

Supporting Information

Sell et al. 10.1073/pnas.0904312106

SI Text

Perception of Strength by Others. Details of the procedure can be found in Sell et al. (1). Raters were shown full body photographs of each subject wearing a standard black pair of shorts and standing next to an experimenter (for a standard comparison); these had been edited with Photoshop 8.0 so that the subjects' heads were not visible. Men removed their shirts for the photographs; for cultural reasons, women could not be photographed shirtless, and were instead given a white t-shirt to wear over their shirts to standardize style of dress.

The photographs were rated on physical strength on a seven point scale from 1 (very weak) to 7 (very strong). The ratings for each subject were averaged, giving a single score indicating that subject's strength as perceived by the raters. In Study 1, the raters were 50 undergraduates (18 male). In Study 2, there were 12 raters (five male); each evaluated all targets of one sex first, then all targets of the other sex, with the order counterbalanced across raters. Raters were not subjects in either study, and they were paid \$5 to rate the photographs.

Men's Strength in Studies 1 and 2. Three strength measures are found in both studies; on all three of these measures the men in Study 1 (recruited from the gym) were approximately one-half standard deviation stronger than those in Study 2. Flexed biceps circumference: Study 1: 35.8 cm (SD 2.93); Study 2: 33.2 cm (SD 3.28). Self-reported strength (stronger than <blank>%): Study 1: 58.1 (SD 22.29); Study 2: 48.49 (SD 19.43). Perception of strength by others (from photos, on scale from 1 to 7): Study 1: 4.58 (SD .95); Study 2: 4.17 (SD .83).

Success in Conflicts and Entitlement. The recalibrational theory also predicts that success in conflicts will lead people to feel more entitled to being treated well. The data support this: These instruments were themselves correlated. Men: $r = 0.31$ ($P = 0.0004$). Women: $r = 0.42$ ($P = 10^{-7}$).

Do the Results Support the Existence of a Napoleon Complex? A common folk notion is that shorter men are more aggressive or easier to anger. Our data flatly contradict this view. The Napoleon complex predicts that men's height will be negatively correlated with their anger-proneness and history of fighting, but in Studies 1 and 2 the correlations were either near zero or positive (although not significantly so; see Table S3). It is worth noting that height and strength are positively correlated ($r = 0.23$, $P = 0.07$). Controlling for men's height, their strength continues to significantly predict seven out of eight theoretically relevant anger variables across Studies 1 and 2 (and always predicts anger-proneness and history of fighting). In contrast, height does not predict any of them when strength is controlled for.

Geographical Differences in Attitudes. Attitudes about aggression and related topics are known to vary broadly by geographical region in the U.S. (e.g., see ref. 2). If this study had been conducted on a population drawn broadly from across the U.S., covariation by region in cultural attitudes could in principle account for some of the relationships we found. However, our population is so geographically homogenous that it is difficult to see how geographical differences could explain any of our results. Subjects were a random sample from student facilities at University of California, Santa Barbara (UCSB), where 96% of undergraduates are from California.

Full Scales for Anger and Anger-Related Attitudes (Study 2). Unless otherwise stated, subjects were asked to rate items on how much they agreed with them from 1 (strongly disagree) to 7 (strongly agree).

Scale 1: Proneness to Anger: $\alpha = 0.85$

Although I don't necessarily act on it, I feel an urge to punch people who think they are better than me.
People who get in my face bug the hell out of me.
It really bothers me if someone has gotten away with something at my expense.
Rate how much of a temper you have (compared to your same sex friends). [Scaled from 1 (much less) to 7 (much more)]
If someone insults me I just let it pass. (R)
If another driver cuts me off, I do not get angry. (R)
It is harder to get me angry than other people. (R)
Some people just need to be taken down a peg or two.
If someone shoves me I shove back.
If someone was making too much noise in a movie theater, and ruining it for the rest of us, I would tell the loudmouth to shut up.
I don't back down.
I have a short fuse.
I get very angry when someone makes fun of me.
If someone insults me, I usually don't say anything about it. (R)
If someone gets in my face, I tell them to back off.
If someone hurts my feelings I usually let it pass. (R)
If someone cuts in line in front of me, I let it pass. (R)
I usually shrug it off when a stranger casually insults me. (R)
Sometimes I get so mad I feel like I'm going to burst.
People act like jackasses all of the time.
People often irritate me.

