Socially dominant women strategically build coalitions of strong men in resource-rich environments

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ABSTRACT

Selecting formidable male coalitions to navigate intergroup threats and resource acquisition evolved to enhance survival through group living, given men’s enhanced ability to extract and protect resources through physical aggression. Though advantageous in certain contexts, formidable men can nonetheless inflict intragroup costs, suggesting preferences for this trait varies with resource availability in local ecologies. This study tasked participants (477 women, 140 men; M_{age} = 19.98, SD = 4.22) with building coalitions from arrays of physically strong and weak men to acquire resources in hopeful and desperate ecologies before assessing endorsement of several aspects of conservatism. Women high in social dominance orientation built more formidable coalitions in resource-abundant ecologies. Men’s coalitional interests were unaffected by these factors. We frame results through evolved sex differences in coalition-building based on men and women’s different formidability valuation thresholds while considering ancestral logic behind political ideology related to resource acquisition.

Optimal group living requires identifying those most capable of facilitating individual member- and group-level goals. Access to, and protection of, critical resources would have historically elicited aggressive behavioral tendencies to win in physical intergroup conflict stemming from resource concerns, an advantage for group living observed across contemporary and historical human cultures (Wrangham & Peterson, 1996). When selecting those most effective for intergroup conflict, formidability becomes highly valued. Through sexual selection pressures to outcompete other men intrasexually for access to high quality mates, sexual dimorphism emerged over time, with men being larger and more muscular than women (Lassek & Gaulin, 2009). Consequently, this formidability became one basis of men’s social value beyond reproductive contexts, particularly in protective domains. Individuals socially selected formidable group members to engage in coalitional processes that could serve to protect the group from outgroup threats (Sell, Hone, & Pound, 2012). Formidable men have a selective advantage in forming coalitions, particularly among men (Łukaszewski, Simmons, Anderson, & Roney, 2016; McDonald, Navarrete, & Van Vugt, 2012), as coalitional formidability would increase groups’ continued access to resources and protection.

Although coalitional interest in formidability presents various social benefits, these benefits may be especially desirable among those valuing coalitional organization that emphasizes competition and rigid social structures. Such rigid structures would favor formidable individuals capable of winning conflicts who would facilitate implementation of social rules that would maintain their access to these benefits (e.g., Petersen & Laustsen, 2019; Price, Sheehey-Skeffington, Sidanius, & Pound, 2017). For individuals who could benefit from such social rules, recruiting formidable coalitional allies may facilitate resources acquisition through success in intergroup conflict. Within a modern context, individuals likely to benefit from these structures may be more ideologically conservative and prefer coalitions that could increase their access to resources through victory. This study sought to identify how conservatism shapes the formation of formidable coalitions in contexts varying in resource availability.

1. Coalitional value of men’s formidability

Evolutionary history has seen members of social species frequently engage in conflict over finite resources within their ecology, with considerable documentation of physical conflict between groups, including both humans and non-human primates (Insko et al., 1992; Wrangham & Peterson, 1996). The coevolution of physical conflict with the sexual dimorphism in formidability has led to conflict becoming
sexually asymmetric, with men engaging more frequently in physical confrontation (Sell et al., 2012). Although the concomitant size asymmetry imposed by human sexual dimorphism is not as large as it is for other primates (Plavcan, 2012), human males nonetheless possess greater muscle mass and cranial robusticity compared to women in addition to a heightened proclivity to engage in physical aggression and weapon use (Hill, Bailey, & Puts, 2017; Lassek & Gaulin, 2009). Formidable men possess an adaptive advantage in intrasexual competition that would subsequently connote their heritable fitness to prospective mates, making formidability sexually selected (Puts, 2010), though adaptively beneficial beyond direct reproduction as well, such as in facilitating coalitional exploitation.

Formidable men would further experience advantages in physical intergroup conflict, and consequently be the basis of coalitional value during intergroup conflict over access to contested resources, thereby making formidability also socially selected. Such utility of employing formidable men in conflict would have provided several historical advantages, considering the frequency of physical conflict throughout human history. Ethnographic data indicates 64% of documented hunter-gatherer societies engage in conflict at least once every two years that could necessitate the utilization of formidability in conflict (Bowles, 2009). Despite potential costs of physical harm from formidable conspecifics that would position individuals to prefer less dominant leaders in many capacities (von Rueden, Gurven, & Kaplan, 2011), downstream benefits could emerge in selecting formidable allies to ensure resource access in highly competitive environments. Men readily invoke this tradeoff for access to coalitional resources (McDonald et al., 2012), particularly when motivated by self-protection because of formidable allies’ coalitional value in engaging outgroup threats (Brown, Sacco, Lolley, & Block, 2017; Van Vugt, Cremer, & Janssen, 2007). Formidable men are selected more frequently for physical conflict (Hehman, Leitner, Deegan, & Gaertner, 2015) and preferred to provide protection for both men and women (Meskelyte & Lyons, in press; Sacco, Lustgraf, Brown, & Young, 2015; Snyder et al., 2011). Men’s historically greater engagement in physical conflict suggests this interest in formidable coalitional allies should be most apparent for men.

