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**Honour, Competition and Cooperation across 13 Societies**

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**Running Head:** Honour, Competition and Cooperation

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**Abstract**

Effectively addressing societal challenges often requires unrelated individuals to reduce conflict and successfully coordinate actions. The cultural logic of “honour” is frequently studied in relation to conflict, but its role in competition and cooperation remains underexplored. The current study investigates how perceived normative and personally endorsed honour values predict competition and cooperation behaviours. In an online experiment testing pre-registered hypotheses, 3,371 participants from 13 societies made incentivized competition decisions in a contest game and cooperation decisions for coordination in a step-level public goods game. Perceived normative honour values were associated with greater competition and also greater cooperation at both societal and individual levels. Personally endorsing values tied to defence of family reputation was associated with greater coordinative efforts, whereas endorsing self-promotion and retaliation was associated with weaker engagement in coordination. These findings highlight the role of honour as a cultural logic (in its different forms) in shaping competition and cooperation across societies.

**Main Text**

Social interactions frequently involve conflicts of interest between individuals, where the actions available to individuals (e.g., competition, cooperation) and the outcomes they might receive (e.g., zero-sum, positive-sum) can vary extensively1–3. For instance, in formally structured contests where individuals compete for status or limited resources, the outcomes can be zero-sum – meaning a gain for one party directly translates into a loss for another4. In contrast, situations where individuals coordinate to achieve a common good at a personal cost often involve positive-sum outcomes, where the collective gain for all parties exceeds what any one of them could achieve independently5. Understanding these different types of interactions is essential for addressing societal challenges, such as mitigating conflict and fostering efficient coordination among unrelated members of society.

Past literature has taken different perspectives on studying competition and cooperation. Some research categorizes these behaviours as representing two extremes of a singular behavioural spectrum4,6, while others consider them as entwined components harmoniously coexisting or even being positively related in conflicting-interest situations7–9. Empirical research has increasingly investigated when and why individuals compete and/or cooperate with others, though largely in separate studies, both within and across cultural contexts10–15. Recent cross-cultural research, containing evidence from non-Western regions, investigated a range of ecological, social, and institutional factors that may account for cross-cultural variation in competition and/or cooperation13,16,17. *Honour*, a relevant yet underexplored cultural concept, is particularly prevalent in certain non-Western regions (e.g., the Middle Eastern and North African societies)18–21, and may act as an important cultural logic shaping how individuals navigate conflicts of interest between the self and others.

Honour can be understood as the value of a person in their own eyes and in the eyes of others22. To be honourable, individuals must actively express certain traits or behaviours to claim honour and gain recognition and respect from others in their social environment23–25. Recently, honour has been studied as a cultural logic comprising shared beliefs, values, norms, and practices that cohere around the central theme of pursuing honour26. This cultural logic tends to emerge in harsh, competitive environments characterized by status inequality and instability, and historically weak institutions27–29. In these environments, individuals likely develop strategies to protect their safety and resources, as well as those of their close ingroups such as family members, through personal actions. A reputation for toughness and strength is adaptive because it can deter competitors and prevent being exploited in the future26,28,30. Individuals’ willingness to retaliate or even preemptively defend themselves, securing a tough reputation, can be selected as an important survival strategy and thus become normative in these environments31. Moreover, individuals may engage in similar actions to defend the honour of their close others or affiliated social groups (e.g., typically family members)32. However, the pursuit of honour seems to risk escalating unnecessary conflict, especially among unrelated individuals. Past literature has documented that honour-related norms and behaviours can foster conflict responses such as violence, aggression and honour-related crimes28,33–36.

To study how the cultural logic of honour may shape both competition and cooperation, we employed two separate incentivized economic games that may provide different opportunities for the expression of honour-related values and norms37,38. Economic games are highly structured situations with formal rules and unambiguous outcomes, which are nonetheless widely used to study human judgement, decision-making and behavioural choices that may transfer into everyday life37,39. We examined how individuals’ behaviour in these games may be predicted by honour values on multiple levels: societal-level variation in honour culture (i.e., effects of living in societies where honour values are more or less prevalent)40, individual-level variation in perceived societal honour norms (i.e., effects of perceiving honour values as more or less normative in one’s society—also known as “intersubjective culture”)21,41,42, and individual-level variation in personal honour values (i.e., effects of personally internalizing cultural values of honour more or less)26.

Contest games are formally structured conflict situations in which one can only be better off at the cost of the other, and one risks being exploited if losing to one’s opponent43,44. These games have been used to study informal and formal types of competition, as they model conflict situations that result in zero-sum outcomes (e.g., public debates, sports competitions, leadership elections). In societies more strongly characterized by a cultural logic of honour, competition can serve as an important means for achieving or maintaining honour, while failure to compete may be perceived as a sign of weakness, leading to potential losses of reputation and social status for individuals (and their close associates, such as family members)45,46. Thus, we expected that members of societies where honour values are more prevalent would exhibit higher levels of competition (*H1a*) and expectations about interpersonal competition (*H1b*). At the individual level, we hypothesized that the more individuals perceive honour values as being societally prevalent, the more likely they may engage in competitive actions themselves (*H2a*), and expect unrelated others to adopt similar strategies, expressing toughness and competing to promote oneself or prevent losing resources (*H2b*). Moreover, individuals who more strongly endorse honour values may be more likely to adopt strategies expressing strength and toughness in front of others by engaging in more competitive actions (*H3*)47.

Step-level public goods games (PGG) model situations where individuals can cooperate to achieve better collective outcomes at the risk of wasting personal efforts if coordination fails (e.g., building a neighbourhood security system or communal infrastructure)3,5. Compared to continuous PGGs, the step-level form transforms the cooperation game into a social coordination problem that aligns self-interests more closely with collective interests and increases the likelihood of cooperation15. Investing in coordinating the successful provision of a public good does not necessarily signify weakness. Unlike contest games where one can only benefit by imposing a cost on others, step-level PGGs give individuals the choice between extending benefits to others at a personal cost or refraining from doing so48. The latter enables individuals to express their benevolence, generosity, hospitality, and politeness, which may enhance their own honour and that of their close ingroup26,30,49,50. However, the inherent risk of wasting coordinative efforts may place individuals in a “sucker’s situation” if others do not cooperate, potentially suggesting a negative link between honour and cooperation51,52. We therefore did not formulate specific hypotheses but explored the relationship between honour and cooperation.

The experiment reported here involved a sample of 3,371 participants stratified by age and gender from 13 societies (see Table 1 and Table S35 for more demographic information) to test our pre-registered hypotheses (https://osf.io/r9atc) and examine further research questions about how perceived normative and personally endorsed honour values relate to competition and cooperation. Participants were recruited online through panel agencies and local research companies (see Methods). Nine of the 13 societies—Spain, Italy, Greece, Turkey, Cyprus (both Greek Cypriot and Turkish Cypriot communities), Lebanon, Egypt, and Morocco—were in the Mediterranean region, where recent findings have shown that honour values are deeply ingrained in individuals’ social worlds, albeit in different forms and to a greater extent in societies further East and/or South within this region21. Participants made 12 independent rounds of decisions in two economic games (six rounds per game). Each round was played with a different participant from participants’ own society, whose decision was asynchronously paired after the experiment for payment calculation. We studied interactions among unrelated individuals from the same society to avoid confounding our outcomes with competitiveness between societal ingroup (citizens) and outgroup members (foreigners)17.