Scale 2: Tendency to Ruminate: $\alpha = 0.81$

I live by the motto "let bygones be bygones." (R)
Rate how long you hold a grudge (compared to your same sex friends). [Scaled from 1 (much less) to 7 (much more)]
Sometimes I stay mad for days.
I get over being angry in an hour or two. (R)
Rate how irritable you are (compared to your same sex friends). [Scaled from 1 (much less) to 7 (much more)]
It takes me a long time to get over something.
I hold grudges for a long time.
I sometimes wake up mad about things that happened a long time ago.
Sometimes I'm seething with anger for long periods of time.
After an argument I'm usually more angry than I was before.
When someone makes me mad, I find myself thinking about it for weeks afterwards.
When I get angry, I think it's important to act on it. (R)

Scale 3: History of Fighting: $\alpha = 0.79$

I have gotten so angry that I threw myself at someone without thinking of the consequences.
I have physically intimidated someone who had it coming.
I have physically defended myself against attack.
I have stared people down.
Since the age of 14, I have been in fights.

Scale 4: Utility of Personal Aggression: $\alpha = 0.81$.

If I don't respond to provocations and do something to make wrong-doers pay, they'll just do more to hurt me in the future.
If someone gets out of line with me, I think it is better to let it pass. (R)
If someone hurts me, and I do something back to make them pay, they'll just do more against me. (R)
It's not worth my time or effort to pay back someone who has wronged me. (R)
If someone does something to hurt me, and I don't get them back, then they'll think they can do whatever they want to me.
Sometimes, you just have to settle things with physical force.
A wise person avoids competition. (R)
You have to stand up for yourself by confronting people with what they've done.
You should not back down when someone threatens you; if you do back down the person will continue to take advantage of you.
Words can solve most problems better than violence. (R)
If I were to use force to solve my problems it would only cause more problems for me in the long run. (R)
If I don't fight back, people will walk all over me.
When it comes to one-on-one confrontations, violence never solves anything. (R)
Violence can solve problems for me.
Confronting people scares me. (R)
It makes me nervous to voice strong disagreement. (R)

Scale 5: Utility of Political Aggression: $\alpha = 0.89$

I think the US spends too much on the military. (R)
I think it was good for the US to show the world, by going to war against Iraq, that it has the strongest military in the world.
I agreed more or less with the campus antiwar demonstrations. (R)
I think it is a mistake to go after Middle Eastern countries that harbor terrorists. This will just lead to more attacks on America in the future. (R)
In most cases I agree with the phrase, "Peace not War." (R)
Violence only breeds more violence. (R)
When used against guilty murderers, the death penalty is a well justified part of the criminal justice system.
When countries respond to force with force it only causes more problems in the long run. (R)

A good way for a country to protect itself is to fight harder and stronger than the opposing country.
Wars in general promote terrorism. (R)
When it comes to international conflicts, violence never solves anything. (R)
The military can solve problems for our country.
We need a strong military.
To deter violence, a country needs a strong military.
Going to war is always wrong. (R)

Scale 6: Entitlement: $\alpha = 0.60$

I deserve to have a good life.
I don't deserve any more than anyone else. (R)
Most people are better than me. (R)
What I earn in life is mine, and I shouldn't be forced to share it. (R)
I am better than most people.
I deserve more than the average person.
I deserve less than the average person. (R)
I feel uncomfortable taking the last soda when in a group of people. (R)
I feel uncomfortable when I get awards because other people might be jealous. (R)
I usually feel nervous when I'm late for a meeting or appointment with someone else. (R)
People get too upset with me when I do minor things.
I feel uncomfortable saving seats for people at the movie theater when it's really crowded. (R)
When people offer to do me a favor I often refuse because I would be uncomfortable imposing on them. (R)
I sometimes feel uncomfortable when I'm given praise. (R)
I feel as though I need to come out on top in any confrontation.

Scale 7: Success in Conflict: $\alpha = 0.78$

If I want something, I can usually get it even if others don't want me to have it.
Other people know not to get in my way.
If another person and I both want something, I will be more likely to get it.
People generally do what I ask them to do.
I don't have much of a problem getting people to do what I want them to do.
I can't get people to do what I want them to do. (R)
When there's a dispute, I usually get my way.

1. Sell A et al. (2009) Human adaptations for the visual assessment of strength and fighting ability from the body and face. *Proc R Soc London Ser B* 276:575-584.

