



Interpersonal conflicts and third-party mediation in a pastoralist society

Zachary H. Garfield^{a,c,d,*}, Luke Glowacki^{b,c,*}

^a Institute for Advanced Study in Toulouse, Université de Toulouse 1 Capitole, Toulouse, France

^b Department of Anthropology, Boston University, Boston, MA, USA

^c The Omo Valley Research Project, USA

^d Africa Institute for Research in Economics and Social Sciences, Université Mohammed VI Polytechnique, Rabat, Morocco

ARTICLE INFO

Keywords:

Conflicts
Conflict resolution
Third-party mediation
Leadership
Pastoralism
Ethiopia

ABSTRACT

Human societies depend on the ability of their members to coordinate and cooperate with others. Yet, within-group conflict can threaten group stability. This threat is severe among humans due to the scale of our societies and the frequent low levels of relatedness between members. Our ability to resolve inter-individual conflicts is a key aspect of our species' success. Despite the importance of conflict resolution in human sociality, the socio-ecology of how within-group conflicts are resolved in naturalistic settings is underexplored. Using a sample of 160 inter-individual conflicts reported by 81 adults from an agro-pastoralist community in southwest Ethiopia, we identify the primary causes of interpersonal conflict and the features associated with third-party mediation and conflict outcomes. We find that both men and women experience relatively severe inter- and intra-gender conflicts; conflicts between women are more likely to be social in nature, while conflicts between men are more likely to be over resource control. Third-party mediation more often occurs in social conflicts rather than conflicts over material or subsistence resources and in conflicts between clan members and friends. Mediators in conflicts between women tend to be women while mediators for conflicts between men tend to be men. Women, however, are as equally likely as men to help mediate inter-gender conflicts, which suggests an important opportunity for female leadership in this patriarchal society. Although more than 80% of conflicts were resolved, social conflicts are more difficult to resolve than conflicts over resources. Conflict severity, clan membership, and the relationship between those in conflict are associated with severed relationships. These results underscore the importance of third-party mediators and inter-gender interactions in human societies and the importance of socio-economic structures in shaping interpersonal conflicts and their resolution.

1. Introduction

Compared to other mammals, humans exhibit an unparalleled level of cooperation (Fehr & Fischbacher, 2003; Gintis, 2011). Conflicts of interest, however, are an inevitable part of social life. Conflicts can emerge between individuals or groups and are capable of escalating into severe disputes (Ericksen & Horton, 1992; Parker, Royle, & Hartley, 2002; Roscoe, 2009). The success of our large and highly cooperative societies hinges upon our ability to resolve conflicts (Boyd & Richerson, 2009; Glowacki, 2022). As communities expand in size, the frequency of conflicts may escalate due to challenges in communication, including inefficiencies and errors, as well as increased demands for information processing (Johnson, 1982) and increased within-group heterogeneity (Gavrilets, 2015; Hill et al., 2011; Johnson & Earle, 1987). These difficulties can lead to the deterioration and breakdown of cooperative

relationships, posing a threat to the viability of the social group. Maintaining human cooperation necessitates the resolution of conflicts and the restoration of cooperative relationships, whether through the efforts of the parties in conflict, third-party intervention, or social institutions (Fitouchi & Singh, 2022; Garfield, Syme, & Hagen, 2020; Singh & Garfield, 2022; Wiessner, 2019). Despite the vital role of conflict resolution in sustaining human cooperation, the mechanisms of conflict mediation and the factors shaping the emergence of conflict mediators remain underexplored. While previous studies conducted among rural, politically acephalous communities have examined the characteristics of conflict mediators, such as their social or physical capital (Glowacki & von Rueden, 2015) and the institutionalization of intra-group conflict resolution through leadership (von Rueden, Gurven, Kaplan, & Stieglitz, 2014), they have not explicitly addressed conflict outcomes. Field research and cross-cultural studies have also explored the nature of

* Corresponding authors at: The Omo Valley Research Project, USA.

E-mail addresses: zachary.garfield@um6p.ma (Z.H. Garfield), laglow@bu.edu (L. Glowacki).