**Table 1**. Summary of descriptives.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Society** | ***N*** | **Language** | **% Females** | ***M*age (*SD*)** | **% Comp (E)** | **% Coor (E)** | **PNH (O)** | **PNH (F)** |
| Egypt | 270 | Arabic | 50.38 | 40.78 (14.00) | 69.45 (60.20) | 66.54 (62.20) | 6.03 | 0.41 |
| Greece | 255 | Greek | 49.61 | 40.59 (13.76) | 64.86 (57.25) | 64.15 (60.41) | 5.29 | 0.19 |
| Greek Cypriot community | 269 | Greek | 50.93 | 41.22 (14.20) | 65.72 (59.55) | 64.13 (62.88) | 5.35 | 0.48 |
| Italy | 270 | Italian | 50.37 | 41.14 (14.21) | 62.34 (57.42) | 62.57 (60.75) | 5.04 | -0.09 |
| Japan | 261 | Japanese | 49.23 | 41.56 (14.91) | 64.12 (57.09) | 57.06 (56.44) | 4.50 | -0.34 |
| Lebanon | 250 | Arabic | 53.01 | 39.25 (12.83) | 61.17 (50.36) | 59.69 (56.84) | 5.64 | -0.08 |
| Morocco | 260 | Arabic | 49.22 | 39.81 (13.15) | 67.66 (59.25) | 63.71 (59.56) | 5.66 | 0.55 |
| South Korea | 271 | Korean | 49.82 | 41.21 (14.61) | 62.00 (55.50) | 60.13 (60.06) | 4.89 | 0.05 |
| Spain | 249 | Spanish | 48.19 | 40.81 (14.30) | 62.76 (54.73) | 61.55 (58.20) | 4.98 | -0.16 |
| Turkish Cypriot community | 245 | Turkish | 49.80 | 40.32 (14.46) | 59.42 (57.61) | 59.62 (59.62) | 5.05 | 0.17 |
| Türkiye | 260 | Turkish | 50.77 | 40.72 (14.01) | 67.62 (61.79) | 66.66 (64.45) | 5.50 | 0.15 |
| United Kingdom | 255 | English | 49.80 | 41.47 (15.79) | 62.51 (55.69) | 60.95 (56.14) | 4.45 | -0.60 |
| United States | 256 | English | 51.01 | 41.33 (16.25) | 62.22 (55.68) | 61.42 (57.77) | 4.44 | -0.72 |
| **Total** | **3,371** | **/** | **50.16** | **40.79 (14.36)** | **64.03 (57.13)** | **62.20 (59.68)** | **5.14** | **/** |

*Note*. *N* = sample size, *M*age (*SD*) = mean age (standard deviation), % Comp (E) = percentage of competitive investments (percentage of expectations of other’s competitive investments), % Coop (E) = percentage of cooperative investments (percentage of expectations of other’s cooperative investments), PNH (O) = societal mean of perceived normative honour values, PNH (F) = factor score of perceived normative honour values. See Table S35 for more summary information on the age range, parents’ education level, subjective social status, ethnicity, and living environment (e.g., urban, rural) of the sample from each society.

Competition was measured in a contest game where participants could invest their money attempting to take away their opponent’s money (see Fig. 1)43,44. If a participant invested more than their opponent, they could take all the money that the opponent did not invest; if both participants invested the same amount (i.e., tie), they would each keep whatever money they had not invested. Cooperation was measured in a coordination game: a step-level PGG with two provision levels (16 and 12 monetary units, MUs) where participants could attempt to reach the provision levels of the public good by contributing money that would be combined with their partner’s contributions (see Fig. 1)53. A compelling decision rule, potentially rooted in concepts of equity and fairness, is to equally share the cost to meet a provision point (e.g., contributing 8 or 6 MUs). Such decisions are often referred to as *focal points* in coordination games, and the frequency with which individuals make these decisions can reflect their coordinative efforts5. After each decision in both games, we asked participants to indicate their beliefs about their partner’s decision, which we used to test *H1b* and *H2b* as well as to define further outcomes for exploratory analyses (see Fig. 3 and Methods).

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**Fig. 1 | Summary of the design.** In the contest game, participants (red avatar) invested money to attempt to take away the money from their game partner (competition decisions). All invested money would be lost. If a participant invested more than their partner, they could take all the money that their game partner did not invest. However, if both participants invested the same amount, they would each keep whatever money they had not invested. In the step-level public goods game, participants (blue avatar) invested money (together with their game partner’s investment) to attempt to reach the provision points of the public good (cooperation decisions). The total amount invested by both participants was summed and compared to two provision points. If the total investment reached the first provision point of 12 MUs, each participant would receive 10 MUs plus any money they had not invested. If the total investment reached the second provision point of 16 MUs, each participant would receive 15 MUs plus any money they had not invested. In each round, participants faced a different game partner from the same society, with manipulated gender information (male, female, or not provided). After data collection, participants’ decisions were asynchronously matched with another participant’s decisions, based on the manipulated gender information, to compute game payments without deception (see also Methods).

Here, we assessed both individual and family (i.e., close ingroup) facets of honour because these two facets may have different implications for social interactions within the cultural logic of honour. Specifically, our measure of individual honour focused on valuing certain traits and actions (e.g., self-promotion, retaliation) to claim honour, whereas our measure of family honour mainly focused on protecting and defending the family’s reputation21,54. Compared to the family facet, individual honour may be theoretically more relevant for shaping decisions in the dyadic interactions captured in the current study. However, empirical research into the implications of family honour remains limited so far. We sought to contribute to this literature by testing whether the degree to which individuals value defending the honour shared by their family shapes their interactions with unrelated others in their society.

We operationalized the cultural logic of honour through the individual-level measures of personal endorsement of the abovementioned two facets of honour values (referred to as *personal values*) as well as intersubjective perceptions of how prevalent the two facets of honour values are within each society (referred to as *perceived normative values*)41,42. The society mean of perceived normative honour values across both facets was used to construct a societal-level indicator, characterizing the extent to which a society can be considered a culture of honour (referred to as *societal-level honour*), ranging in our current samples from 4.44 (United States) to 6.03 (Egypt) (see Table 1 for scores of all samples). As pre-registered, we measured additional variables at the individual level, including beliefs in a zero-sum game55 and relational mobility56, and obtained society means to construct societal-level indicators for these variables. These variables may offer additional explanations for competition and cooperation, respectively, and have been shown to vary cross-culturally (see Methods and Section 3.2.5 and 3.3.5 in the Supplementary Information, SI, for more details).

The results revealed that perceived normative honour values were positively associated with competition, cooperation, and expectations of these behaviours from others, at both societal and individual levels. Further analyses revealed that perceived normative honour values, particularly defence of family reputation, were positively associated with coordinative decisions, anticipation of successful coordination, and willingness to engage in conditional cooperation. Regarding personal honour values, defence of family reputation values were linked to increased cooperative and coordinative efforts, whereas self-promotion and retaliation values were associated with reduced efforts in these behaviours.