Despite formidable men’s coalitional advantage, they nonetheless pose several interpersonal costs that would make them undesirable in myriad contexts beyond those described above. Strong men’s aggression implicates them as more exploitative toward others (Gallup, White, & Gallup, 2007). In fact, women from desperate ecologies, or environments with limited access to resources and increased threats to one’s safety, who have been exposed to violence demonstrate aversion toward facial structures typically deemed formidable (Borras-Guevara, Batres, & Perrett, 2017). Harsh ecologies could lead women to perceive their environment as offering scarce resources, fostering aggressive competition. Archaeological evidence further suggests resource scarcity was a primary basis for physical conflict among ancestral humans (Allen, Bettenger, Coddin, Jones, & Schwittalia, 2016). Given the advantage afforded to strong men in physical conflict and a general sense of entitlement over contested resources (Sell et al., 2012), desperate ecologies could lead to greater concern among women that formidable men would be more likely to fight to secure resources for themselves with women being disadvantaged in conflict. Harsh environments could consequently heighten salience of costs and downregulate formidable coalition-building. As the size asymmetry leaves women more vulnerable to exploitation, this downregulated interest should be most apparent for women.

Conversely, women demonstrate enhanced preferences for interpersonal dominance in more hopeful ecologies, or environments with greater access to resources and security (Little, Cohen, Jones, & Belsky, 2007). This preference could reflect heightened emphasis on the benefits of formidability over its costs, particularly in terms of increasing benefits for themselves. In environments with greater access to resources, groups or group members could more readily acquire resources through aggressive bargaining, which would create selective advantages for formidable men. The abundance of resources in hopeful ecologies, formidable male allies could afford women increased access to resources without them having to engage others physically themselves because of their disadvantage in intergroup conflict against men.

2. Ideological coalition-building

Formidable individuals’ successful navigation of various physical conflicts could subsequently facilitate their adoption of aggressive interpersonal strategies that continue their access to resources for themselves and group members. Research indicates physically strong men are more likely to endorse social rules favoring aggressive social bargaining, competition, and aggressive intergroup conflict that facilitates their increased access to finite resources, often at the expense of competitors’ access (Brown, Chua, & Lukaszewski, 2021; Petersen & Laatsen, 2019; Price et al., 2017; Sell et al., 2017). Affiliating with individuals who appear to endorse aggressive bargaining tactics could increase individuals’ access over contested resources, given that they would no longer be competition to these men.

Inferior constellation of formidable men could implicate them as desirable among those with similar interest in rigid social structures. Given that individuals capable of aggressive social bargaining are more likely to prefer competition-driven social policies (Sell et al., 2012), those espousing a conservative ideology could perceive formidable men as instrumental in facilitating their goals in instilling competition-based social hierarchies. Recent findings posit modern conservatism possesses an adaptive function that facilitates the building of strong coalitions to mitigate intergroup threats (Sinn & Hayes, 2018). This preference would thus make it sensible to predict conservatives would find strong men as desirable coalition members to facilitate ingroup access to resources. This formidability preference should further be limited to environments with abundant resources, as the abundance would ensure that formidable men could focus their efforts on protecting the resources for their groups while having their own resource needs satisfied. However, within desperate ecologies that have scarce resources over which ingroup members could aggress (Allen et al., 2016), formidable men’s advantage in combat could position them to acquire more resources for themselves rather than on behalf of the group. This would implicate formidable coalition members as undesirable in those environments, particularly among those with more self-interested resource acquisition goals (i.e., conservatives).

3. Current research

This research sought to extend previous findings identifying formidability advantages in coalition building as a function of ecological scarcity and political ideology. Participants built male coalitions with formidability to acquire group resources in resource-abundant and -scarce ecologies. The coalitional benefits of formidability led us to predict participants would select more formidable coalition members, particularly in hopeful environments. Conversely, given both an aversion to dominance in unpredictable environments (Brown et al., 2017) and the fact that resource scarcity heightens physical conflict (Allen et al., 2016), the costs of affiliating with formidable individuals should downregulate interest in building formidable coalitions. This down-regulation should be particularly pronounced among women due to sexually dimorphic size asymmetries (Sell et al., 2012).