<https://doi.org/10.1016/j.evolhumbehav.2023.10.003>

Received 29 July 2022; Received in revised form 16 July 2023; Accepted 28 October 2023

Available online 8 November 2023

1090-5138/© 2023 Elsevier Inc. All rights reserved.

conflicts requiring mediation and the influence of socioecological factors on variation in conflict mediation (Garfield & Hagen, 2020; Redhead & Von Rueden, 2021; Wiessner, 2019), but they have not investigated the impact of inter and intra-gender dynamics on third-party mediation. Furthermore, empirical data on conflicts and mediation among politically acephalous, nonindustrial societies are limited.

Conflicts, whether experienced directly between individuals, indirectly through a social partner, or in mediating the conflicts of others, are an inevitable feature of social life (Boehm, 1982; Trivers, 1974). Given the pervasiveness of interpersonal conflicts and our universal ability to resolve them, conflict resolution is also likely a fundamental feature of human societies (Garfield et al., 2020). However, the underlying mechanisms driving variation in the socio-ecology of inter-individual conflicts and their mediation remain unclear. Addressing these questions can provide valuable insights into how human cooperation is maintained amid recurrent inter-individual conflicts.

1.1. Social and economic drivers of conflict

Interactions between individuals are not random and, as a result, inter-individual conflicts are often non-random as well. Demographic factors, residency patterns, social structures, geography, and economic strategies all contribute to systematic patterns of interaction. Although human family systems exhibit substantial variability (Sear, 2021), the family unit is universal across human societies (Brown, 1991; Walker, Hill, Flinn, & Ellsworth, 2011). Marriage and family practices shape household compositions and can both exacerbate and alleviate inter-individual conflicts. In approximately 85% of documented societies, men are allowed to marry multiple wives (White, 1988). Polygyny, prevalent among East African pastoralists, serves as a means for men to enhance their social status, forge alliances, and accumulate wealth through livestock ownership (Fratkin, 2001; Fratkin, Galvin, & Roth, 1994; Boserup (2007)). Polygyny, however, also intensifies conflicts within groups. Competition among co-wives, reduced relatedness within households, increased spousal jealousy due to diminished paternity certainty, and larger age gaps between spouses are suggested to drive heightened conflict potentials (Henrich, Boyd, & Richerson, 2012). In the context of high rates of polygyny, we can expect increased rates of conflicts between co-wives and their social partners, between unmarried men of similar age and social statuses, and between half-siblings sharing a common biological father but residing in different households.

Economic systems introduce specializations and opportunities for divisions of labor and roles, but they also create new avenues for inter-individual conflict (Bliege-Bird, 1999; Gurven, Winking, Kaplan, von Rueden, & McAllister, 2009). Greater diversification in livelihoods and increased integration of economic and social systems can alter the causes of conflicts experienced by individuals, thereby impacting their nature and potential for resolution. Two significant shifts in economic systems throughout human evolution and among many contemporary rural populations involve increased property ownership (such as domesticated livestock and land ownership) and market integration (involving material wealth and money). In contexts characterized by heightened wealth inequality, conflicts over critical resources tend to be more prevalent, while more economically egalitarian societies may experience a higher incidence of social conflicts (Levine, 1961).

1.2. Social structures and conflict resolution

Despite the ever-present threat of interpersonal conflict, humans possess remarkable abilities in resolving conflicts. Biological or affinal kinship can create incentives for cooperation and align the interests of individuals (Hames, 2015). Friendships establish reciprocal patterns of investment, reducing negative socioemotional states (Hruschka, 2010). Cross-cutting sodalities and clan structures formalize membership and social ties, extending familial commitments, expectations, and norms to a broader range of individuals (Glowacki, 2020). Third-party actors also

play a crucial role in conflict resolution by facilitating coordination between disputing parties (Boyd & Mathew, 2021; Marlowe et al., 2008; Singh & Garfield, 2022; Wiessner, 2019). While women generally have less social and political influence compared to men across human societies (Low, 1992), older post-menopausal women often emerge as influential local political actors. Leveraging their social and family networks, they assume leadership positions and aid in resolving conflicts within groups (Brown & Kerns, 1985; Garfield, von Rueden and Hagen, 2019). In more gender egalitarian societies, women play an active role in conflict mediation, surpassing their counterparts in more gender-stratified societies. Among the Conambo horticulturalists in Ecuador, women serve as mediators in within-group conflicts, and their involvement enhances the status of men through their wives' participation (Bowser & Patton, 2010). Ethnographic evidence suggests that women mediators may be preferred in more egalitarian communities due to their lower likelihood of escalating conflicts, making them more effective at helping individuals find resolution (Garfield & Hagen, 2020; Lewis, 2014; von Rueden, Alami, Kaplan, & Gurven, 2018). Given women's lower propensity for physical aggression compared to men (Archer, 2004), their involvement can be advantageous in conflict situations where the potential for escalating violence is high.

