



# Physical strength as a heuristic cue of political conservatism

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## ABSTRACT

Physically formidable men are motivated to pursue strategies to acquire resources and status through direct competition and the promotion of hierarchical social organization. In service of these priorities, these men support social policies favoring the use of aggressive bargaining and hierarchy-maintenance strategies. Given these associations, we hypothesized physical strength may function as a heuristic cue of political conservatism. Participants in four unique U.S. samples assessed the political orientation of men who varied in physical strength and musculature, considering various facets of what constitutes conservatism. Physically strong men appeared more conservative to perceivers (Study 1;  $N = 203$ ). Neither type of conservatism (social versus fiscal) nor presence of wealth cues moderated effects (Study 2;  $N = 302$ ). Perceivers further regarded liberty as most central to strong men's morality (Study 3;  $N = 179$ ). Similar perceptions emerged for muscularity as cue to upper body strength (Study 4;  $N = 210$ ). We frame results from an affordance management framework, wherein perceivers identify the potential social opportunities and costs of social targets based on physical features that inform trait inferences.

## 1. Introduction

Group living affords several benefits for humans. Nonetheless, the often-hierarchical arrangement of group living is adaptive insofar as members identify effective leaders to address challenges, whereby members allocate status to them (Durkee et al., 2020; Garfield et al., 2020; Lukaszewski et al., 2016; Price & Van Vugt, 2014; Redhead et al., 2021; von Rueden et al., 2014). Identification of these potentially effective leaders remains probabilistic for perceivers who rely on imperfect heuristics to estimate the presence of traits diagnostic of one's leadership ability. Status allocations necessitate sensitivity to physical and behavioral cues associated with traits that implicate others as optimal leaders.

The need to identify effective leaders would have benefited from the development of acuity toward physical features connoting an ability to facilitate hierarchical group living, namely through cues of physical strength or aggression. Given men's advantages in physical strength that became a basis for their assumption of leadership positions (Sell et al., 2012; von Rueden et al., 2014), identifying men's formidability appeared to function ancestrally for identifying coalition members to contribute to intergroup defenses (McDonald et al., 2012). Their

frequent engagement in physical conflict appears to be the product of intrasexual competition, implicating their strength as central to their social capital (Puts, 2010). Men's formidability is quickly and accurately identified through upper body strength (Durkee et al., 2018; Sell et al., 2009). Strong men's advantage in combat positions individuals to allocate status to them to address group challenges (Lukaszewski et al., 2016).

Strong men's advantage in conflict has concomitant attitudes about intragroup resource allocation. Physical advantages calibrate men to endorse aggressive social bargaining strategies that favor strength. This advantage could inform their preferred social structures. Formidability is associated with endorsement of social rules favoring competition typical in modern conservatism (Petersen et al., 2013; Petersen & Laustsen, 2019; Price et al., 2017), implicating cues to formidability as heuristics of coalitional status. Upper-body strength is a route to infer conservatism, prompting the current program of research in tracking ideology to perceivers through upper body strength.

### 1.1. Men's physical strength and political affiliation

Physical conflict over finite resources has been common throughout

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evolutionary history to ensure inclusive fitness for oneself and one's social group. This selection pressure could have led to the evolution of perceptual systems for mutual assessment of relative fighting ability between prospective combatants for conflict resolution (Archer, 1988). These assessments could inform stereotypes from heuristic associations between formidability and intentions.

Formidable men's bargaining power affords opportunities to acquire group resources. Their physical advantages appear foster self-perceptions of their entitlement to resources that they could gain through their efforts in competition versus more equalitarian allotments that do not necessarily favor competition (Lukaszewski, 2013; Sell et al., 2012). This larger claim of group resources could foster endorsement of intragroup rules to preserve strong men's advantage (Price et al., 2017). Men's strength advantage could be an impetus behind sex differences in navigating competitive environments and how they engage group members (Brown et al., 2017; Kerry & Murray, 2021; Manson et al., 2023; Rodriguez & Lukaszewski, 2020; Sacco et al., 2017). Perceivers could recognize their advantage for coalitional and mating decisions from which they develop implicit theories on their preferred interpersonal strategies (Brown et al., 2022, b, 2023). Whereas intrasexual competition would lead to the selection of men's formidability, assessments of women's formidability would be largely irrelevant (Sell et al., 2012), reflecting a less apparent signal value of formidability through female morphology (Lukaszewski et al., 2016; Palmer-Hague et al., 2018).

Group rules could have historically prioritized competition among members at the expense of equalitarian systems of resource allocation. This emphasis on competition parallels several aspects of conservatism within modern societies. Conservatism is a suite of beliefs emphasizing preservation of structural traditions that would include rigid social hierarchies. Within these traditions are preferences for social rules that favor competition. Strong men's aggressive social bargaining for hierarchical ascension and resource acquisition could position them to prefer conservative ideologies that endorse group rules favoring their strategies. Within contemporary societies, male-typical aggressive strategies align with what is frequently deemed conservatism. Physically strong men espouse more conservative ideologies (Petersen & Laustsen, 2019), social dominance (Price et al., 2017), militancy (Brown et al., 2021; Sell et al., 2017), and opposition to wealth redistribution (Petersen et al., 2013; but see an account for mixed results from Kerry & Murray, 2018).

### 1.2. Inferences of formidability and ideology

Humans exhibit perceptual acuity in identifying men's formidability. One of the more direct, and veridical, routes through which perceivers infer men's formidability are physical features connoting upper body strength (Durkee et al., 2018). Within these inferences is recognition of men's potential capabilities to facilitate group living by the enforcement of intragroup rules and protection from outgroup threats (Lukaszewski et al., 2016). Indeed, strong men assume high-status leadership roles in various societies (von Rueden & Van Vugt, 2015). Such assortment could shape downstream inferences about their attitudes about social structures, particularly those that would facilitate the continuation of rules that favor competition.

Men's physical capabilities in conflict could provide estimates of their coalitional status. Perceivers could estimate whether members of superordinate groups are part of subordinate groups *within* that collective. Ideology may be one such group. Individuals are accurate in categorizing individuals as conservative or liberal through static images (Samochowiec et al., 2010). Conservatism is specifically inferred through dominance (Rule & Ambady, 2010). The associations between formidability and conservatism would make it sensible to predict men's upper body strength is a heuristic for conservatism (Petersen & Laustsen, 2019; Price et al., 2017). Physically strong men are perceived as more likely to employ traditional rule enforcement, creating a potential link

between formidability and ideology (Brown, Sacco, & Barbaro, 2022).

### 1.3. Current research

Across four unique U.S. samples, this program of research considered the trait covariation between men's political ideology and physical strength through perceptions of formidability as indicative of conservatism (e.g., Petersen et al., 2013; Price et al., 2017). Because of the sexual dimorphism that makes physical strength more crucial toward men's survival and reproductive success than women's (Lassek & Gaulin, 2009; Sell et al., 2012) and that upper body strength is less reliably predictive of ideology in women (Petersen et al., 2013), we exclusively considered male targets. Our analyses additionally considered perceptions across both sexes, given the invariance in formidability inferences as they may relate to coalitional utility that would similarly affect men and women in finding (dis)similar group members.