**Results**

**Competition and cooperation**

We observed significant differences across societies in competition and cooperation, with between-society variance significantly different from zero for competition, χ2 (1) = 31.30, *p* < .001, and cooperation, χ2 (1) = 39.80, *p* < .001 (see Table S3). Consistent with previous findings that competition and cooperation are not bipolar opposites7,8, we found that competition and cooperation were positively associated both at the societal-level (standardized regression coefficient: βpredicting competition = 0.11, *t*(11) = 3.95, *p* = .002, 95% Confidence Intervals (CI) = [0.05, 0.17]; βpredicting cooperation = 0.12, *t*(11) = 3.97, *p* = .002, 95% CI = [0.05, 0.18]) and at the individual-level (βpredicting competition = 0.58, *t*(3354) = 41.51, *p* < .001, 95% CI = [0.55, 0.61]; βpredicting cooperation = 0.57, *t*(3354) = 41.51, *p* < .001, 95% CI = [0.55, 0.60], see Table S4 and Fig. S1).

**Honour and competition**

Across 13 societies, societal-level honour was associated with greater competition (*H1a*: β = 0.07, *t*(11) = 2.56, *p* = .027, 95% CI = [0.01, 0.13], see Table S5 and Fig. 2a), but not necessarily higher expectations about others’ competition (*H1b*: β = 0.04, *t*(11) = 1.10, *p* = .294, 95% CI = [−0.04, 0.11], see Table S6). At the individual level, perceived normative honour values of self-promotion and retaliation (SPR), as well as defence of family reputation (DFR), were related to higher levels of competition (mixed-effects regression controlling for societal-level honour, partner gender, participant gender, age, and game order; *H2a*: β = 0.05, *t*(3351) = 2.59, *p* = .010, 95% CI = [0.01, 0.08] (SPR); β = 0.07, *t*(3351) = 3.45, *p* = .001, 95% CI = [0.03, 0.11] (DFR); see Table S5), and increased expectations of other’s competition (*H2b*: β = 0.04, *t*(3351) = 2.11, *p* = .035, 95% CI = [0.003, 0.07] (SPR); β = 0.07, *t*(3351) = 3.39, *p* = .001, 95% CI = [0.03, 0.10] (DFR), see Table S6). Individual-level measures of personal honour values across both facets were not associated with engagement in competitive behaviour (*H3*: β = −0.03, *t*(3351) = −1.45, *p* = .146, 95% CI = [−0.06, 0.01] (SPR); β = 0.02, *t*(3351) = 1.15, *p* = .251, 95% CI = [−0.02, 0.06] (DFR); see Table S5). Robustness checks using factor scores of honour values confirmed the results above, with the addition that the positive association between perceived normative honour values of self-promotion and retaliation and expectations of others’ competition became nonsignificant (Table S7-S8).

Next, we explored the potential interaction between individual-level personal honour values and societal-level honour, as the implications of personally endorsing honour values could differ according to the broader cultural logic in one’s society. Indeed, we observed a complex pattern for personal values related to the defence of family reputation (β = −0.03, *t*(3349) = −2.08, *p* = .038, 95% CI = [−0.07, −0.002]), but no significant interaction for self-promotion and retaliation (β = 0.01, *t*(3349) = 0.83, *p* = .409, 95% CI = [−0.02, 0.04], see Table S9). Specifically, the relationship between personal values of defending family reputation and competition was positive in societies with lower societal-level honour but became nonsignificant as society-level honour increased (see Fig. S2 for simple slope analyses). We also explored whether individuals with the same level of perceived normative and personally endorsed honour values, but inhabiting societies with differing societal-level honour, would differ in their engagement in competition and expectations of other’s competition, but found no support for these contextual effects (competition: β = 0.02, *t*(13) = 0.64, *p* = .533, 95% CI = [−0.04, 0.08]; expectation: β = −0.01, *t*(12) = −0.20, *p* = .843, 95% CI = [−0.08, 0.07]; see Table S10).

Following the preregistered analysis plan, we tested beliefs in a zero-sum game as a potential additional explanation for competition. Societal mean beliefs in a zero-sum game explained no significant variation in competition beyond societal-level honour (β = −0.03, *t*(8) = −0.87, *p* = .411, 95% CI = [−0.12, 0.06]), and individual-level beliefs in a zero-sum game explained no significant variation beyond personal and perceived normative honour values (β = −0.001, *t*(2841) = −0.07, *p* = .946, 95% CI = [−0.03, 0.03], see Table S11). These results were replicated using factor scores of honour values and beliefs in a zero-sum game (see Table S12). Further exploration of other societal-level indicators theoretically relevant to the cultural logic of honour in relation to competition can be found in Section 3.2.6 in the SI (see Table S13-S14).



**Fig. 2 | The relation between societal-level honour (i.e., societal mean perceived normative honour values), (a) competition, and (b) cooperation.** Each graph was obtained by regressing the competition or cooperation behaviour on the societal mean perceived normative honour values. Dots represented society level means and were labelled by country iso code 3 (see Table S35). CYP-N represented the Turkish Cypriot community and CYP-S represented the Greek Cypriot community. The shaded area indicates the 95% CI. Societal mean perceived normative honour values (referred to as societal-level honour) was significantly and positively associated with competition (*H1a*: β = .07, *p* = .027), and surprisingly, also cooperation behaviour (β = .08, *p* = .013).

**Honour and cooperation**

Societies characterized by higher mean perceived normative honour values showed higher levels of cooperation (β = 0.08, *t*(11) = 2.97, *p* = .013, 95% CI = [0.02, 0.14], see Table S15 and Fig. 2b) and expectations of interpersonal cooperation (β = 0.07, *t*(11) = 2.49, *p* = .030, 95% CI = [0.01, 0.13], see Table S16). At the individual level, perceived normative values of self-promotion and retaliation predicted more cooperation (β = 0.05, *t*(3351) = 2.78, *p* = .005, 95% CI = [0.01, 0.08], see Table S15), although they were not associated with expectations of other’s cooperation (β = 0.03, *t*(3351) = 1.91, *p* = .056, 95% CI = [−0.001, 0.07], see Table S16). Perceived normative values of defence of family reputation predicted greater expectation of other’s cooperation (β = 0.07, *t*(3351) = 3.76, *p* < .001, 95% CI = [0.03, 0.11], see Table S16), but were not associated with own cooperation (β = 0.03, *t*(3351) = 1.62, *p* = .105, 95% CI = [−0.01, 0.07], see Table S15). The two facets of personal honour values showed more complex patterns depending on society-level honour values. Overall, personal values of defence of family reputation positively predicted cooperation (β = 0.06, *t*(3351) = 3.00, *p* = .003, 95% CI = [0.02, 0.09], see Table S15); this positive association was stronger in societies with lower societal-level honour, becoming nonsignificant as societal-level honour increased (β = −0.04, *t*(3349) = −2.54, *p* = .011, 95% CI = [−0.07, −0.01], see Table S19 and Fig. S3 for simple slope analyses). Personal values of self-promotion and retaliation did not predict cooperation overall (β = −0.02, *t*(3351) = −0.95, *p* = .342, 95% CI = [−0.05, 0.02], see Table S15), but their relationship was negative among societies with lower societal-level honour, becoming weaker or even positive as societal-level honour increased (β = 0.04, *t*(3349) = 2.67, *p* = .008, 95% CI = [0.01, 0.07], see Table S19 and Fig. S3). Results were similar when using factor scores for honour values (see Table S17-S19).