2. Nisbett, R. Cohen, D (1996) *Culture of Honor: The Psychology of Violence in the South* (Westview, Boulder, CO).

Table S1. Regression results, Study 1 (men): Beta coefficients for regressions where attractiveness and strength are the independent variables*

	Anger proneness	History of fighting	Utility of personal aggression	Utility of political aggression	Rumination
Lifting strength (measure a) Attractiveness	0.30 ($P = 0.007$) 0.32 ($P = 0.004$)	0.44 ($P = 0.0002$) 0.14 ($P = 0.11$)	0.30 ($P = 0.009$) 0.19 ($P = 0.06$)	0.23 ($P = 0.04$) 0.23 ($P = 0.035$)	-0.01 ($P = 0.48$) 0.09 ($P = 0.25$)
Perceptions of strength self + other (measure b) Attractiveness	0.30 ($P = 0.014$) 0.25 ($P = 0.028$)	0.41 ($P = 0.002$) 0.05 ($P = 0.35$)	0.23 ($P = 0.055$) 0.15 ($P = 0.132$)	0.18 ($P = 0.10$) 0.20 ($P = 0.08$)	0.14 ($P = 0.17$) 0.02 ($P = 0.44$)
Flexed bicep circumference + b Attractiveness	0.38 ($P = 0.002$) 0.25 ($P = 0.02$)	0.44 ($P = 0.0005$) 0.08 ($P = 0.25$)	0.29 ($P = 0.015$) 0.15 ($P = 0.12$)	0.24 ($P = 0.038$) 0.20 ($P = 0.07$)	0.12 ($P = 0.19$) 0.04 ($P = 0.38$)

*Three separate regressions, each using a different measure of strength. P values one-tailed (all were directional predictions except for rumination).

Table S2. Regression results, Study 2: Beta coefficients for regressions where attractiveness and strength are the independent variables*

	Men		Women	
	Strength	Attractiveness	Strength	Attractiveness
Proneness to anger	0.31 ($P = 0.0005$)	0.04 ($P = 0.34$)	0.04 ($P = 0.29$)	0.22 ($P = 0.003$)
Fighting history	0.39 ($P = 0.00002$)	-0.04 ($P = 0.32$)	0.07 ($P = 0.21$)	0.03 ($P = 0.37$)
Utility of personal aggression	0.33 ($P = 0.0002$)	0.01 ($P = 0.46$)	0.04 ($P = 0.31$)	0.17 ($P = 0.02$)
Utility of political aggression	0.17 ($P = 0.04$)	-0.09 ($P = 0.18$)	0.03 ($P = 0.35$)	0.15 ($P = 0.04$)
Entitlement	0.25 ($P = 0.004$)	0.18 ($P = 0.025$)	0.05 ($P = 0.25$)	0.30 ($P = 0.0001$)
Success in conflict	0.15 ($P = 0.054$)	0.23 ($P = 0.007$)	0.10 ($P = 0.10$)	0.22 ($P = 0.003$)
Rumination	0.05 ($P = 0.29$)	-0.04 ($P = 0.33$)	0.02 ($P = 0.42$)	0.05 ($P = 0.25$)

* P values one-tailed (all were directional predictions except for rumination).

Table S3. Height effects (men): Zero-order correlations for strength, height, weight, and BMI on anger related measures*

Study 1	Anger proneness	History of fighting	Utility of personal aggression	Utility of political aggression	Rumination
Lifting strength	0.38 ($P = 0.003$)	0.47 ($P = 0.0001$)	0.34 ($P = 0.006$)	0.28 ($P = 0.027$)	0.02 ($P = 0.90$)
Height	0.15 ($P = 0.25$)	0.11 ($P = 0.39$)	0.23 ($P = 0.074$)	0.25 ($P = 0.05$)	0.23 ($P = 0.072$)
Weight	0.31 ($P = 0.015$)	0.30 ($P = 0.017$)	0.26 ($P = 0.04$)	0.28 ($P = 0.029$)	0.16 ($P = 0.23$)
BMI (weight/height ²)	0.32 ($P = 0.012$)	0.33 ($P = 0.01$)	0.16 ($P = 0.21$)	0.18 ($P = 0.16$)	0.001 ($P = 0.99$)
Study 2					
Strength	0.32 ($P = 0.0004$)	0.37 ($P = 0.00002$)	0.33 ($P = 0.0002$)	0.15 ($P = 0.10$)	0.06 ($P = 0.50$)
Height	0.06 ($P = 0.49$)	0.05 ($P = 0.62$)	0.07 ($P = 0.43$)	0.08 ($P = 0.039$)	0.003 ($P = 0.97$)
Weight	0.18 ($P = 0.046$)	0.25 ($P = 0.005$)	0.25 ($P = 0.006$)	0.00 ($P = 1.0$)	0.08 ($P = 0.39$)
BMI (weight/height ²)	0.17 ($P = 0.07$)	0.24 ($P = 0.007$)	0.22 ($P = 0.013$)	-0.05 ($P = 0.55$)	0.09 ($P = 0.31$)

* P values two-tailed for consistency across measures.