We conducted Study 1 to determine whether perceivers use strength as a heuristic for men's ideology while considering whether perceptions were specific to attitudes toward resource allocation or maintaining social structures. Study 2 tested competing predictions between complex and simple social bargaining models in how access to resources influences perceptions (Price et al., 2017). Study 3 tested whether formidability is utilized as a heuristic to identify morality aligning with what is typical of conservatism (i.e., moral foundations; Graham et al., 2009). Study 4 considered the specific morphological underpinnings of these inferences.<sup>1</sup>

## 2. Study 1

Study 1 sought to demonstrate that physically strong men are perceived as more conservative. This study also considered potential specificity in these perceptions. Strong men *are* more conservative in social and fiscal domains (Petersen et al., 2013; Price et al., 2017). But which aspect of conservatism is most perceptually salient through formidability? Although social and fiscal conservatism are related, economic views are empirically distinct from social views (Lefkoffridi et al., 2014; Malka et al., 2019). We predicted that strong men would be perceived as more conservative but remained agnostic as to which facet of is most readily inferred.<sup>1</sup>

### 2.1. Method

#### 2.1.1. Participants

We recruited 203 undergraduates from a public university in Southeastern U.S. for course credit (153 women, 49 men, 1 undisclosed;  $M_{Age} = 20.26$ ,  $SD = 3.94$ ; 53.2% White). A sensitivity analysis indicated our sample could detect small effects (Cohen's  $f = 0.13$ ;  $1-\beta = 0.80$ ). We assessed ideology with one item (1 = *Very Liberal*; 7 = *Very Conservative*); our sample was moderate ( $M_{Grand} = 4.24$ ,  $SD = 1.57$ ). Political affiliation did not moderate findings, prompting no further consideration of the perceiver's ideology hereafter. No data were excluded.

### 2.2. Material and procedure

#### 2.2.1. Target strength

Participants evaluated political opinions of 8 unique identities. Four bodies were of physically strong men and another four of physically weak men. All targets were White and photographed in white tank tops for standardization. Strength was ascertained by an electronic dynamometer on which targets provided measures of their chest/arm strength through a chest press and their dominant handgrip strength (Lukaszewski et al., 2016). Strong men were significantly stronger,

<sup>1</sup> Data and materials are available: [https://osf.io/fx7g3/?view\\_only=3bf3c3b768a4d440197416c636523c6d](https://osf.io/fx7g3/?view_only=3bf3c3b768a4d440197416c636523c6d)

which is accurately inferred by perceivers (see Fig. 1). Participants evaluated one of two versions of each unique identity. That is, identities were heads of each target either left on the original body or placed on a matched body. Participants evaluated two original and two matched-body targets for both categories of targets. Which versions of each unique identity participants viewed was randomized in counterbalanced blocks. Participants did not view the same unique identity twice.<sup>2</sup> As an internal manipulation check, participants indicated how strong each target body appeared (1 = *Not Strong at All*; 7 = *Very Strong*).

### 2.2.2. Politics

We considered attitudes through two different dependent variables to test the full extent of strength perceptions influencing political perceptions.

**2.2.2.1. Political identity.** Participants indicated the extent to which targets identified as liberal/conservative using two 7-point scalar items assessing political beliefs along fiscal and social dimensions (1 = *Very Liberal*; 4 = *Moderate*; 7 = *Very Conservative*).

**2.2.2.2. Political issues.** To determine the full extent of strength as a cue to political affiliation beyond identity, participants indicated the extent targets agreed with specific issues along 7-point scales (1 = *Strongly Disagree*; 7 = *Strongly Agree*) with higher scores indicating perceptions of more conservative stances. This included three items assessing fiscally conservative sentiments (opposition to wealth redistribution, opposition to higher taxes, opposition to welfare) and three items with socially conservative sentiments (opposition to immigration, opposition to abortion, support for traditional values). The internal consistency across categories prompted us to collapse them into composite measures of issue endorsements, wherein higher values would reflect perceptions of a more conservative stance on political issues ( $\alpha > 0.74$ ).

## 2.3. Results and discussion

### 2.3.1. Basic comparisons

Strong men appeared stronger ( $M = 4.36$ ,  $SD = 0.90$ ) than weak men ( $M = 3.07$ ,  $SD = 0.83$ ),  $t(202) = 17.81$ ,  $p < 0.001$ ,  $d = 1.48$ . Participants further viewed strong targets as endorsing more conservative stances ( $M = 4.03$ ,  $SD = 0.65$ ) than weak men ( $M = 3.84$ ,  $SD = 0.64$ ),  $t(202) = 4.03$ ,  $p < 0.001$ ,  $d = 0.28$ .

### 2.3.2. Political identity

We entered participants' responses to the two political affiliation measures (i.e., fiscal, social) for targets into a 2 (Target Strength: Strong = +1, Weak = -1) × 2 (Viewpoint Type: Fiscal = +1, Social = -1) linear mixed effects model (LMEM) including random intercepts for participants and stimuli and a random slope for strength for the participant intercept. A Target Strength main effect indicated that strong targets appeared more conservative ( $M = 4.13$ ,  $SD = 1.57$ ) than weak targets ( $M = 3.92$ ,  $SD = 1.59$ ),  $b = 0.11$ ,  $SE = 0.04$ ,  $t = 2.44$ ,  $p = 0.03$ ,  $\beta = 0.07$ , 95 %  $CI_{\beta}$  [0.01, 0.12]. One-sample  $t$ -tests weighted against the mid-point of 4 (i.e., perceptions of being moderate) indicated that strong men appeared categorically conservative to perceivers,  $t(202) = 4.13$ ,  $p = 0.017$ ,  $d = 0.17$ , 95 %  $CI_d$  [0.02, 0.24]. Weak men were perceived as neither conservative nor liberal,  $t(202) = -1.41$ ,  $p = 0.160$ ,  $d = 0.10$ , 95 %  $CI_d$  [-0.19, 0.03]. Neither the Viewpoint Type main effect nor interaction were significant ( $ps > 0.55$ ). Fig. 2 displays the results.

Strong men appeared more conservative. Nonetheless, additional nuance in our data may exist based on accompanying ecological factors heuristically associated with different political affiliations. Strong men's

<sup>2</sup> Including counterbalances in the model for versions of the targets that participants viewed, no interactive effects emerged.

command over resources and status could suggest their wealth and status inform perceptions of conservatism in a complementary fashion. Study 2 addressed this possibility by manipulating men's overall wealth.

## 3. Study 2

Results from Study 1 could be further qualified by environmental cues. Whereas a simple social bargaining model suggests strong men are more conservative based on a general interest in using competition to acquire resources, a complex social bargaining model would indicate men's strength is only predictive of conservatism among those atop a social hierarchy (Petersen et al., 2013; Price et al., 2017). Status hierarchy ascension may be difficult and could limit the benefit of conservative policies to formidable men with resource access. The association between formidability and aggressive interpersonal strategies is stronger among low-status individuals (Goetz et al., 2013). Previous findings suggest strong men of low socioeconomic status (SES) endorse redistributive economic policies (Petersen et al., 2013). Endorsement would be strategic to increase their access to own resources through restrictive government policies that require cession of resources from group members who could have acquired theirs from competition.

