *Convergent validity of scales measuring support for redistribution*

Each study uses a different scale to measure support for redistribution, thereby allowing the items to take into account country-specific factors regarding the political discussions on redistribution.

While this maximizes the ecological validity of our measures, it would provide additional confidence in our results if we could directly demonstrate that these different scales do capture the same underlying dimension. To demonstrate this, a subset of the US subjects in study 2 was presented with the redistribution items from all three studies. Analyses of this subsample demonstrate that all scales are highly related and have intercorrelations between .75 and .87. As further evidence of this, a scale consisting of all items has an alpha of .88. Furthermore, we can test whether it is possible to replicate the interaction effect in the subsample from study 2 on the scales from study 1 (alpha = .69) and 3 (alpha = .75). The analyses are presented in supplementary table 4. As can be seen, there is a highly significant interaction effect on support for redistribution as measured by the scale from study 1 and on support as measured by a combination of all three

scales. The interaction effect is not significant when the scale from the Danish study are used to gauge the US subjects' support for redistribution. This arises because two of the items are somewhat unreliable in a US context. Hence, for items 5 and 6, the inter-item correlations range from as low as .11 to .30. These two items are also those that express the idea of European-style market intervention most clearly and, hence, could sound odd and unfamiliar to the US subjects. When these two unreliable items are removed (alpha after removal = .72), the interaction effect becomes significant.

#### *Robustness of the Argentina study*

The scale measuring support for redistribution in the Argentina sample has a low  $\alpha$ -level and, hence, is affected by a high level of random noise. Hence, the consistency of the results across the samples is achieved in spite of this noise. A subscale with an acceptable  $\alpha=.65$  can be formed from items 1 and 4. In support of the validity of the findings, we find a significant interaction effect between males' socioeconomic status and their upper body strength on this subscale ( $F_{1,102}=4.255, p = .021$ ).

#### **References**

Sell, A., Cosmides, L., Tooby, J., Sznycer, D., von Rueden, C., & Gurven, M. (2009). Human adaptations for the visual assessment of strength and fighting ability from the body and face. *Proceedings of the Royal Society B: Biological Sciences*, 276, 575–584.

Supplementary Table 1. How upper body strength and SES shape support for redistribution in men. Argentina sample, males only. With controls.

	Model 1		Model 2	
	Coeff.	p	Coeff.	P
Constant	.246	.039	.193	.071
SES	.147	.225	.122	.252
Upper-body strength	-.186	.117	.021	.883
× SES <sup>1</sup>	-.336	.003	-.256	.01
Age	-	-	-.034	.699
BMI	-	-	-.143	.251
Political ideology	-	-	.425	.000
R <sup>2</sup>	.082		.293	
N	101		100	

Notes. Coefficients are OLS unstandardized regression coefficients computed from z-scored variables and are comparable to standardized regression coefficients. Variables were z-scored prior to separating males from females in the analyses. High value on the dependent variable indicates support for redistribution. Changes in N are due to missing data on control variables.

<sup>1</sup>P-values are one-sided due to the directionality of the interaction hypothesis; all other p-values are two-sided.

Supplementary Table 2. How upper body strength and SES shape support for redistribution in men. US sample, males only. With controls.

	Model 1		Model 2		Model 3	
	Coeff.	p	Coeff.	p	Coeff.	p
Constant	-.108	.258	-.069	.384	-.151	.098
SES	.150	.147	.202	.019	.134	.113
Upper-body strength	-.021	.818	-.004	.955	-.002	.980
× SES <sup>1</sup>	-.246	.007	-.307	.000	-.246	.001
Age	-	-	.001	.888	.001	.985
BMI	-	-	-.001	.871	.049	.545
Political ideology	-	-	.575	.000	.341	.000
Welfare recipients are lazy	-	-	-	-	-.241	.003
Welfare recipients are unintelligent	-	-	-	-	-.099	.113
Anger towards welfare recipients	-	-	-	-	.033	.653
Compassion towards welfare recipients	-	-	-	-	.269	.000
R <sup>2</sup>	.032		.34		.562	
N	204		202		139	

Notes. Coefficients are OLS unstandardized regression coefficients computed from z-scored variables and are comparable to standardized regression coefficients. Variables were z-scored prior to separating males from females in the analyses. High value on the dependent variable indicates support for redistribution. Changes in N are due to missing data on control variables (the items on welfare recipients are only asked in some of the waves of data collection).

<sup>1</sup>P-values are one-sided due to the directionality of the interaction hypothesis; all other p-values are two-sided.

Supplementary Table 3. How upper body strength and SES shape support for redistribution in men. Denmark sample, males only. With controls.

	Model 1		Model 2		Model 3		Model 4	
	Coeff.	p	Coeff.	p	Coeff.	p	Coeff.	p
Constant	-.037	.447	-.019	.645	.011	.785	.002	.955
SES	-.309	.000	-.215	.000	-.197	.000	-.174	.000
Upper-body strength	.033	.493	.112	.009	.082	.057	.073	.090
× SES <sup>1</sup>	-.152	.001	-.135	.001	-.141	.001	-.124	.004
Age	-	-	.187	.000	.096	.001	.156	.000
BMI	-	-	-.002	.969	.104	.884	-.015	.71
Political ideology	-	-	.557	.000	.494	.000	.468	.000
Welfare recipients are lazy	-	-	-	-	.044	.085	-.099	.064
Welfare recipients are unintelligent	-	-	-	-	.110	.000	.036	.388
Anger towards welfare recipients	-	-	-	-	-.094	.083	-.088	.049
Compassion towards welfare recip.	-	-	-	-	-.13	.574	.154	.000
Weekly hours of exercise	-	-	-	-	-	-	-.021	.577
Occupation: Non-worker	-	-	-	-	-	-	-.107	.005
R <sup>2</sup>	.124		.439		.479		.490	
N	418		402		381		380	

Notes. Coefficients are OLS unstandardized regression coefficients computed from z-scored variables and are comparable to standardized regression coefficients. Variables were z-scored prior to separating males from females in the analyses. High value on the dependent variable indicates support for redistribution. Changes in N are due to missing data on control variables.

<sup>1</sup>P-values are one-sided due to the directionality of the interaction hypothesis; all other p-values are two-sided

Supplementary Table 4. How upper body strength and SES shape support for redistribution measured by different scales. US sample, males only. With controls.

	Scale from study 1 (Argentina)		Scale from study 3 (Denmark)		Scale from study 3 without item 5 & 6		All scales combined	
	Coeff.	p	Coeff.	p	Coeff.	p	Coeff.	p
Constant	-.039	.691	-.001	.926	-.610	.495	-.048	.613
SES	.164	.085	-.107	.282	-.004	.967	.091	.324
Upper-body strength	-.027	.787	-.013	.904	.018	.518	.002	.985
× SES <sup>1</sup>	-.251	.003	-.075	.205	-.167	.035	-.241	.003
Age	.020	.755	.036	.594	-.003	.966	.023	.710
BMI	.134	.146	.029	.766	-.030	.758	.063	.480
Political ideology	.57	.000	.542	.000	.552	.000	.592	.000
R <sup>2</sup>	.373		.338		.340		.409	
N	141		139		140		139	

Notes. Coefficients are OLS unstandardized regression coefficients computed from z-scored variables and are comparable to standardized regression coefficients. Variables were z-scored prior to separating males from females in the analyses. High value on the dependent variable indicates support for redistribution. Changes in N are due to missing data on control variables.