We then explored whether individuals with the same level of perceived normative and personally endorsed honour values, but inhabiting societies with higher societal-level honour, would differ in their engagement in cooperation and expectations of other’s cooperation, but found no support for these contextual effects (cooperation: β = 0.03, *t*(12) = 1.02, *p* = .327, 95% CI = [−0.03, 0.09]; expectation: β = 0.02, *t*(13) = 0.69, *p* = .506, 95% CI = [−0.04, 0.07], see Table S20). As pre-registered, we tested relational mobility as a potential additional explanation for cooperation. Societal mean relational mobility did account for additional variation in cooperation beyond societal-level honour (β = 0.06, *t*(10) = 2.64, *p* = .025, 95% CI = [0.01, 0.10], see Table S21), and individual-level relational mobility positively predicted cooperation beyond personal and perceived normative honour values (β = 0.03, *t*(3350) = 2.38, *p* = .017, 95% CI = [0.01, 0.06], see Table S21). Yet, these results were not replicated using factor scores of honour values and relational mobility (see Table S22). Importantly, interpretations of societal-level patterns from the model containing both societal-level honour and societal-level relational mobility as predictors should be made cautiously, given the relatively small number of societies (*N*society = 13), which may have limited the statistical power and generalizability of these findings57. Further exploration of other societal-level indicators in relation to cooperation can be found in Section 3.3.6 in the SI (see Table S23).

As pre-registered, we conducted secondary analyses of existing meta-analytic and empirical datasets that measured cooperation using prisoner’s dilemmas (PD) and continuous PGGs. In these situations, non-cooperation can always yield the best outcome for an individual regardless of what others do. We used societal mean perceived normative honour values retrieved from Study 2 of recent research21 to predict a) study-level mean cooperation13 in a meta-regression, and b) individual-level cooperation16 in mixed-effects models, using data retrieved from previous studies (see Section 3.3.7 in the SI for more information). Results showed that societal-level honour did not predict either study-level cooperation rates (*B* = 0.06, *t*(1151) = 0.70, *p* = .487, Δ pseudo *R*2 = 0%, see Table S24) or individual-level cooperation (β = 0.02, *t*(7) = 0.39, *p* = .707, 95% CI = [−0.11, 0.15], see Table S26).

The step-level PGG allowed us to analyse individual’s willingness to coordinate by examining the focal point decisions (i.e., contributing 8 or 6 MUs). We thus explored the likelihood with which individuals made coordinative decisions to contribute exactly 8 or 6 MUs. Societal-level honour was positively associated with coordinative efforts targeting achieving efficient coordination (i.e., contributing 8 MUs) (generalized linear mixed model: *Odds Ratio* (*OR*) = 1.14, *p* = .001, 95% CI = [1.06, 1.23]), as were individual-level perceived normative honour values of defence of family reputation (*OR* = 1.30, *p* < .001, 95% CI = [1.17, 1.45], see Table S27). Conversely, personally endorsing self-promotion and retaliation was negatively associated with the likelihood of contributing 8 MUs (*OR* = 0.84, *p* < .001, 95% CI = [0.77, 0.92], see Table S27). We found no significant association between societal-level (*OR* = 0.99, *p* = .841, 95% CI = [0.94, 1.06]) or individual-level perceived normative honour values (*OR* = 1.01, *p* = .785, 95% CI = [0.94, 1.09] (SPR); *OR* = 1.05, *p* = .230, 95% CI = [0.97, 1.14] (DFR); see Table S27) and coordinative efforts targeting achieving efficient coordination (i.e., contributions of 6 MUs). However, the two facets of personal honour values showed divergent effects: self-promotion and retaliation related to lower likelihood of contributing 6 MUs (*OR* = 0.88, *p* = .001, 95% CI = [0.82, 0.95]), while defence of family reputation related to higher likelihood of contributing 6 MUs (*OR* = 1.14, *p* = .002, 95% CI = [1.05, 1.23], see Table S27). These findings remained consistent when using factor scores of honour values (see Table S28).

**Exploratory analyses: Honour and** **behaviours adjusted by expectations**

**(Less-)efficient coordination success.** To further shed light on the potential motives associated to the observed behavioural cooperation patterns, we compared the sum of individuals’ own cooperation and expected partner’s cooperation with two provision points of the public good. This allows to explore how the cultural logic of honour relates to individuals’ anticipation of coordination success (see Methods). Societal-level honour positively predicted the anticipation of *efficient coordination success*, defined as the expectation of reaching the higher provision point (*OR* = 1.42, *p* < .001, 95% CI = [1.26, 1.60]), but was not associated with the anticipation of *less-efficient coordination success*, defined as the expectation of reaching the lower but not the higher provision point (*OR* = 1.01, *p* = .816, 95% CI = [0.92, 1.11], see Table S29). At the individual-level, perceiving stronger normative values of defence of family reputation was positively associated with anticipation of less-efficient coordination (*OR* = 1.20, *p* < .001, 95% CI = [1.10, 1.32]) but not with anticipation of efficient coordination (*OR* = 1.10, *p* = .270, 95% CI = [0.93, 1.29], see Table S29). The two facets of personal honour values showed divergent patterns: defence of family reputation positively predicted anticipation of efficient coordination success (*OR* = 1.19, *p* = .030, 95% CI = [1.02, 1.39]), while self-promotion and retaliation negatively predicted anticipation of less-efficient coordination success (*OR* = 0.84, *p* < .001, 95% CI = [0.77, 0.91], see Table S29). Results were consistent when using factor scores of honour values (see Table S30).

**(Less-)efficient competition**. We also explored different forms of competition by subtracting expected partner’s competition from individuals’ own competition. This allows to distinguish different type of competitive behaviour which may have reflected different underlying motives (see Methods). Specifically, we explored how the cultural logic of honour relates to *efficient competition* (defined as spending just enough to win) and *less-efficient competition* (defined as overspending to make sure they win). At the individual level, stronger perceived normative values of self-promotion and retaliation consistently predicted more occurrence of efficient competition (*OR* = 1.11, *p* = .012, 95% CI = [1.02, 1.21]), but not less-efficient competition (*OR* = 0.97, *p* = .497, 95% CI = [0.88, 1.06], see Table S31). Perceived normative values of defence of family reputation did not predict the occurrence of either efficient or less-efficient competition (*OR* = 1.01, *p* = .918, 95% CI = [0.92, 1.10], see Table S31). These findings remained consistent when using factor scores of honour values (see Table S32). However, we found no consistent evidence for an association between societal-level honour (or personal honour values) and the occurrence of either efficient or less-efficient competition using observed scores and factor scores of honour values (see Table S31-S32).

**(Un)conditional cooperation.** By subtracting expected partner’s cooperation from individuals’ own cooperation, we also distinguished different types of cooperative behaviour (see Methods), and explored how the cultural logic of honour relates to *conditional cooperation* (defined as matching the expected contribution of one’s partner in the same round) and *unconditional cooperation* (defined as exceeding the expected contribution of one’s partner in the same round). At the individual level, perceiving honour values of defence of family reputation as more prevalent in one’s society consistently positively predicted the occurrence of conditional cooperation (*OR* = 1.10, *p* = .043, 95% CI = [1.00, 1.20]), but negatively predicted unconditional cooperation (*OR* = 0.82, *p* < .001, 95% CI = [0.73, 0.91], see Table S33).These findings were consistent when using factor scores of honour values (see Table S34). However, we found no evidence for the association between societal-level honour (or individual-level honour indicators: perceived normative values of self-promotion and retaliation, personal honour values for both facets) and the occurrence of either conditional or unconditional cooperation using observed scores and factor scores of honour values (see Table S33-S34).