Nonetheless, more recent findings tend to provide greater empirical support for a simple social bargaining model that would lead strong men to endorse policies to prioritize competition (Petersen & Laustsen, 2019; Price et al., 2017). The presence of restrictive policies that impede competition would be seen as detrimental to such men. Evidence consistent with simple social bargaining would be perceptions of strong men more conservative regardless of SES. Conversely, evidence consistent with a complex model would be perceptions of formidable men as more conservative when wealthy.

### 3.1. Method

#### 3.1.1. Participants

We recruited 302 undergraduates from a public university in the Southeastern U.S. for course credit in online data collection (228 women, 71 men, 3 undisclosed;  $M_{Age} = 20.46$ ,  $SD = 4.51$ ; 60.6 % White). This sample was also moderate ( $M_{Grand} = 4.26$ ,  $SD = 1.43$ ). A sensitivity analysis indicated sufficient power to detect small effects for a 2 × 2 × 2 within-subjects design (Cohen's  $f = 0.10$ ,  $1 - \beta = 0.80$ ). No data warranted exclusion.

#### 3.2. Materials and procedure

Participants viewed the targets similarly to Study 1. However, targets were also paired with a statement indicating their hypothetical income relative to the reported median income in the city of the university in question (i.e., \$35,000), which served as a proxy for targets' SES. Incomes above the median (above \$80,000) were regarded as high SES and below indicating low SES (below \$26,000). Participant viewed two strong high-SES, two strong low-SES, two weak high-SES, and two weak low-SES targets. Identities were counterbalanced as in Study 1. Along with asking participants' perceptions of targets' political identity (fiscal and social), we tasked participants to indicate the extent they agreed with a statement implicating the targets as wealthy (1 = *Strongly Disagree*; 7 = *Strongly Agree*).

### 3.3. Results and discussion

#### 3.3.1. Manipulation checks

Strong men ( $M = 4.05$ ,  $SD = 0.95$ ) appeared stronger than weak men ( $M = 3.03$ ,  $SD = 0.93$ ),  $t(301) = 18.99$ ,  $p < 0.01$ ,  $d = 1.09$ . High-SES men ( $M = 3.98$ ,  $SD = 1.43$ ) appeared wealthier than low-SES men ( $M = 2.26$ ,  $SD = 0.92$ ),  $t(301) = 19.01$ ,  $p < 0.001$ ,  $d = 1.09$ .



Fig. 1. Example target strong (left) and weak bodies.

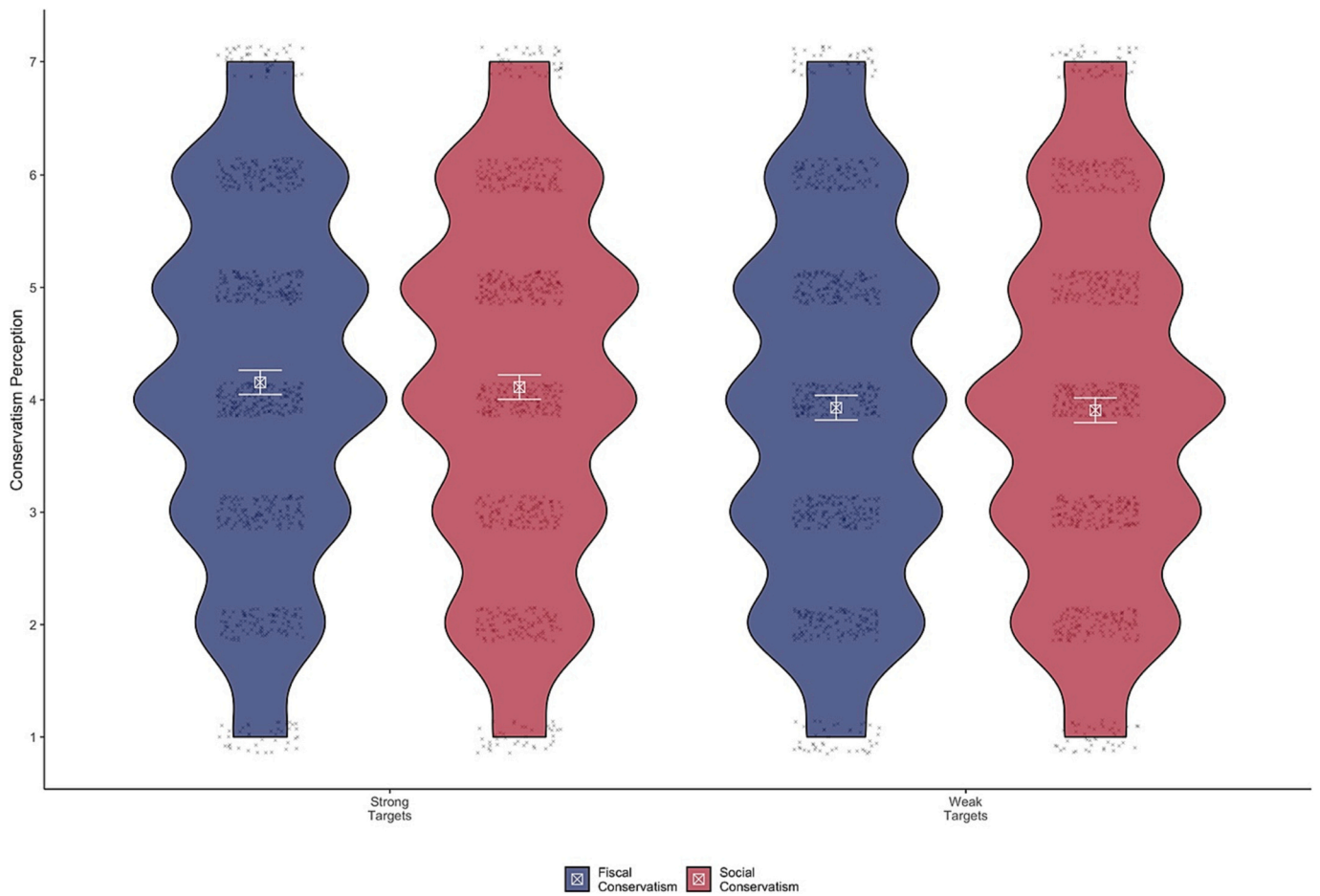


Fig. 2. Conservatism perceptions from Study 1. Individual points reflect participants' average response per trial. White points reflect overall condition means. Error bars reflect 95 % CIs of the means.