Understanding how humans resolve interpersonal conflicts is a critical aspect of unraveling the processes that underpin human sociality. Particularly valuable are insights from conflict resolution within politically autonomous and decentralized societies lacking state-based dispute resolution mechanisms. Such societies provide glimpses into the social and cultural processes that have enabled our species' success, considering that much of human evolutionary history unfolded in similar socioecological contexts (Boehm, 1999; Singh & Glowacki, 2022). While no contemporary or ethnographically described politically acephalous, rural community provides a direct analogue to ancestral human societies, empirical data from such communities are invaluable in examining the intricate interplay between culture and psychology in the absence of formal political and state-based institutions. To gain a deeper understanding of the nature of interpersonal conflicts and their resolution, we conducted individual and focus group interviews with members of a subsistence-based community, exploring recent in-group conflicts. Our interviews focused on identifying conflict causes, antagonists, and delving into gender dynamics and the role of third-party mediators.

1.3. Ethnographic setting

The Hamar are a semi-autonomous ethnolinguistic group residing in the South Omo Zone of southwest Ethiopia (Petrollino, 2017; Yitbarek, 2020). The majority of Hamar individuals, around 97%, continue to live as rural agro-pastoralists in clusters of rural settlements (Calvert, 2016; Strecker, Lydall, & Baxter, 1984; Wondimu & Woldesemayat, 2020). There is substantial variation among rural Hamar communities today in terms of ecology, demographics, and integration with markets, however, many still uphold and are strongly influenced by traditional social structures and cultural practices (Dubosson, Clack, & Brittain, 2018).

Hamar settlements span both highland and lowland ecologies. The number of households they contain range from a few to over 100, and the spatial arrangement of houses within a settlements varies. Some communities are located closer to market towns, leading to more frequent interactions with tourists as well as governmental and non-governmental organizations. Today, very serious conflicts or legal infractions, such as murder, are likely to involve local police in more market-integrated communities.

Households are organized around a *dónza*, which means something equivalent to a 'competent married man.' These men have attained specific ritual statuses and are recognized as competent, knowledgeable, and productive members of their communities. They actively participate in local political decision-making and generally have a disproportionate influence in the community. They are also economically independent

and have the right to develop their own herds and agricultural lands. Individual households, headed by a *dónza* are associated with other households in close proximity within a cluster of houses called a *zarsi*. A *zarsi* functions collectively and its members can coalesce as needed for higher-order community decision-making and coordination. A *zarsi* may include multiple settlements or hamlets, known as *gurdá*.

Beyond the local settlements, the Hamar are organized into *mulda*, which are groups of close kin that function collectively in ritual contexts and facilitate marriages. *Muldas* are further grouped into *gertamó*, which are patrilineal clans that link individuals across wider geographic ranges, irrespective of their household or settlement (see [Strecker, 1976](#)). In rural Hamar communities, most collective decision-making beyond the household occurs at the *zarsi* level—a group of closely linked households forming a micro-community within a larger network of communities. Each *zarsi* is embedded within other cross-cutting socialities, such as age-sets and ritual statuses, which, although culturally significant, have less influence in regulating daily life.

The current study was conducted within a rural Hamar community consisting of one *zarsi* with two *gurdá* (settlements or hamlets). At the time of data collection, this community had approximately 177 adult residents and 84 households. It was located approximately 11 km away from the nearest market town, which was about a two-hour walk. This community exhibited limited market integration, with minimal engagement in wage labor and reliance on market-purchased foods, and essentially no exposure to formal education or culturally exogenous religious institutions.