**Fig. 3 | Percentage of rounds for each type of (a) anticipation of coordination success and behavioural deviation from expectations for (b) competition and (c) cooperation.** (**a**) The sum of an individual’s own contribution and expected contribution from the other in a given round in the step-level PGG were grouped into three categories, where *failed coordination* indicates that the sum contribution did not reach the first provision point (i.e., 12 MUs), *less-efficient coordination* indicates that the sum contribution only reached the first provision point but not the second one (i.e., 16 MUs), and efficient coordination indicates that the sum contribution reached the second provision point. (**b**) In the contest game, the deviations of an individual’s own competition from their expected competition from the other in a given round were grouped into four categories, where *underinvested competition* indicates that the individual’s own competition was less than expected competition from the other, *tie* indicates that the individual competed exactly the same level as the expected level from the other, *efficient competition* indicates that the individual’s own competition was just one MU more than the expected competition from the other, *less-efficient competition* indicates that the individual’s own competition was at least two MUs more than the expected competition from the other. (**c**) In the step-level PGG, the deviations of an individual’s own contribution from their expected contribution from the other in a given round were grouped into three categories, where *underinvested cooperation* indicates that the individual’s own contribution was less than expected contribution from the other, *conditional cooperation* indicated that the individual contributed exactly the same level as the expected level from the other, and *unconditional cooperation* indicates that the individual’s own contribution was more than the expected contribution from the other. Societies were sorted in ascending order according to societal-level honour (i.e., the societal mean of perceived normative honour values), from the bottom upwards on the y-axis.

**Discussion**

Our online experiment tested hypotheses and research questions about the role of honour values in competition, cooperation, and expectations of these behaviours from unrelated others, at both societal and individual levels, across 13 societies. The study incorporated a multi-faceted and multi-layered examination of honour values and norms, thereby providing a test of how the cultural logic of honour may shape competition and cooperation. As predicted, members of societies where honour values were more prevalent exhibited greater interpersonal competition (supporting *H1a*), but they did not show correspondingly higher expectations of competition from others in our main analyses (no support for *H1b*). Individuals who perceived honour values as more prevalent in their society also competed more (supporting *H2a*) and expected greater competition from others (supporting *H2b*). Personal honour values were not associated with competition (no support for *H3*). Similar patterns were observed for cooperation, with both societal mean and individual perceived normative honour values positively associated with cooperation and expectations of other’s cooperation (see Table 2 for a summary of main findings).

**Table 2.** Support for hypotheses and summary of main findings

|  |  |  |  |
| --- | --- | --- | --- |
| **Predictor** | **Outcome** | **Competition** | **Cooperation** |
| **Hy.** | **Direction** | **Support** | **Direction** |
| Societal-level honour | Behaviour | *H1a* | +\* | Y | +\* |
| Expectation | *H1b* | + | N | +\* |
| Individual-level honour |   |   |  |   |  |
| Perceived normative honour values |   |   |  |   |  |
| Self-promotion and retaliation | Behaviour | *H2a* | +\* | Y | +\*\* |
| Defence of family reputation | +\*\* | Y | + |
| Self-promotion and retaliation | Expectation | *H2b* | +\* | Y | + |
| Defence of family reputation | +\*\* | Y | +\*\*\* |
| Personal honour values |   |   |  |   |  |
| Self-promotion and retaliation | Behaviour | *H3* | − | N | − |
| Defence of family reputation | + | N | +\*\* |
| Cross-level interactions |   |   |  |   |  |
| Personal honour (SPR) × Societal-level honour | Behaviour | / | + | / | +\*\* |
| Personal honour (DFR) × Societal-level honour | / | −\* | / | −\* |
| Contextual effects | Behaviour | / | + | / | + |
| Expectation | / | − | / | + |

*Note*. Hy. = number of hypotheses, −/+ = direction of the effect, Y = hypothesis supported, N = hypothesis not supported (nonsignificant results). The contextual effects describe the differences in competition (or cooperation) among participants who have the same level of perceived normative and personal honour values but live in societies with different societal-level honour. The “Support” column is missing for cooperation as no hypothesis was preregistered. \* *p* < .05, \*\* *p* < .01, \*\*\* *p* < .001

Our hypotheses and analyses were informed by the cultural logics framework which conceptualizes honour as a cultural syndrome involving a set of coherent shared beliefs, values, behaviours, and practices26. The positive association between perceived normative honour values and competition at both societal and individual levels aligns with characterisations of pre-emptive defence as an important strategy in social interactions under the cultural logic of honour20,34,58–61, and with previous research on conflict and negotiation showing higher competitive aspirations in negotiations among individuals from honour, compared to non-honour cultural backgrounds45. Interestingly, exploratory analyses suggested that individuals who perceived stronger normative values of self-promotion and retaliation may aim to minimize the cost of winning a contest, rather than engage in excessive competitive spending that could diminish their welfare after winning. This finding challenges claims in the literature linking honour with abhorring cost-benefit calculations26. When competition is institutionalized with clearly defined incentive structure, such conditions afford honour-related norms to manifest in efforts to compete efficiently, based on expectations of the other’s competition.

Beyond the conflict situation that constrained individuals to compete or not, the present study also employed a social coordination situation that afforded the possibility of working together to increase welfare. The positive association between perceived normative honour values and cooperation—including evidence from levels of cooperation, coordinative decisions targeting achieving efficient coordination (e.g., contributing 8 MUs), and anticipation of coordination success—both at societal and individual levels, aligns with earlier research on honour cultures and conflict management. This research found that individuals from honour, compared to non-honour, cultures were more willing and able to handle conflict situations constructively, and made more cooperative offers in negotiations when the situation afforded such opportunities — such as in the absence of insults59, or in the presence of social rewards49. Moreover, exploratory analyses that subtracted expectations of others’ cooperation from one’s own suggested that individuals who perceived stronger normative values of defence family reputation may be more likely to condition their own cooperation on the expected cooperation of others, but less likely to respond altruistically to expected less-cooperative others. These findings provided empirical support for the theorised importance of positive reciprocal principles and self-protection to avoid being exploited in social interactions within the cultural logic of honour26.

We observed a positive association between competition and cooperation at both the societal and individual levels, which supports the perspective that these two processes are not mutually exclusive but coexist7,8. Research increasingly found competition and cooperation to co-occur for the same individuals in group activities62, and across domains such as business63 and politics64. Similarly, recent evolutionary models that investigated competition and cooperation as independent components have demonstrated the joint evolution of these behaviours48. Moreover, our findings suggested that competition and cooperation can coexist within the cultural logic of honour. This aligns with previous research that found self-reliance and group-oriented interdependence to coexist in societies where honour is a central cultural value65 and to be associated with competition and cooperation66,67. Our findings suggest that the ecologies fostering the cultural logic of honour may also promote the co-emergence of competition and cooperation.