### 3.3.2. Primary analyses

We entered participants' perceptions of target conservatism in a 2 (Target Strength: Strong = +1, Weak = -1) × 2 (Target SES: High = +1, Low = -1) × 2 (Viewpoint Type: Fiscal = +1, Social = -1) LMEM that again included random intercepts for participants and stimuli and a random slope for strength for the participants intercept. A Target SES

main effect indicated that high-SES targets ( $M = 4.30, SD = 1.52$ ) appeared more conservative than low-SES targets ( $M = 3.94, SD = 1.58$ ),  $b = 0.18, SE = 0.03, t = 5.82, p = 0.004, \beta = 0.11, 95\% CI_{\beta} [0.08, 0.15]$ . A marginal Target Strength main effect indicated that strong targets appeared descriptively more conservative ( $M = 4.20, SD = 1.54$ ) than weak targets ( $M = 4.05, SD = 1.58$ ),  $b = 0.08, SE = 0.03, t = 2.25, p =$



0.06,  $\beta = 0.05$ , 95 %  $CI_{\beta}$  [0.01, 0.10]. A Viewpoint Type main effect further indicated that targets appeared more fiscally conservative ( $M = 4.16$ ,  $SD = 1.58$ ) than socially conservative ( $M = 4.08$ ,  $SD = 1.55$ ),  $b = 0.04$ ,  $SE = 0.02$ ,  $t = 1.99$ ,  $p = 0.046$ ,  $\beta = 0.02$ , 95 %  $CI_{\beta}$  [0.001, 0.05]. See Fig. 3 for these data. None of the omnibus interactions were statistically significant ( $ps > 0.33$ ).

Evidence supported a simple social bargaining model (Price et al., 2017) in a marginal capacity. Strong men appeared more conservative than across SES. SES provided a competing cue to political identity. These competing signal values could foster unique pathways to identify coalitional status independent of each other. High-SES targets appeared more conservative, suggesting assortment into coalitions occurs along boundaries of resource access. High-SES men could endorse rules that encourage competition. Indices of wealth predict reduced endorsement of both intragroup wealth redistribution (Luberti et al., 2020; Sznycer et al., 2018) and heightened endorsement of aggressive intergroup relations (Brown et al., 2021). Indeed, previous research suggests that stereotypes of higher socioeconomic status track those of an interest in adhering to sometimes rigid social rules (Williams, 2023; Williams et al., 2016).

Successful group living requires social hierarchies both for enforcement of group rules and the acquisition of group resources. Enforcement could serve to preserve group rules ostensibly critical for its survival. The codification of these rules could lead to specific moralizations typical of conservative ideologies. Similar possibilities could exist with an interest in codifying social rules that favor competition. Within these conservatism inferences could be inferences of morality typical of an ideology. Study 3 considered how these inferences could extend to perceptions of men's endorsement of moral foundations.

#### 4. Study 3

Identification with conservative ideology can be motivated by myriad attitudinal factors, including morality. People's justification of political ideologies through morality would lead them to endorse social policies that could facilitate enactment of rules aligning with these ideologies and place them at a higher status within their group. According to Moral Foundations Theory (Graham et al., 2013), conservatives base their morality of fostering group cohesion through adherence to traditions (i.e., ingroup loyalty, respect for authority, disgust; Graham et al., 2009). Conservative morality has roots in establishing group hierarchies. Tradition could be at the expense of considering morality from perspectives of care and fairness typical of liberal ideologies. In fact, strong men's morality is less rooted in these concerns (Brown et al., 2021).

Disinterest in ostensibly liberal foundations could be related to strong men's reliance on aggressive bargaining strategies. Study 3 sought to determine whether formidability provided a heuristic for men's morality. We first predicted individuals would perceive morality of formidable men as more rooted in conservative foundations. This reliance on aggressive bargaining could lead formidable men to appear as valuing moral foundations pertaining to liberty, given its emphasis on market competition that could have historically advantaged strong men in resource acquisition typical to fiscal conservatism (Iyer et al., 2012).

#### 4.1. Method

##### 4.1.1. Participants

We recruited 179 participants from a public university in South-eastern U.S. for course credit (92 men, 84 women, 3 identifying as neither, 1 undisclosed;  $M_{Age} = 19.54$ ,  $SD = 2.42$ ; 83.3 % White). The sample was again fairly moderate ( $M = 4.45$ ,  $SD = 1.73$ ). A sensitivity analysis we had sufficiently power to detect small effects for  $2 \times 3$  within-subjects design (Cohen's  $f = 0.12$ ,  $1 - \beta = 0.80$ ). No data warranted exclusion.

##### 4.1.2. Materials and procedures

Participants evaluated the same targets from the previous two studies using the same randomization and counterbalancing. In addition to responding to the same item assessing target strength, participants additionally indicated the extent 12 different statements were relevant to the targets' morality. Statements originated from the revised factor structure of the Moral Foundation Questionnaire considering perceptions of relevance for various issues to a person's morality (Harper & Rhodes, 2021). Unlike initial conceptualizations of five dimensions (e.g., Graham et al., 2009), this structure considered three dimensions of morality along dimensions of traditionalism, compassion, and liberty.

Traditionalism was comprised of items derived from those previously defined as part of purity, ingroup loyalty, and respect for authority that typify conservative morality (e.g., "This person believes respect is something all children need to learn"). Compassion was derived from care and fairness typifying liberal morality (e.g., "This person would be really upset if someone was cruel to another person"). Liberty was derived from a later-defined factor central to libertarians' morality (e.g., "This person believes the government interferes far too much in everyday lives"; Iyer et al., 2012). Items operated along 7-point scales (1 = *Completely Irrelevant*; 7 = *Completely Relevant*), with four items representing each factor ( $\alpha > 0.87$ ).

#### 4.2. Results and discussion

##### 4.2.1. Manipulation check

Strong men appeared stronger ( $M = 4.56$ ,  $SD = 0.89$ ) than weak men ( $M = 2.99$ ,  $SD = 0.86$ ),  $t(178) = 25.57$ ,  $p < 0.001$ ,  $d = 1.91$ .