2. Methods

2.1. Data collection procedures

Data were collected between January and March 2022. All study materials were reviewed and approved by the IAST Review Board for Ethical Standards in Research. Study design and goals were introduced to and approved by local community elders and leaders. Informed consent was obtained at the community and individual levels. We recruited a convenience sample of 99 adults for interviews about conflicts between adult members of the community, attempting to recruit all adult community members. Of these individuals, 18 (12 women, 6 men) either declined to participate or could not recall instances of conflict among community members, resulting in 81 individuals reporting on conflicts (47 women and 48 men; mean estimated age = 33, SD = 12.7, range = 17–72.5).

2.1.1. Inter-individual conflict reports

Participants completed a structured “conflict survey” which also included free-response prompts, designed to collect retrospective information on conflicts they were familiar with between members of their community. The survey was administered orally in the Hamar language, having been translated to Hamar from English collaboratively by two native Hamar speakers who are also proficient in English. Responses were translated orally to English at the point of data collection. The conflict survey asked about conflicts, disagreements, or quarrels (*waché* or *uurí*) within three categories: conflicts they had with another community member (first-person), conflicts between other community members they knew about (second-hand), and conflicts they had helped mediate between other community members (i.e., as third-party mediator). Here, community members were defined as individuals residing within either of two adjacent villages (*gurdá*) within the same *zarsi*. Participants were asked to report on up to two conflicts within each of these three categories. We did not provide participants with a time frame from which to limit their recalls. For each conflict reported, we asked participants to describe the situation and the cause, as well as the individuals involved and their relationship to each other (biological or affinal kin, friends, or other unrelated community members), and their gender. We also asked if a third-party helped mediate the conflict, who

the third-party was, if the conflict was resolved, and if the individuals have a positive social relationship after the conflict (essentially, “do they get along today?”). We also asked participants about the severity of each conflict they reported and asked them to rate each as either minor, moderate, or more severe compared to most conflicts. For the last prompt, we asked participants if they had since recalled any other additional conflict, they wanted to report.

Based on participant’s free responses on the causes of conflict, we coded 22 unique sources of conflict (developed post-hoc after reviewing all responses) and grouped the sources of conflict in three *cause type* categories: social conflicts, subsistence resource conflicts, and material resource (i.e., non-subsistence) conflicts (See [Fig. 1](#)). Demographic census data were used to confirm and supplement participant-reported data on inter-individual relationships as well as to provide data on the clans of individuals mentioned in conflict reports.

2.1.2. Ethnographic data collection

We additionally conducted two focus group interviews, one composed of five women, and one composed of eight men, each of which included a mix of elders, middle-age, and younger adults. Focus group interviews were conducted in the Hamar language and recorded. Oral translation to English was provided at the point of data collection and translators provided additional translations using recordings following interviews. Focus group interviews included questions about the causes and nature of social conflict, and how they are typically resolved. Focus group interviews were conducted after all conflict report interviews were completed.

2.2. Study aims and analytic strategy

We organize our approach around three complimentary aims. First, we described the causes of conflicts in this community, their type, and the relationship between inter-individual conflict and gender dynamics. Second, we identify the features of individuals and conflicts predictive of third-party mediation and the gender of third-party mediators. Finally, we then identify which of these same features predict conflict outcomes, specifically when conflicts go unresolved and when conflicts lead to severed relationships.

We rely on descriptive statistics to identify the frequency of types of conflicts reported and how conflict types relate to the gender of individuals in conflict. We use Bayesian multi-level logistic regression to identify predictors of 1) when conflicts involved third-party mediation, 2) the gender of third-party mediators, 3) when conflicts were unsuccessfully resolved, and 4) when individuals in conflict severed/failed to develop positive post-conflict social relationships. Bayesian models employed an index variable approach for categorical predictors and non-centered parameterization for group-level coefficients of binary outcomes ([McElreath, 2020](#)), including random effects for participants to account for multiple reports per participant. Models were fit using RStan ([Carpenter et al., 2017](#)) and the CmdStan package ([Gabry & Češnovar, 2021](#)), which fits Bayesian models using Hamiltonian Markov Chain Monte Carlo. Markov chain convergence was assessed using standard diagnostics (number of effective samples, the Gelman-Rubin diagnostic, and visual inspection of trace plots). Following [McElreath \(2020\)](#), we compute the expected difference (contrasts) between levels j within categorical predictors k by subtracting the two posterior distributions (e.g., $\text{posterior}_{k,j_1} - \text{posterior}_{k,j_2}$) and interpret the 90% intervals of contrast distributions which do not include 0 as meaningful differences between levels within categorical predictors (reporting mean differences of two distributions, $\Delta\hat{\beta}$, and their lower and upper 90% credible intervals, LCI and UCI). We follow [Chen, Cohen, and Chen \(2010\)](#) in interpreting effect sizes of these distribution differences, i.e., log odds = 0.51, 1.23, and 1.90 are equivalent to Cohen’s $d = 0.2$ (small), 0.5 (medium), and 0.8 (large). See the SI for additional details.