Our study provides multi-layered evidence by examining the cultural logic of honour from subjective endorsement of cultural values to intersubjective perceptions of normative values in one’s society, and further extending to societal-level cultural phenomenon40,41,54,68. Compared to personal values, perceived normative honour values played a stronger and more robust role in predicting both individuals’ behaviours and their expectations of others’ behaviours in situations involving a conflict of interest. Aggregating these intersubjective perceptions to societal-level means as a cultural indicator largely replicated findings observed from individual-level perceived normative honour values. We further decomposed the societal-level effects into contextual and individual-level effects, but found no evidence for contextual effects. This suggests that cultural contexts characterized by varying levels of honour value prevalence may shape interpersonal competition and cooperation primarily through individuals’ perceptions of the prescribed values and norms within these contexts. Additionally, findings from cross-level interactions showed that personal honour values were more predictive of competition and cooperation in societies with lower societal-level honour. This suggests that weaker societal pressure to adhere to honour norms may amplify the role of personal honour values in shaping behaviours. Taken together, these findings highlight the importance of examining the cultural logic of honour as a set of normative values that individuals inhabiting different cultural contexts perceive and respond to, and of considering the affordances cultural contexts provide when testing the role of individual’s personal beliefs or values in predicting their behaviours41,69.

Our analyses revealed contrasting roles of two facets of personal honour values in relation to cooperation. Specifically, the value placed on defence of family reputation was associated with increased cooperative and coordinative efforts (the latter was particularly evidenced by more frequent decisions of equally splitting the cost to achieve successful coordination in the step-level PGG), whereas the value placed on self-promotion and retaliation was linked to reduced efforts in the same behaviours. Divergent mechanisms also emerged for the two facets of honour when examining the cross-level interactions in predicting cooperation. In societies with lower (vs. higher) societal-level honour, personally endorsing self-promotion and retaliation was found to hinder cooperation, while personally endorsing defence of family reputation played a positive role in fostering cooperation. One possible explanation lies in the interdependent and coordinative nature of family honour—a family’s honour is maintained by members working together to uphold their family’s reputation and prevent any damage to it in the surrounding environment30. However, it remains unclear why this family honour-oriented coordination motive extended beyond close ingroup boundaries to also benefit unrelated others within the same society (in the absence of any outgroup from other societies). Future research could examine personal values of defending the honour of larger ingroups beyond the family to determine whether the same patterns hold at varying levels of group boundaries.

We used incentivized economic games to capture participants’ actual behaviours (i.e., beyond hypothetical situations and questionnaire self-reports) as well as their incentivized expectations about other’s behaviours. This approach introduces real consequences for individuals if their reported behaviour does not align with true preferences39. By altering the formal rules of the game, structural variations were applied to study specific types of situations15. For instance, the distinct separation between the contest game and the step-level PGG helped avoid ambiguity in operationalizing competitive and cooperative behaviours7. As evidenced by findings from reanalysis of previous datasets, step-level PGGs may be more suitable for measuring cooperation, compared to PDs and continuous PGGs13,16, as the strong appeal of non-cooperation to self-interest in the latter two may limit the expression of the cultural logic of honour in the manifestation of cooperation.

While past research has shown the ecological validity of behaviours measured in economic games70–73, these insights may not generalize to all social settings74. In everyday life, competition (and cooperation) involved in honour-claiming or protecting behaviours may not adhere to formal rules or have an explicit incentive structure to determine winners and losers (provision points of public goods)75. Real-life cases of competition may sometimes result in mutual development rather than zero-sum outcomes9. Future research could employ methods such as experience sampling to explore the role of honour in shaping spontaneous competition and cooperation in daily social interactions. A further potential methodological limitation is that both competition and cooperation were measured as proactively deciding to invest resources. This approach may introduce confounds to the covariation of competition and cooperation with honour due to a general tendency among individuals to invest monetary units (MUs) into the (challenge/common) pool. On the other hand, this controlled for the potential framing effects that could arise if cooperation were operationalized as “give-some” behaviour (i.e., investing resources) and competition as “keep-some” behaviour (i.e., refraining from investing)76.

The current research demonstrated a positive relationship between perceived normative honour values and competition, as well as cooperation, at both societal and individual levels across various societies. Personal values of defence of family reputation were linked to more cooperative and coordinative efforts, while self-promotion and retaliation was associated with reduced efforts in these behaviours. These findings enhance our understanding of honour as a multi-faceted and multi-layered cultural logic shaping social interactions, particularly as individuals navigate conflict and coordination challenges with unrelated others in their society.

**Methods**

**Ethics & Inclusion**. The research was approved by the Sciences & Technology Cross-Schools Research Ethics Committee (C-REC) at the University of Sussex (ER/SJ468/1). The pre-registration (registered on May 24, 2023) and materials are accessible at https://osf.io/r9atc (see Section 1 in the SI for pre-registration deviations and unregistered steps). All participants provided informed consent before completing the study on a voluntary basis.

**Participants.** We recruited 3,656 participants aged 18 years or older, stratified by age and gender, from 13 societies (Cyprus: both Greek and Turkish Cypriot communities, Egypt, Greece, Italy, Lebanon, Morocco, Spain, Turkey, Japan, South Korea, United Kingdom, United States of America). Several inclusion criteria were applied, resulting in the exclusion of a) 120 participants who were not born and located in the respective society, b) 24 participants who did not self-identify as male or female, c) 29 participants who failed the quality check question, and d) 112 participants who failed all four comprehension questions designed to assess participants’ understanding of the contest game and step-level PGG rules. A final sample of 3,371 participants was retained for analyses (50.16% women; *M*age = 40.79, *SD*age = 14.36). Our sample was not stratified in terms of other demographic characteristics. The majority of participants self-identified as belonging to the majority ethnic group in the respective society (93.60%) and reported having an urban background (85.79%). Overall, participants reported a moderate level of parental education (i.e., above high school; *M* = 4.33, *SD* = 1.58) and subjective socioeconomic status (*M* = 5.59, *SD* = 1.92, on a scale from 1 to 10; see Table S35 for more information). One of our main goals was to detect potential differences between societies in their level of competition and cooperation. A sensitivity power analysis indicated that a sample of 250 participants per society, with 80% power (α = .05), could detect an effect size of *d* = .25 between two societies. We thus aimed at recruiting 3,250 participants (~250 per society).Participants were recruited through an online panel provider (Toluna) including members of its third-party panel providers. As an exception, participants from Cyprus were recruited through a market research agency based in the Greek Cypriot community (CYMAR), and a research, analysis and consultancy organization based in the Turkish Cypriot community (Statica). Participants either received an email invitation or had access to the study link through the panellist portals. Only participants in the Turkish Cypriot community completed the study on a tablet provided by the research organization. Participants were compensated for their participation right after completing the survey and received additional payment based on their own and their paired game partner’s decisions at the end of data collection in each society.