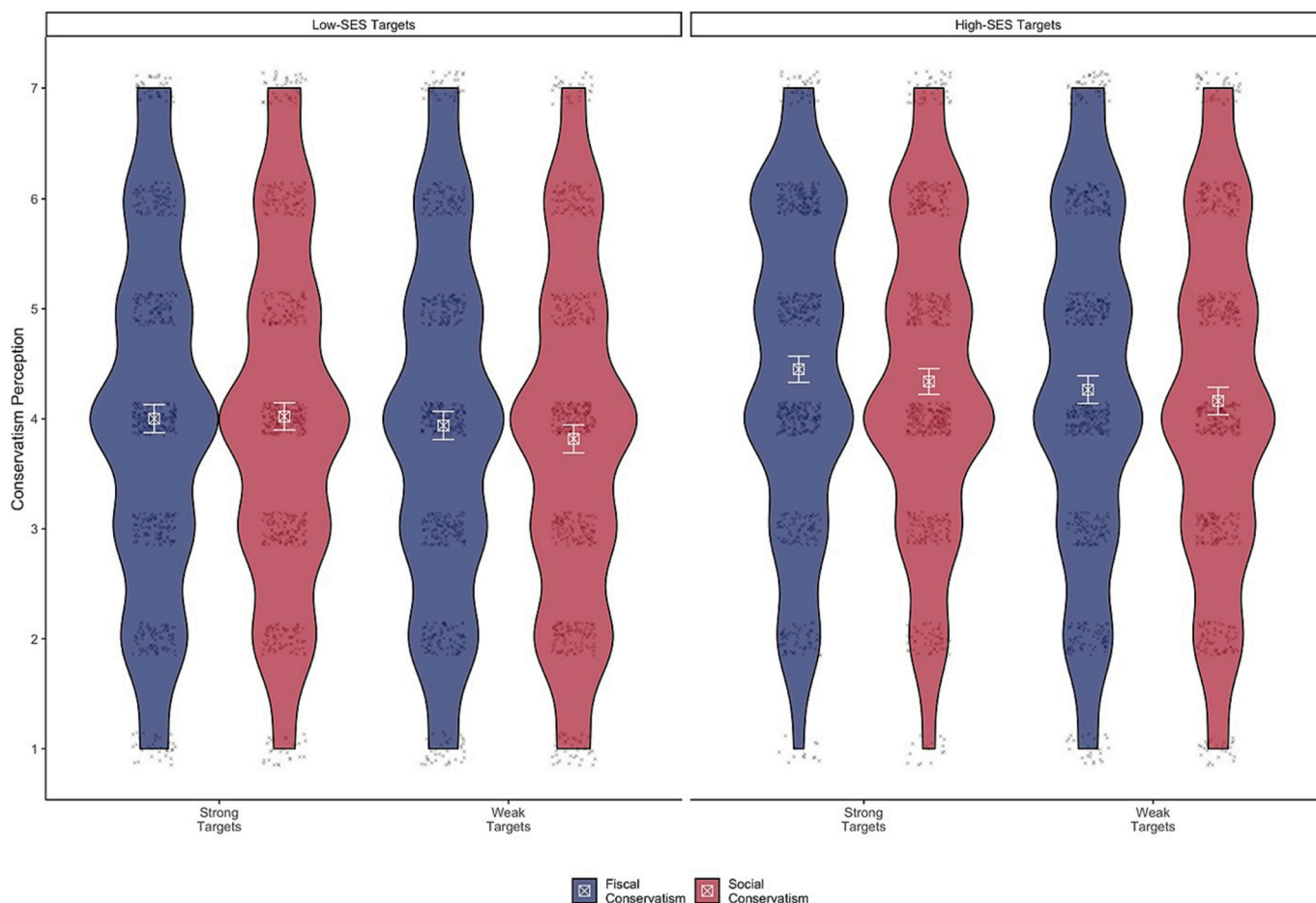
##### 4.2.2. Primary analyses

We entered participants' responses into a 2 (Target Strength: Strong, Weak)  $\times$  3 (Moral Foundation: Tradition, Compassion, Liberty) LMEM and computed an ANOVA on the model to determine condition differences. We did not consider the main effects in this model due to the ambiguity in interpreting these effects. Effects were nonetheless qualified by a Target Strength  $\times$  Moral Foundation interaction,  $F(2, 3930.30) = 12.48$ ,  $p < 0.001$ ,  $\eta_p^2 = 0.006$  (see Fig. 4).

We first decomposed the interaction at each level of moral foundation by comparing strong and weak targets. Participants perceived strong targets ( $M = 4.06$ ,  $SD = 1.35$ ) as endorsing the tradition foundation only marginally more than weak targets ( $M = 3.91$ ,  $SD = 1.36$ ),  $F(1, 6.01) = 4.46$ ,  $p = 0.08$ ,  $\eta_p^2 = 0.43$ . Participants saw no differences in the endorsement of the compassion foundation for strong ( $M = 3.82$ ,  $SD = 1.36$ ) and weak ( $M = 3.93$ ,  $SD = 1.44$ ) targets ( $p = 0.54$ ). Strong targets ( $M = 4.27$ ,  $SD = 1.32$ ) appeared more endorsing of liberty foundations to participants than weak targets ( $M = 4.04$ ,  $SD = 1.29$ ),  $F(1, 6.00) = 12.49$ ,  $p = 0.01$ ,  $\eta_p^2 = 0.68$ .

We also decomposed this interaction at each level of target strength. Strong targets displayed a simple effect of moral foundation,  $F(2, 1961) = 42.84$ ,  $p < 0.001$ ,  $\eta_p^2 = 0.04$ . Specifically, participants perceived these targets as more likely to endorse liberty over compassion foundations,  $t(1961) = 9.25$ ,  $p < 0.001$ ,  $d = 0.21$ , tradition over compassion foundations,  $t(1961) = 4.93$ ,  $p < 0.001$ ,  $d = 0.11$ , and liberty over tradition foundations,  $t(1961) = 4.32$ ,  $p < 0.001$ ,  $d = 0.10$ . For weak targets, there was again a simple effect,  $F(2, 1961.10) = 3.99$ ,  $p = 0.02$ ,  $\eta_p^2 = 0.004$ . Participants rated weak targets as more likely to endorse liberty foundations over tradition foundations,  $t(1961) = 2.59$ ,  $p = 0.03$ ,  $d = 0.007$ . Differences between compassion and liberty foundations were marginal,  $t(1961) = 2.27$ ,  $p = 0.06$ ,  $d = 0.05$ , whereas differences between compassion and tradition were not significant ( $p = 0.94$ ).

We found converging evidence for how formidability connotes conservatism while finding granularity in previous studies. Liberty appeared most relevant to strong men's morality, whereas many of the effects for tradition remained marginal. This granularity aligns with previous findings suggesting that maintenance of social hierarchies often require endorsement of competition that sees strong group



**Fig. 3.** Conservatism perceptions from Study 2. Individual points reflect individual participants' responses per trial. White points reflect overall means per condition. Error bars reflect 95 % CIs of the mean.

members succeed rather than the maintenance of tradition (Sinn & Hayes, 2018). Such competition would likely be most possible if a social group does not codify equalitarian norms that would minimize competition.

Despite the consistency in these findings, a possibility exists that these inferences could be specific to the stimuli. It remains less clear whether these findings are robust across different modalities of formidability and which aspects of formidability are perceived as diagnostic of conservatism. Study 4 considered complementary cues to formidability through men's body mass, namely the specific signal values of body fat and muscularity.

## 5. Study 4

Formidability inferences are possible through various features in men's bodies, though the previous studies did not necessarily consider specific body parts from which these inferences could occur. This led us to consider muscularity and adiposity as potential indicators of conservatism, given their signal values in formidability inferences. Muscular men are particularly advantaged in combat, with perceivers accurately inferring muscular men as formidable combatants and therefore more likely to endorse aggressive bargaining strategies (Muñoz-Reyes et al., 2019). Conversely, men exhibiting high levels of body fat are perceived as non-aggressive, which could implicate them as averse to aggressive bargaining due to physical disadvantages in conflicts (Brown, Boykin, & Sacco, 2022; Frederick & Haselton, 2007; Sacco et al., 2020).