To account for missing observations (139 observations within the

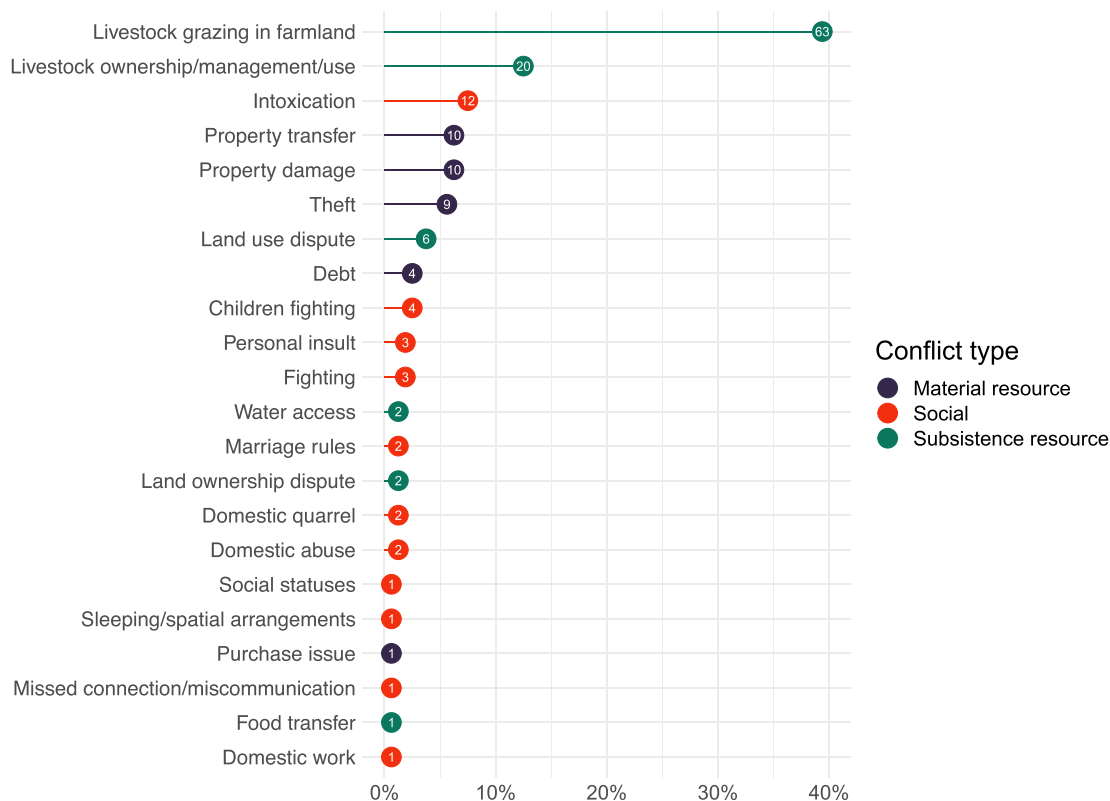


Fig. 1. Frequencies of causes of conflict by cause type. Count of types represented in points with x-axis representing the percentage of all reported conflicts.

160 × 9 matrix), we performed multiple imputation using the mice R package (Van Buuren & Groothuis-Oudshoorn, 2011), generating $m = 10$ fully imputed datasets, where all other variables are used as predictors of missing values (Bartlett, Frost, & Carpenter, 2011). Uncertainty in the missing values was retained by averaging over these 10 fully imputed datasets during model fitting. See the SI for details on imputed values.