This study further considered individual differences in conservatism. Because previous work suggests interest in selecting formidable coalition members for various tasks requiring aggressive social bargaining (Lukaszewski et al., 2016), we predicted conservatives would be build more formidable coalitions. We tested several facets of conservatism (i.e., social dominance orientation, system justification) to determine which was most predictive of coalitional preferences; no a priori predictions were made for which would be. Finally, we considered sex differences in coalition-building. Given men’s interest in selecting
formidable allies for their own coalitional endeavors (McDonald et al., 2012), we predicted men’s coalitions would be more formidable overall, particularly among those espousing a conservative ideology in resource-abundant environments. We report all measures, manipulations, and exclusions. Data and materials are at: https://osf.io/khs68/

4. Method

4.1. Participants

We recruited 619 participants from a public university in Southeastern U.S. for course credit. Two participants were excluded from final analyses for reporting as neither male nor female, given our interest in considering sex differences (n = 617; 477 women, 140 men; Msex = 19.98, SD = 4.22; 58% White). A sensitivity analysis indicated adequate power to detect medium effects (Cohen’s f = 0.20, β = 0.95).

4.2. Materials and procedure

4.2.1. Targets

Participants selected four prospective coalition members for two separate tasks from an array of eight target individuals (Hehman et al., 2015). Target individuals were college-aged Caucasian men differing in physical strength (Łukaszewski et al., 2016). Images originated from a set of photographs, wherein researchers selected the four strongest and four weakest men to create categories of strong and weak targets. Strength was determined through upper body strength, which is accurately inferred through static images (Sell et al., 2009). Targets’ appearance was standardized by a white tank top with a neutral facial expression with pictures taken from the waist up. Although previous work demonstrated that the strong targets were deemed more attractive than the week, this attractiveness was not basis of status allocation for coalition-building when controlling for inferred formidability, suggesting targets were sufficiently standardized for the current paradigm (Łukaszewski et al., 2016). See Fig. 1 for anonymized example targets.

4.2.2. Environments

Participants were instructed to envision themselves being placed in a team that would gather resources in untamed wilderness in two environments to build a society. These frontiers were described as having limited intervention from humans aside from the participants’ group in addition to other groups, a condition we used to leverage concerns of intergroup conflict initially. One environment had easy-to-locate resources described as scarce and requiring constant protection from rival groups, which served as our corollary for a desperate ecology. The other was described as having difficult-to-locate but abundant when found, a corollary for a hopeful ecology, albeit without an identical reinforcement of an impending intergroup threat like with a desperate ecology. Selecting a team for the resource-scarce and -abundant environment first was randomized on a between-participant basis. We summed the number of strong and weak targets selected separately for each environment.

4.2.3. Conservatism

Our interest in identifying which facet of conservatism predicts strength preferences prompted consideration of multiple measures. We selected measures based on relevance to competitive resource acquisition and favorability toward economic competition that would typify the ancestral roots of what is frequently considered as part of the latent variable deemed as conservatism through folk language conventions (see Sinn & Hayes, 2018).

4.2.4. Social dominance orientation

We assessed social dominance orientation (SDO) using SDO-7 (Ho et al., 2015). This 16-item scale assesses the extent individuals desire rigid social hierarchies along dimensions of dominance (α = 0.78) and anti-egalitarianism (α = 0.78), operating along 7-point scales (1 = Strongly Oppose; 7 = Strongly Favor). Subscales moderately correlated, prompting aggregation (r = 0.66, p < 0.001; Mrand = 2.99, SD = 0.96).

4.2.5. System justification

We assessed individual differences in system justification (SJ) using a widely used 8-item scale (Kay & Jost, 2003). This scale assesses the extent individuals perceive the current system as fair along 9-point scales (1 = Strongly Agree; 9 = Strongly Disagree). After appropriate recoding, higher scores reflected heightened perceptions of fairness in society that could be deemed right-wing and lower scores reflected perceptions of societal unfairness that could be deemed left-wing (Mrand = 4.36, SD = 1.39; α = 0.79).

Consenting participants selected their teams for both environments before indicating their SDO and SJ. This was followed by demographics, including two items assessing fiscal and social conservatism along separate 7-point scales (1 = Very Liberal; 7 = Very Conservative). Items highly correlated with each other (r = 0.72, p < 0.001); we collapsed across them as one measure of conservatism that indicated a moderate overall sample (Mrand = 4.11, SD = 1.40). Our decision to include this ubiquitous measure was to discern between whether a specific facet of conservatism was driving effects or if a general identification was more impactful.