Study 4 sought to clarify the generalizability of this effect with

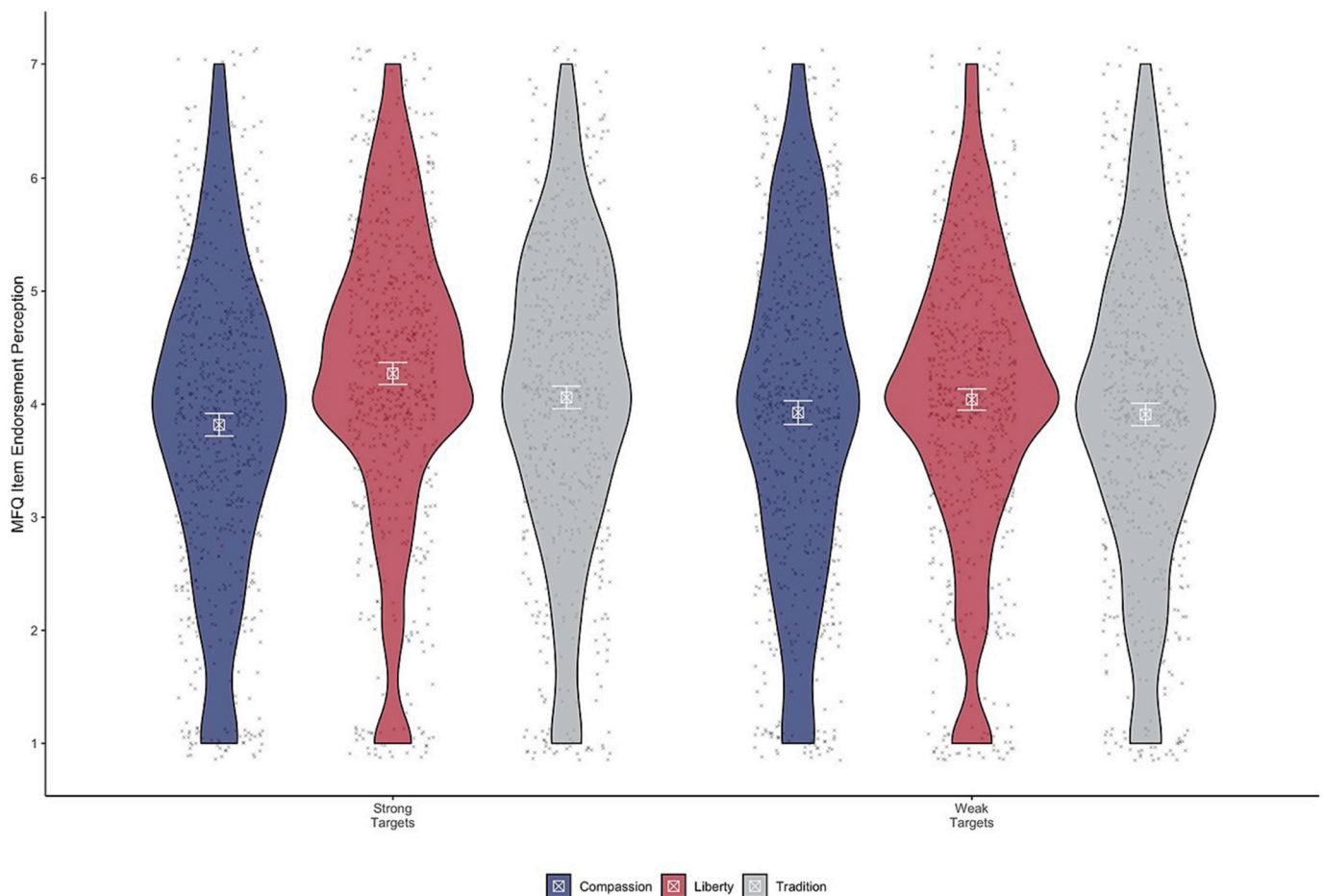
different stimuli. Given the greater success in conflict through various forms of upper body musculature (e.g., Caton & Lewis, 2021; Sell et al., 2009), we predicted high muscularity would be more diagnostic of conservatism. Additionally, we predicted these inferences would be particularly apparent at low levels of body fat, given the physical disadvantages of adiposity in conflict.

### 5.1. Method

#### 5.1.1. Participants

We recruited workers from Amazon Mechanical Turk in exchange for \$0.35 (US), wherein 226 completed the study. We excluded three participants for providing nonsense answers in a written attention check and 13 for being older than 60. This latter methodological decision was rooted in the fact that perceptual acuity toward formidability cues declines with age (Richardson et al., 2021), as 61 is typically the onset of sarcopenia that atrophies muscles and could impede men's combative abilities (Wang & Bai, 2012). Our final sample was  $N = 210$  (152 men, 58 women;  $M_{Age} = 34.09$ ,  $SD = 9.16$ ; 79.5 % White). This sample was moderate ( $M = 4.57$ ,  $SD = 1.91$ ). A sensitivity analysis indicated sufficient power to detect small effects for a  $2 \times 2 \times 2$  within-subjects study (Cohen's  $f = 0.09$ ,  $1 - \beta = 0.80$ ).<sup>3</sup>

<sup>3</sup> Inclusion of participants older than 60 in this analysis results in the reported main effect as becoming marginally significant ( $p = 0.078$ ).



**Fig. 4.** MFQ item perceptions from Study 3. Individual points reflect individual participants' responses per trial. White points reflect overall means per condition. Error bars reflect 95 % CIs of the mean.

### 5.1.2. Materials and procedure

Participants responded to the same two items assessing the extent targets appeared liberal/conservative in fiscal and social domains from Studies 1 and 2. They evaluated four computer-generated male targets from the UCLA Body Matrices (Gray & Frederick, 2012; see Fig. 5). Targets were standardized only to vary on their degree of muscularity (small versus large) and body fat (high versus low), with each target in the same attire and having an occluded face. Each target exhibited a unique combination of high/low body fat and small/large muscles. Targets were specifically chosen for reflecting non-exaggerated body dimensions to have potentially greater ancestral relevance (Brown, Boykin, & Sacco, 2022; Sacco et al., 2020). Participants additionally evaluated each target along a single 7-point item assessing perceived strength of the target (1 = *Not at All Strong*; 7 = *Very Strong*).

## 5.2. Results and discussion

### 5.2.1. Manipulation check

We conducted an initial 2 (Target Muscularity: Small vs. Large)  $\times$  2 (Target Body Fat: Low vs. High) repeated ANOVA for perceptions of target strength. A Target Muscularity main effect indicated high-muscle targets appeared stronger ( $M = 5.30$ ,  $SD = 1.21$ ) than low-muscle targets ( $M = 4.80$ ,  $SD = 1.34$ ),  $F(1, 209) = 41.03$ ,  $p < 0.001$ ,  $\eta_p^2 = 0.16$ . The Target Body Fat main effect was not significant,  $F(1, 209) = 2.07$ ,  $p = 0.152$ ,  $\eta_p^2 = 0.01$ . A Target Muscularity  $\times$  Target Body Fat interaction emerged,  $F(1, 209) = 9.56$ ,  $p = 0.002$ ,  $\eta_p^2 = 0.04$  (Table 1). Simple effects indicated that high-muscle targets appeared stronger than low-muscle targets to perceivers in both the high- and low-fat categories,  $F_s >$

$9.56$ ,  $ps < 0.003$ . The effect for low-fat targets was larger ( $\eta_p^2 = 0.18$ ) than for high-fat targets ( $\eta_p^2 = 0.04$ ).

### 5.2.2. Primary analysis

We conducted a 2 (target muscularity: small, large)  $\times$  2 (target body fat: low, high)  $\times$  2 (conservatism type: fiscal, conservative) repeated-measures ANOVA for our primary analysis. A target muscularity main effect indicated large-muscle targets appeared more conservative ( $M = 4.89$ ,  $SD = 1.37$ ) than small-muscle targets ( $M = 4.75$ ,  $SD = 1.44$ ),  $F(1, 209) = 4.55$ ,  $p = 0.03$ ,  $\eta_p^2 = 0.02$ .<sup>3</sup> No other main effects or interactions emerged,  $F_s < 2.34$ ,  $ps > 0.13$  (see Fig. 6).