All analyses were conducted with R version 4.2.2 (2022–10–31) and any additional packages used are cited in the SI (<https://osf.io/t2x85/>). Data available via the *hamarconflictdata* R package (Garfield & Glowacki, 2022).

Lastly, we contextualize quantitative results by developing qualitative insights from focus group interviews and participants' free responses on conflicts and their outcomes.

3. Results

3.1. Towards a cultural model of conflict and resolution within Hamar communities: qualitative insights

First, we summarize qualitative data from our two focus group interviews, also drawing on themes offered in open responses during interviews. These descriptions provide an emic view of conflict and resolution in this Hamar community, allowing residents to offer their perspective on the causes and nature of social conflict and how they are typically resolved. Note, the cultural model developed here may diverge from interpretations of our quantitative results, a point to which we return in the conclusion.

3.1.1. Causes of conflicts

In the focus group interview among women, participants explained that the most common conflicts in their community are due to livestock entering in agricultural fields. In these cases, the field owner will often confront the livestock owner, telling them they need to be more careful

and questioning them as to why they failed to appropriately control their livestock. Often, the owner will then explain they were unaware that livestock has entered a field, and it was their mistake. Conflicts are more severe when animals excessively graze on young sorghum or maize sprouts. In such cases, the people may argue aggressively and harass each other and their friendship or social relationship may end. A key feature of Hamar social life is drinking *bunno*, a drink made from coffee berry shells. An indicator of a positive (or at least neutral) social relationship is if two parties drink *bunno* together. When describing the nature of a social relationships between individuals, informants (in focus groups and in open-ended responses during conflict surveys) often made comments such as, “yes they get along today, they drink *bunno* together regularly” or, “no they could not settle the dispute, still they are not drinking *bunno* together.” Women also explained that in the case of severe conflicts, someone will often get involved to help mediate telling the disputants that mistakes related to animal behavior are bound to happen and the individuals at fault should not be criticized so heavily.

Women also suggested that conflicts between men most often concern livestock. A common example is when a man has not built a strong enough fence around his field and grazing animals are able to easily enter his agricultural land. In these cases, if the field owner attempts to blame the livestock owner for the behavior of their animals the livestock owner can explain that the field owner has not appropriately protected his land. These sorts of disagreements are likely to lead to more severe conflicts. Women also claimed that conflicts between spouses over livestock are common.¹ When the husband has traveled away from the village the wife manages the livestock kept at the homestead. Sometimes a woman will delegate to children to watch

¹ Our quantitative data on conflicts only includes one conflict between spouses (i.e., between affinal kin). This was a “domestic quarrel” (i.e., social dispute), in which the husband was very critical of the wife’s propensity to invite people into the home, and which they had recently fought about.

livestock while she is focused on other tasks. If an animal is lost or killed by predators or is grazing in someone's field, the husband will blame the wife, and the wife will blame the children. The couple may fight over the appropriate accountability. Hamar women also suggested that when women have conflicts with other women, it is most often over property damage or misuse. Women often share material goods, such as water cans or calabash or other household items. If they are broken while being borrowed, women will often fight over the appropriate compensation.

Men explained that the three most common causes of conflict they experience are conflicts over livestock, over fields and territory, and over issues related to the behavior of children. If an animal is feeding in a field, then the animal owner and the field owner may be in conflict over the potential or actual property damage and debate who is at fault. Also, if someone charged with guarding or herding livestock loses an animal, they may disagree with the owner over responsibility or compensation. Similarly, in the fields, someone in charge of watching the field might fall asleep and allow a donkey or other animal to feed on crops. Children are often given the task of watching animals, but they can make mistakes which can bring disagreements with the adult owners. In these cases, if the children insult the adult, the disagreement can become a more severe conflict. Men suggested conflicts over livestock are often easily resolved, if someone intervenes to help and explains that these types of conflicts are common, are likely to happen again, and are not worth fighting over.