5. Results

We submitted our data to a 2 (Participant Sex: Male vs. Female) × 2 (Target Strength: Strong vs. Weak) × 2 (Resource Availability: Scarcity vs. Abundance) mixed model ANCOVA with repeated factors over the latter two factors while utilizing SDO, SJ, and conservatism as custom covariates to test for interactive effects within a single omnibus model to reduce Type I Error (Sacco & Brown, 2018; Brown et al., 2019). A Resource Availability main effect indicated participants selected more coalition members in a resource-scarce environment (M = 1.90, SD = 0.98) than a resource-abundant environment (M = 1.89, SD = 1.08), F(1, 609) = 7.07, p = 0.008, r²p = 0.011. Another main effect of Target Strength indicated participants selected more strong targets (M = 2.51, SD = 1.07) than weak targets (M = 1.23, SD = 0.99), F(1, 609) = 13.27, p < 0.001, r²p = 0.021. No Participant Sex effect main effect emerged, F(1, 609) = 0.11, p = 0.742, r²p < 0.001.

5.1. Superordinate interactive effects

Effects were most superordinately qualified by a Participant × Resource Availability × Target Strength × SDO, F(1, 609) = 5.66, p = 0.018, r²p = 0.009. We decomposed this interaction by conducting two separate repeated custom ANCOVAs for men and women. No interaction emerged for men, prompting no further consideration, F(1, 138) = 0.05, p = 0.816, r²p < 0.001.

5.1.1. Women’s coalition-building decisions

A subordinate 3-way interaction emerged for women, F(1, 475) = 14.52, p < 0.001, r²p = 0.030. This prompted us to decompose this interaction by conducting subordinate one-way repeated ANCOVAs for resource-scarce and -abundant environments. No subordinate interaction emerged for the resource-scarce environment, prompting no further consideration, F(1, 475) = 3.18, p = 0.075, r²p = 0.007.

A subordinate Target Strength × SDO interaction emerged in the resource-abundant environment, F(1, 475) = 7.98, p = 0.005, r²p = 0.017. We individually correlated the number of strong and weak targets women selected for this environment. A positive correlation for strong

When considering effects outside the omnibus model, no difference emerged, χ²(616) = 3.31, p = 0.758, d = 0.01. This suggests including covariates in the model was the basis of its significance.
targets emerged for the selection of strong targets and SDO. Specifically, high-SDO women selected more strong targets when they perceived their environment as resource-abundant, $r = 0.10, p = 0.021$, 95% CI [0.01, 0.19]. A negative correlation emerged for weak targets; high-SDO women selected fewer weak targets in an environment with abundant resources, $r = -0.14, p = 0.002$, 95% CI [-0.22, -0.05]. A sign test indicated these associations were of significantly different magnitudes, $Z = 3.71, p = 0.002$. No other interactions emerged, $F$s $< 3.31, ps > 0.069$.

6. Discussion

Findings partially support hypotheses for how conservatism shapes preferences for formidable coalition members as a function of environmental resource availability. High-SDO women built more formidable coalitions for resource acquisition within resource-abundant ecologies. This preference could reflect a unique purpose for women’s coalition-building in the service of resource acquisition, namely using formidable coalitions to create an optimal resource market for themselves in resource-abundant ecologies (Little et al., 2007). Women could specifically prefer formidable men in resource-abundant environments because the abundance would enable men to satisfy their personal resource needs, while also facilitating their interest to protect surplus resources for other group members in the service of continued group access and status. Such ingroup loyalty from formidable men could be particularly important for women because of their physical disadvantage in conflict (Sell et al., 2012). When considering these preferences are specific to high-SDO women, this preference could reflect an interest in identifying coalitions that would increase these women’s opportunity to ascend a status hierarchy through resources in a strategy that typifies social dominance (Sinn & Hayes, 2018).

Socially dominant women’s coalitional preferences for formidable men nonetheless remained limited to resource-abundant environments, as they ultimately built coalitions with fewer formidable men when perceiving resources as scarce. This decision could reflect an understanding of increased physical aggression within desperate ecologies that readily fosters aversion to formidable men from women as the latter would be more likely to inflict considerable physical damage in these conflicts in the service of acquiring resources for themselves (Sell et al., 2012). Women would have a physical disadvantage due to size asymmetries that could have fostered greater judiciousness toward potentially exploitative men (Sacco, Brown, Lustgräaf, & Young, 2017). Given socially dominant women’s interest in acquiring status for themselves, formidable men in these highly competitive ecologies could undermine their ascension of hierarchies as such men may be less willing to share resources and women would be at a disadvantage in physical competition. Conversely, low-SDO women were disinterested in strong men in resource-rich environments, which may reflect such women not valuing rigid social hierarchies. Inferences that strong men may value rigid status hierarchies and competition could implicate them as incompatible with these women’s political attitudes.