We offer some specificity for our previously reported effects. Muscularity appeared to be the component of upper body strength that facilitates these perceptions. Indeed, muscularity connotes fighting ability more than a lack of body fat, which could have facilitated these perceptions (Muñoz-Reyes et al., 2019). Inferences could be specific to recognizing aggression typical of masculinized individuals. Body fat appeared unrelated to inferences, which could reflect a dual signal value of adiposity for both reduced proclivity for aggression and older age that corresponds with conservative attitudes (Kerry & Murray, 2019; Sacco et al., 2020).

## 6. General discussion

Our results provide relatively consistent evidence for men's upper body strength being a heuristic for specific coalitional status and related motivations. Participants viewed strong men to espouse more conservative viewpoints, providing a perceptual corollary for work showing



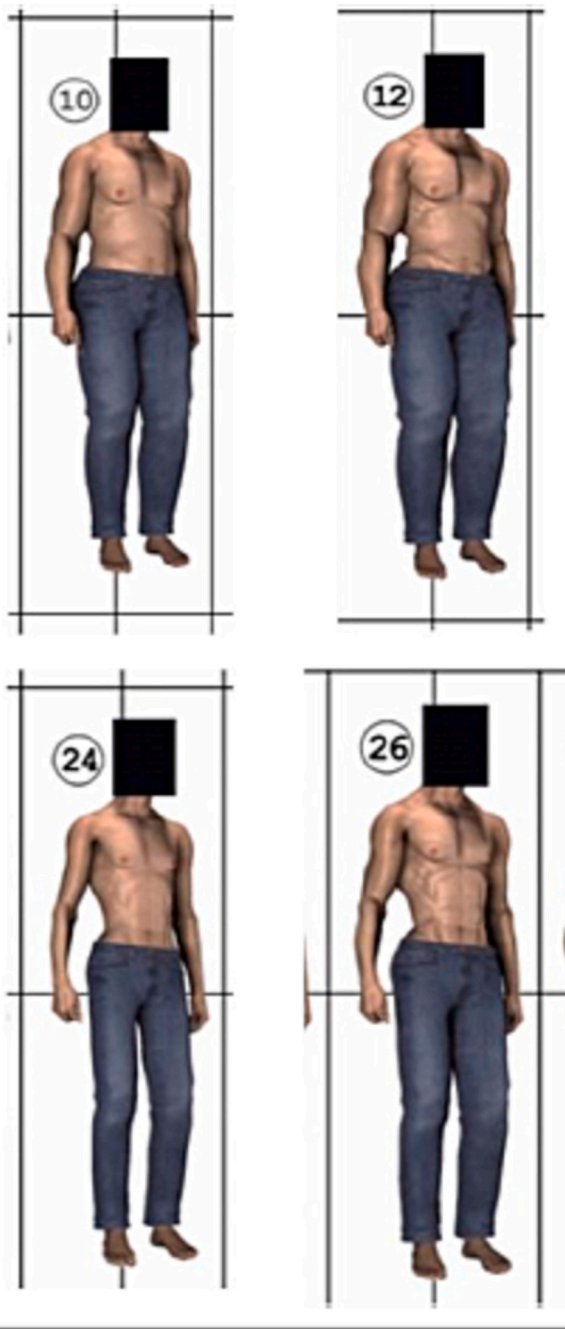


Fig. 5. Target bodies orthogonally manipulated for high (top row) and low body fat with small (left column) and large musculature from Study 4.

Table 1  
Perceived strength of targets across body fat and muscle size.

	High fat	Low fat
Small muscles	4.97 (1.21)	4.64 (1.47)
Large muscles	5.27 (1.33)	5.34 (1.10)

how social bargaining power through strength shapes endorsement of social rules (e.g., Petersen et al., 2013; Price et al., 2011, 2017). Coalitional inferences could facilitate recognizing social affordances related to the costs and opportunities of formidable male conspecifics in group living. Formidable men could be viewed a threatening due to their reliance on aggressive social bargaining (Brown, Tracy, & Boykin, 2022), which could threaten resource acquisition goals of opposing

coalition members, particularly coalitions favoring more equalitarian social systems (Price et al., 2017). Conversely, formidability could represent an opportunity to ensure group access to resources through increased protection in competitive environments and opportunities to generate wealth for other group members (Brown et al., 2022, g).

Interestingly, as indexed by our one-sample *t*-tests in Study 1, physically weak men appeared neither conservative nor liberal. The basis of affordance judgments for liberal ideologies through physical features could be unrelated to formidability. Inferences of liberal ideologies could be rooted in perceptions of warmth, which could be less salient to perceivers in male targets. Liberals prefer warm leaders (Laustsen & Petersen, 2016), which could be rooted in selecting coalitions averse to antagonism. Future research could present faces varying in levels of warmth for participants to assess their ideology.

Perceptions of conservatism were not specific to any domain of conservatism. This could suggest considerable overlap between the ancestral goals of formidable men that manifest as modern conservatism (Sinn & Hayes, 2018). The fiscal dimension may represent interest in resource allocation from formidable men’s advantage in direct competition. The social dimension could represent interest in instilling rigid social hierarchies to facilitate increased aggressive intergroup contact favored by formidable men (Price et al., 2017; Sell et al., 2017). Study 3 provides converging evidence that formidability connotes endorsement of more conservative ideologies by demonstrating perceptions of strong men’s endorsement of liberty that could represent both social and fiscal domains (Malka et al., 2019). Namely, endorsement of liberty could reflect an interest in maintaining social rules that codify aggressive competition (social domains), whereas continued interest in competition would ensure greater access to resources without having to rely on additional rules (fiscal domains). This confluence of perceptions could reflect an understanding of formidability reflecting “principled conservatism,” which emphasizes personal responsibility (for a discussion, see Reyna et al., 2006).