**Procedure and experimental design.** The design consisted of two counter-balanced within-participant treatments with type of game (i.e., contest game, step-level public goods game) and three randomized within-participant treatments related to the gender information of the pairing partner (i.e., male vs. female vs. gender not provided). We collected data using the software platform Qualtrics (version May 2023). The study materials were prepared in English and translated into local languages of the non-English-speaking countries following a team translation approach. Specifically, all materials were first translated by members of the research team, who are native speakers of the respective language, and then reviewed and checked for accuracy and local conventions of language use by other team members who are fluent in both the local language and English. Whenever disagreements emerged, an additional round of discussion was used to reach a final decision. In some cases, we adjusted the wording of materials to fit locally common expressions (e.g., the translation of “challenge pool” for the contest game).

The same experimental procedure was followed in all samples. Participants were asked to make six independent rounds of decisions in the contest game, and another six rounds in the step-level public goods game. Each round involved a different game partner—either male, female, or with gender information not provided—from their own society, whose decisions were asynchronously paired with those of the participant after the experiment. Participants were asked to make decisions regarding the allocation of Monetary Units (MU) and estimate their partners’ decisions. To ensure comparable payment levels, each MU was set to the monetary value of 0.1 kg flour in each society. Information on flour prices in each society was retrieved at https://www.globalproductprices.com/ in March 2023. Participants were informed about the monetary value of each MU and that their decisions in the game have monetary consequences. No deception was used in the economic games. Participants also completed several measures, including perceived normative values and personal values across the two facets of honour (i.e., self-promotion and retaliation, defence of family reputation), beliefs in a zero-sum game, and relational mobility. They were debriefed at the end of the experiment and compensated for their participation through the panel provider/research agency.

After data collection was completed, we randomly selected one out of 12 rounds of participants’ decisions from the two economic games for post hoc decision pairing within each society and calculating participants’ payment from the game16,79. The pairing of decisions was implemented based on both the participant’s gender and the partner’s gender information from the randomly selected round. For example, if a female participant’s game partner in the selected round was male, her decision was paired with a male participant whose game partner was female. The game payment consisted of earnings from making the decision and from making an accurate estimation of their partner’s decision in the selected round. Participants received their game payment within two weeks following the conclusion of data collection.

**Contest game**. We applied a continuous contest game (also referred to as the rent-seeking game)43,80 to measure individuals’ own competitive behaviour and expectations of others’ competition. The contest game involved two players. Each player received an endowment of 10 MUs and decided how many of the 10 MUs they wanted to invest into a challenge pool (investment = $x\_{i}$, 0 ≤ $x\_{i}$ ≤ 10) or keep for themselves. Higher investment to the challenge pool was taken as evidence of individuals engaging in higher levels of competitive behaviours. The player who has invested more to the challenge pool would win the game and receive final earnings comprising the remaining MUs that the other player did not invest plus the MUs that the player kept for themselves. In other words, the winner of the game took the remaining resources of the loser, and the loser would end up with nothing. However, if the two players invested equal MUs to the challenge pool (i.e., tie), both players would simply end up with the MUs they did not invest in the challenge pool. More formally, if $π\_{i}$ denotes player *i*’s payoff, then

$$π\_{i}=\left\{\begin{array}{c}\left(10-x\_{i}\right)+ \left(10-x\_{j}\right), if x\_{i}>x\_{j} (i.e., i wins) \\10-x\_{i}, if x\_{i}=x\_{j} (i.e., i ties) \\0, if x\_{i}<x\_{j} (i.e., i loses). \end{array}\right.$$

Thus, the contest game is a symmetric conflict game in which each player has the possibility to increase their payoff at the expense of the other player. In this game, player *i*’s payoff would fall in the range of 0 ≤ $π\_{i}$ ≤ 19 MUs. The pareto efficient outcome could be achieved if no player invested to exploit the other and both kept their initial endowment (and thereby maintain peace). However, peace is game-theoretically unstable since there is always a temptation for one of the players to invest just one MU to the challenge pool and thereby take all the MUs of the other player in this case (see Section 5.1 in the SI for more information).

**Step-level public goods game**. We applied a step-level public goods game (PGG) to measure cooperation and coordination5,53. This step-level PGG involved two players and two provision points. Each player received an endowment of 10 MUs and decided how many of the 10 MUs they wanted to invest into a common pool (investment = $x\_{i}$, 0 ≤ $x\_{i}$ ≤ 10) or keep for themselves. Higher investment to the common pool was taken as individuals engaging in higher levels of cooperative behaviour. Both players’ investment to the common pool would be lost if the total investment did not reach the first provision point of 12 MUs. If the total investment reached 12 MUs, each player could receive 10 MUs from the common pool. Moreover, if the total investment reached the second provision point of 16 MUs, each player could receive 15 MUs from the common pool. More formally, if $π\_{i}$ denotes player *i*’s payoff, then

$$π\_{i}=\left\{\begin{array}{c}10-x\_{i}, if x\_{i}+ x\_{j}<12\\10-x\_{i}+10, if 12\leq x\_{i}+ x\_{j}<16\\10-x\_{i}+15, if 16\leq x\_{i}+ x\_{j}. \end{array}\right.$$

The implementation of two provision points allowed the step-level PGG to have coordinated solutions, i.e., players could possibly work together to increase their payoff through successful coordination. Player *i*’s payoff would fall in the range of 0 ≤ $π\_{i}$ ≤ 19 MUs. We defined successful coordination as cases without wasteful investment (i.e., cases where $x\_{i}+x\_{j}\in \left\{0, 12, 16\right\}$), and efficient coordination as the case when the provision of the public good maximized joint payoffs (i.e., $x\_{i}+x\_{j}=16$). Players had an incentive to make higher contributions as efficient coordination always yielded higher payoff compared to less efficient coordination (i.e., $x\_{i}+x\_{j}=12$). However, it was not safe for individuals to invest to the common pool, because the first provision point of 12 MUs could not be exceeded alone, and the second provision point of 16 MUs required high investment from both players. One could waste their own investment if the other player did not make a sufficient investment (see Section 5.2 in the SI for more information).

**Expectations about other’s competition and cooperation.** After each competition or cooperation decision, participants were asked about their expectation of their partner’s behaviour (scale 0 to 10). We incentivized these expectations using a simple belief elicitation rule. Specifically, participants earned 5 MUs if they made a correct estimation of their partner’s behaviour. Participants’ payoff from making an estimation $π\_{e}$ equaled 5 when estimation was correct, or 0 when incorrect.

**Behaviours adjusted by expectations.** In the step-level PGG, we also distinguished different types of anticipation of coordination success by summing up an individual’s cooperation and their expectations of their game partner’s cooperation. Specifically, we categorized a given round as *efficient coordination* if the expected sum contribution reached the second provision point (i.e., 16 MUs or more), as *less-efficient* coordination if it only reaches the first provision point (i.e., 12 MUs or more but fewer than 16 MUs), and otherwise as *failed coordination* (i.e., fewer than 12 MUs, see Fig. 3).

In the contest game, we distinguished different types of competition by analysing behavioural deviation from expectations, i.e., subtracting individuals’ expectations of their game partners’ competition from their own competition decisions.Specifically, a given round can be categorized as *underinvested competition* if the deviation of an individual’s competition from expected competition of the opponent was negative (meaning that they anticipated to lose their money), as *tie* if the deviation was equal to zero MU, as *efficient competition* if the deviation was equal to one MU (because an individual could potentially win the contest game with minimal investment, thereby retaining the most remaining resources), and as *less-efficient competition* of the deviation was higher than one MU (because any positive deviations greater than one might ensure a win but reduced the individual’s overall payoff in that round, see Fig. 3).