6.1. Bases for men’s coalitional interests

Men’s decisions for coalition-building were not shaped by any study variables. This could suggest men’s interests operate independent of ideology, which may reflect their greater involvement in coalitions relative to women (McDonald et al., 2012). Men of various ideologies could readily identify the benefits of such efforts and seek to build an optimal group for resource acquisition. Nonetheless, men did not build coalitions with predominantly formidable men. This could reflect men’s desire to build coalitions with complementarity rather than selecting an entirely dominant group that would impede group goals. Formidable men’s self-interested pursuit of status could lead to an intragroup power struggle if all men are vying for intragroup dominance (Sell et al., 2012). This would highlight the instrumental value in non-formidable coalition members who would be less self-interested in resource acquisition.

Men’s coalitional interests could further be contingent upon their own formidable, as formidable men are advantaged in aggressively ascending hierarchies and display greater sensitivity to formidable cues (Richardson, Waddington, & Gilman, in press). The presence of additional formidable men would both afford the benefit of an effective coalition but also introduces costs of viable rivals, particularly within male-skewed environments that would necessarily increase competition (Kruger, 2010). Future work would benefit in clarifying the bases of men’s psychological calculus in coalition-building through considering men’s formidable explicitly, through self-report and actual physical strength (Łukaszewski, 2013).

6.2. Limitations and future directions

The current research provides an interesting first step in understanding sex differences in coalition-building yet poses several limitations that necessitate future research. First, this study only considered a few facets of conservatism, namely those that could be directly related to status and resource acquisition, with the interest of ascending and imposing a status hierarchy being more predictive than perceptions of the status quo being fair or a generic conservative attitude. It is less clear how facets of conservatism emphasizing societal traditions may specifically shape coalition-building. For example, it has been argued attitudes
typifying right wing authoritarianism may have evolved to foster coalition-building for protection against threats and intragroup cohesion, with self-interested mobility underlying social dominance orientation’s interpersonal strategies (Sinn & Hayes, 2018). Formidable male coalitions would certainly be instrumental in protecting an ingroup and enforcing intragroup rules that individuals high in right wing authoritarianism desire (Łukaszewski et al., 2016). Future work would benefit from considering right wing authoritarianism in coalitional interests while also identifying additional contexts that would heighten formidable men’s desirability among those with authoritarian personalities.

Though this study provides evidence for specific contexts that favor formidable allies, given the necessity of dominance for intergroup conflict, much of our findings nonetheless suggest formidability remains costly in other domains because of potentially increased likelihood of dominant individuals’ exploitation. This aversion to dominance may work in complement to an interest in coalitional allies who are motivated to obtain prestige within the group, wherein conspecifics seek to gain respect from group members (von Rueden et al., 2011). Future research would benefit from determining whether physical features diagnostic of an interest in prestige would be more desirable in coalition members across these contexts. A study could specifically identify facial features connoting warmth and trustworthiness, given the reduced likelihood of such individuals to exploit others (Oosterhof & Todorov, 2008; Stirrat & Perrett, 2010).

Future research would additionally benefit from considering how situational factors modulate levels of SDO before shaping coalitional decisions. Threats to one’s salient identity fostered heightened interest in instilling rigid social hierarchies between groups (Morrison & Ybarra, 2008). Priming identity threats prior to a coalition-building task in resource-abundant ecologies, based on the current data could heighten interest in building formidable coalitions.

Several empirical limitations may emerge within the current study that necessitate future research. First, correlations between women’s SDO and coalitional interests are relatively small. Despite the importance of reporting smaller effects in the literature to identify potential subtleties in decision-making (Prentice & Miller, 1992), the small effects may represent women’s judicious weighing of costs and benefits with their coalitional decisions that future research would benefit from considering. Another emerges in the relative asymmetric between men and women in this study. Though, sufficiently powered to detect effects, the absence of effects in men could nonetheless be rooted in having fewer men than women. Future investigation would benefit purposefully recruiting larger samples of men.

7. Conclusion

Optimal group living is largely contingent upon the selection of group members most appropriate to address the various challenges of survival and reproduction. For individuals looking to ensure their access to resources through aggressive means, formidable allies may optimize these efforts. This study found that a desire to ascend a hierarchy facilitated women’s interest in men capable of providing this opportunity.

Credit author statement

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References