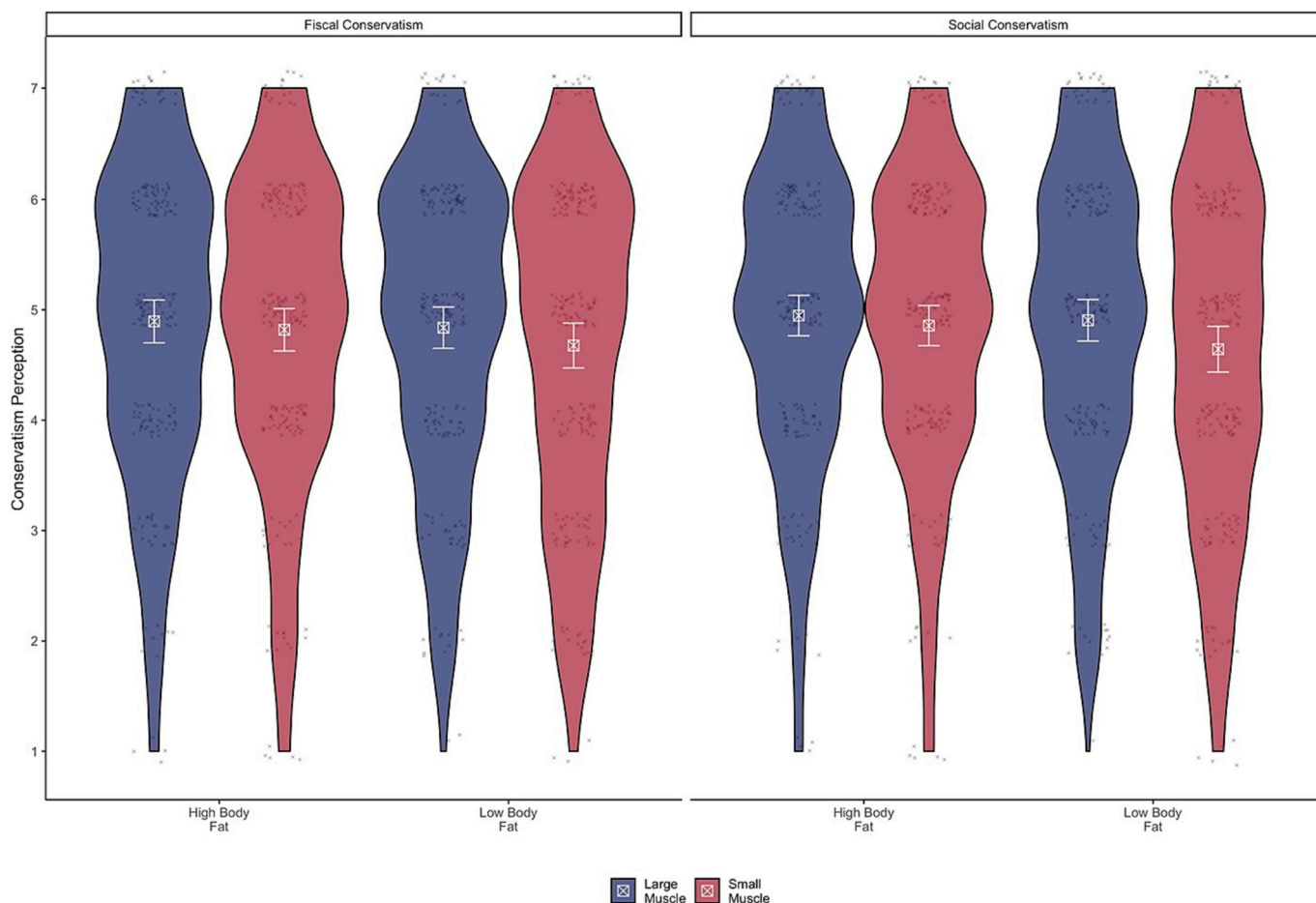
It should be noted that some of our effects were relatively small in these studies. However, the consistency of these small effects could reflect the presence of a relatively subtle effect that is nonetheless interesting (Prentice & Miller, 2016). Formidability is certainly associated with perceptions of men’s interest in various aggressive bargaining tactics (e.g., Brown et al., 2022, e). However, the latent variable of conservatism is an imperfect conceptualization of ancestral social rule endorsements in a modern setting. For example, conservatism is stereotyped as being the orientation of mature adults who may be less prone to physical competition than younger adults (Richardson, 2021). Future research would benefit from identifying specific facets of conservatism that track formidability in younger members of conservative movements (e.g., First and Second Amendment).

6.1. Limitations and future directions

Several limitations exist in this research. Our findings merely indicate the presence of a stereotype for formidable men but not whether demonstrating formidability is a veridical cue to ideology. These stimuli were not pre-tested to identify targets’ affiliations. Conservatism can be accurately inferred through dominant facial features (Rule & Ambady, 2010; Samochowiec et al., 2010), although facial formidability is not associated with conservatism (Saribay & Kleisner, 2018). Future research would benefit from generating stimuli normed for both formidability and conservatism to identify whether these inferences are rooted in a kernel of truth.

Given that facial dominance is a veridical cue of upper body strength (Holzleitner & Perrett, 2016; Sell et al., 2009) and formidable men feel more entitled to resources (Sell et al., 2012), inferences of conservatism may be possible through other bodily indices of formidability. Future research could consider concomitant features that contribute to formidability inferences beyond indices of grip strength for the stimuli in Studies 1–3. For example, previous research suggests that height and





**Fig. 6.** Conservatism perceptions from Study 4. Individual points reflect individual participants' responses per trial. White points reflect overall means per condition. Error bars reflect 95 % CIs of the mean.

self-reported formidability are associated with endorsement of ostensibly more conservative viewpoints (e.g., Brown et al., 2021; Sell et al., 2017; Urbatsch, 2021; Richardson, 2021). Alternatively, it could be possible that these heuristic associations between conservatism and formidability track fitness-enhancing efforts from men. A noticeable portion of the variance for the association between formidability and ideology can be explained by time in the gym (Price et al., 2017). In other words, effort to increase one's formidability could be driven by an implicit understanding of the social capital of upper body strength in men's psychology that motivates men to increase their formidability.

Another future direction includes identifying the cues of political affiliation in women. Although a growing body of evidence indicates women's strength is predictive of individual differences in interpersonal bargaining strategies within certain ecologies (Kerry & Murray, 2019; von Rueden and Van Vugt, 2015), the sexual dimorphism for engaging in physical conflict and its resulting size asymmetry could limit the diagnosticity of women's upper body strength (Palmer-Hague et al., 2018). Accurate inferences of conservatism in female faces are highest in targets with heightened female facial typicality connoting less formidability (Carpinella & Johnson, 2013). Attractive women's bargaining power from femininity positions them to prefer competition (Lukaszewski, 2013). Future studies could identify which physical features deemed attractive in women (e.g., low waist-to-hip ratio) are most associated with perceptions of conservatism to determine whether attractiveness-based bargaining power heightens favorability.

The interest in allocating status to strong men could provide impetus to consider whether the formidability preference is specific to certain coalitions. Cues to interpersonal dominance are preferred among

conservative voters seeking to address outgroup threats and punish free riders (Lautsen & Petersen, 2015, 2017; Lukaszewski et al., 2016). Future research could determine the extent to which strength shapes electoral preferences. These preferences could further be shaped by ecological factors. Our use of samples in the Southeastern U.S. could reflect awareness of what men appear most effective at maintaining social policies that facilitate historically prevalent honor cultures (see Cohen & Nisbett, 1994). Future studies could consider regional differences in preferences for formidable men whom perceivers recognize as conservative while identifying which aspects of these ecologies are predictive of these preferences.

## 7. Conclusion

Formidability is associated with endorsement of aggressive social bargaining strategies typifying modern conservatism. Our research identified a potential evolved psychological calculus in identifying conspecifics' ideology through physical affordance judgments through upper body strength, with formidability heightening perceptions of conservatism. Our findings represent an ancestral basis to coalitional inferences of men's intragroup status.

## CRediT authorship contribution statement

MB conceived and implemented these studies while providing an initial draft of the manuscript. DFS provided critical commentary on methodology and theoretical framing. AWL provided stimuli for Studies 1–3 and offered critical commentary on theoretical framing. RET

provided primary analyses for each study.

## Declaration of competing interest

The authors report no conflicts of interest in the current manuscript.

## Data availability

Data will be made available on request.

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