3.1.2. Intra- and inter-familial conflicts

Women explained that within families, conflicts most often arise due to disagreements about sharing or lack thereof, or disagreement about property use. These sorts of conflicts can be more severe among family members compared to unrelated individuals. Among unrelated individuals in similar situations, individuals are more likely to easily resolve the issue through civil discussions without escalating into conflicts. Sometimes though, a third party will get involved and help mediate minor disagreements before they become severe conflicts. Conflicts between family members do not typically require elders or third-party mediators to get involved. In these cases, family members may have a disagreement or argument, they can discuss the problem and simply leave the conflict after discussion. Conflicts between unrelated neighbors however, for example related to property issues, problems with livestock, or forced marriage abductions, will often require third-party involvement by mediators or elders. In many cases the person at fault will be required to pay restitution to the victim or do something to compensate for their transgressions. Most of the time these sorts of conflicts are between men and can involve aggression or physical fighting. There are strong norms against insulting family members, especially parents. If people do this, they can be sanctioned, including having to provide a goat for slaughter for the community.

3.1.3. Conflict mediation and leadership

Hamar women suggested that third-party mediation is most common for conflicts related to livestock, particularly when livestock are grazing in farmland. Elders may get involved in conflicts concerning animals if the disputants cannot come to a resolution on their own after a few days. In these cases, one of the disputants will consult an elder to come to their defense. Elders will typically advise the disputants that each party needs to understand their mistake and take better care to avoid them in the future. Once discussions have concluded and the individuals in conflict agree to accept their share of fault and move forward, the elder will put a small amount of tobacco in the hand of each individual and they will shake hands, symbolizing and end to the disagreement.

According to Hamar men, third-party mediators are most likely to intervene in the case of very severe conflicts, conflicts involving physical aggression, or if someone removes their knife from their sheath. In these cases, a third party will arrange to meet with the elders of the community to discuss the problem and find a solution. Both disputants will

attend the meeting with the elders. The person who removed their knife, hit the other person the most, or was most heavily involved in the fight will often be required to slaughter a goat for the community and both people in conflict will shake hands with goat blood on their hands, to symbolize resolution of the conflict.

Men also suggested that individuals can typically resolve minor conflicts on their own and will simply exchange tobacco as a symbol of resolution without the involvement of elders. If an elder happens to be around when there is a disagreement or quarrel, they will often intervene. The most severe conflicts, according to Hamar men, always require third-party mediation for their resolution. Third-party mediators will most often be "bond friends," (*aanamo* in Hamar) a special type of institutionalized friendship, of the people in conflict, and when people have a conflict, each disputant may request a bond friend help them to resolve the issue. The bond friends will then collect details and consult elders or perhaps an uncle of one of the people in conflict. The elders will often collectively determine the punishment or restitution. For example, men who attempt to forcefully abduct a bride without consent or who commit rape—serious norm violations that often lead to severe conflicts—will be made to pay a cow to the community or the family of the girl by a third-party mediator or by a council of elders.

3.2. The causes and contexts of inter-individual conflict: quantitative results

From the sample of 81 participants reporting conflicts, the median count of conflicts reported per participant was 2 (mean = 2.1) for a total of 170 conflict reports (each participant was given the opportunity to report a maximum of six conflicts). Of these reports, 16 described the same conflict as another report: on two occasions a particular conflict was reported twice and on four occasions a conflict was reported on three times, totaling six conflicts which were together reported 16 times. Therefore, our data capture 160 unique conflicts. Our data include only reports on these 160 unique conflicts. In selecting among multiple reports on the same conflict we prioritized first-person reports or the most complete report. The final data set includes 73 first-person reports, 75 second-hand reports, and 12 reports by the third-party mediator. When data were available ($n = 149$), 54% of the conflicts were reported to have occurred within the past six months, 21% within six months to one year ago, and 19% more than a year ago.

Of the 160 unique conflicts reported, 94 were over subsistence resources, 34 over material resources (non-subsistence), and 32 the results of a social dispute (social conflicts). Fig. 1 plots the frequency of reports for each of the 22 reported conflict causes by type. Conflicts related to livestock grazing in someone's field was the most reported cause type by far ($n = 63$, 39.3% of all reported conflicts). Including other conflicts related to livestock ownership specifically, including management and use, livestock related incidents account for 51.8% of all reported conflicts.