In the step-level PGG, we distinguished different types of cooperation by analysing behavioural deviation from expectations, i.e., subtracting individuals’ expectations of their game partners’ cooperation from their own cooperation decisions. Specifically, we categorized a given round as *underinvested cooperation* if the deviation of an individual’s own cooperation from expected cooperation of the game partner was negative (meaning that they anticipate to contribute less than their partner), as *conditional cooperation* if the deviation was zero MU (because an individual anticipate that their own level of cooperation matches with their partner’s cooperation in that round), and as *unconditional cooperation* if the deviation was positive (because an individual anticipate to contribute more than their partner, rather than matching their contributions with their partner’s level of cooperation, see Fig. 3).

**Honour values**. Participants were asked to rate ten items assessing their endorsement of two facets of honour values (defence of family reputation: e.g., “*People should not allow others to insult their family*”; self-promotion and retaliation: e.g., “*People always need to show off their power in front of their competitors*”)21,54. Participants rated the same set of items twice: once indicating their personal honour values (“*How much do you agree or disagree with the following statements?*”) and another time indicating their perceived normative honour values, i.e., perception of the extent to which most people in their society would agree or disagree with the items (“*How much would most people in your society agree or disagree with the following statements?*”). The order of these two ratings was counterbalanced across participants. Responses to items were given on a seven-point scale (1 = *strongly disagree* to 7 = *strongly agree* for personal endorsement; 1 = *most people would strongly disagree* to 7 = *most people would strongly agree* for societal perception). Higher scores indicate stronger personal honour values or perceived normative honour values.

**Beliefs in a zero-sum game**. Beliefs in a zero-sum game captures the generalized beliefs about the nature of social relations involving completely conflicting interests55. Previous research has shown that this belief can lead to competition and conflict, and varies across societies and social economic status55,82. To examine whether beliefs in a zero-sum game explain additional variation in competition beyond what could be explained by honour values, we measured this construct by asking participants to indicate the extent to which they agreed with eight statements about their belief that life is conceived as a zero-sum game (e.g., “*The successes of some people are usually the failures of others*”; 1 = strongly disagree to 6 = strongly agree). Higher scores indicate stronger beliefs in a zero-sum game.

**Relational mobility**. Relational mobility is a socio-ecological variable that represents how much freedom and opportunity a society affords individuals to choose and dispose of interpersonal relationships based on personal preference56. Past research has found higher levels of cooperation in societies characterized by more flexible and fluid social relations, as well as among individuals who perceive their environment as offering more opportunities to establish new relationships with strangers16. To examine whether relational mobility explain additional variation in cooperation beyond what could be explained by honour values, we measured this variable by asking participants to state how well 12 statements described the people in the society where they live (e.g., “*It is common for these people to have a conversation with someone they have never met before*”; 1 = *strongly disagree* to 6 = *strongly agree*). Higher scores indicate that people perceive their society to promote open and flexible social relations.

**Demographic information**. Participants were also asked to indicate their age, gender, country of birth, length of stay in the country of data collection, type of environment they mainly lived in (urban, rural, both), ethnic background, religious background, religiosity, education level of parents, and their own subjective social status in the country of residence (SSS)83. All demographic materials were adjusted to the respective country by local collaborators, ensuring that the questions assessed locally meaningful categories (e.g., the category of religious background varies across countries).

**Other societal-level indicators**. The cultural logic of honour has been argued to emerge in harsh, competitive environments characterized by high status inequality and mobility, and historically weak institutions27–29. To operationalize the characteristics of these environments, we selected a set of theoretically relevant societal-level indicators that were retrievable for as many societies in the current study as possible. These included economic indicators (GDP per capita, GNI, human development index, gender inequality), quality of institutions indicators (government effectiveness, rule of law, stability violence, corruption control, corruption perceptions index, market competitiveness), and historical and ecological threats (historical prevalence of infectious disease, world risk index, exposure, vulnerability). Except for the Turkish Cypriot community, these indicators were available for all societies in the current study (see Table S13 for more information about the operationalization of these societal-level indicators).

**Analytic strategy**. For societal-level hypotheses (*H1a*, *H1b*), we applied mixed-effects models in which participants (level 2) and societies (level 3) were included as two random intercepts, and tested societal-level honour as a fixed predictor. For individual-level hypotheses (*H2a*-*3*), we applied mixed-effects models in which participants (level 2) and societies (level 3) were included as two random intercepts to test whether perceived normative values and personal values of honour relate to competition, cooperation or expectations of these behaviours from others. We calculated separate indicators of each facet of perceived normative honour values as well as of personal honour values, and simultaneously included all four individual-level honour indicators as predictors into the mixed-effects model. This approach allowed us to test the roles of perceived normative values and personal values while controlling for one another, as well as to examine how each facet uniquely explained variation in behaviours and expectations. As preregistered, age and participant gender were entered to these models as control variables. We also pre-registered the inclusion of the number (i.e., order) of the randomized game rounds as a control, but were unable to retrieve this information from the Qualtrics survey due to programming constraints. To address this limitation, we instead included the order of the game and gender information of the pairing partner as additional control variables (see Table S1). Gender information of the pairing partner and order of the game were level-1 controls in the models. Individual differences variables (age, participant gender) were level-2 controls. We analysed data with *R* 4.2.184 (*lme4* package85 1.1-35.5). All significance tests were two-tailed.

For multi-item measures of individual-level honour indicators, beliefs in a zero-sum game, and relational mobility, we used observed scores, calculated as unweighted means of the respective scale items. We also generated a societal-level indicator of honour based on mean perceived normative honour values across the two facets for each society, as well as societal-level indicators of beliefs in a zero-sum game and relational mobility, based on the societal means of these variables. To ensure the robustness of our analyses, we also obtained factor scores for honour values at both the between-society and within-society levels using confirmatory factor analysis adjusting for response styles in Mplus 8.1086 (see Section 2 in the SI for more information). Additional analytic strategies used for robustness checks and exploratory purposes were detailed in the Supplementary Information.

**Data availability**

The datasets generated and analysed during the current study are publicly available at https://osf.io/3dscw/.

**Code availability**

The code used to analyse the data is publicly available at https://osf.io/3dscw/. The R code is also provided on the Code Ocean platform (https://doi.org/10.24433/CO.9371203.v1), allowing for a straightforward reproducible run.

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**Author Contributions Statement**

S.J., A.K.U., A.R., and V.L.V. conceived of the project, designed the study and discussed the results. S.J. implemented the study with translation support from R.R.B., M.G.Y., C.H., S.H., K.I., P.K., K.K., E.K., J.M.L., R.M., J.N., S.P., C.P., D.R., M.T., Y.U., and A.K.U., analysed data with inputs from V.L.V. and A.K.H., and wrote the paper with inputs from A.K.U., A.R., V.L.V., A.K.H., R.R.B., S.E.C., M.G.Y., C.H., S.H., K.I., P.K., K.K., E.K., J.M.L., R.M., J.N., S.P., C.P., D.R., M.T., and Y.U. A.K.U. supervised the project. A.R. and V.L.V. contributed equally to this work.

**Competing Interests Statement**

The authors declare no competing interests.

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