Most commonly conflicts were between unrelated community members ($n = 58$, 38%), however conflicts between affinal kin ($n = 44$, 29%) and biological kin ($n = 42$, 27%) were also common. Similarly, most conflicts occurred between members of different clans ($n = 83$, 74%). Conflict between friends ($n = 10$, 6.5%) were relatively less frequent.

Conflicts within and between genders were relatively balanced and included 58 male-male conflicts, 54 female-female conflicts, and 48 female-male conflicts.

Within each gender-type category, conflict cause types varied. Conflicts between women were more likely to be about social and material resource disputes, whereas conflicts between men and inter-gender conflicts were more likely to be subsistence related conflicts (Fig. 2, Table S1).

3.2.1. When third parties help mediate conflicts

Over half of conflicts involved third-party mediation ($n = 85$, 53%).

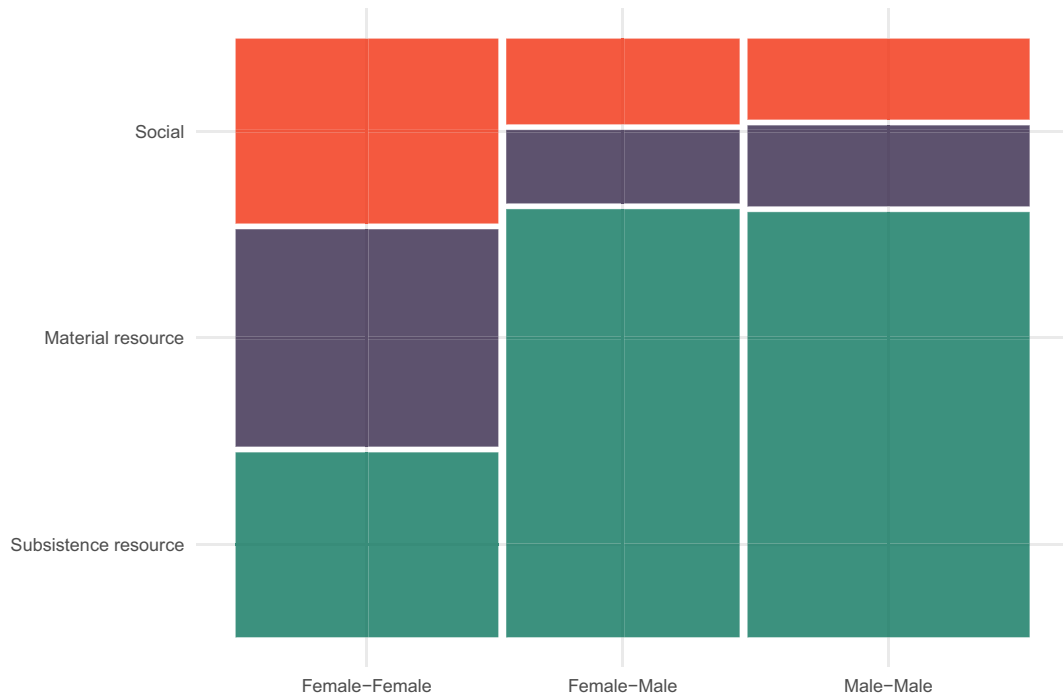


Fig. 2. Mosaic plot of conflict reports by cause type and gender of individuals in conflict. The area of the bars is proportional to the count of conflict reports in that category. See Table S1 for count data.

To assess when third parties were involved in conflict resolution, we used the measure of third-party involvement (*yes* = 1, *no* = 0) as an outcome predicted by *Cause*, *Clan relationship*, *Gender*, *Relationship*, and *Severity* in a Bayesian multi-level logistic regression model (as described in the Methods and discussed in the SI). Fig. 3A plots posterior distributions and 90% credible intervals (CI) for each level of the categorical

predictors.

Holding other measures constant, there was a medium effect of social conflicts being more likely to be associated with third-party mediation compared to conflicts over subsistence resources ($\Delta\hat{\beta} = 1.5$, LCI 0.592, UCI 2.81), there was a small effect of conflicts within clan being likely to involve third-party mediation compared to conflicts between clan ($\Delta\hat{\beta} =$

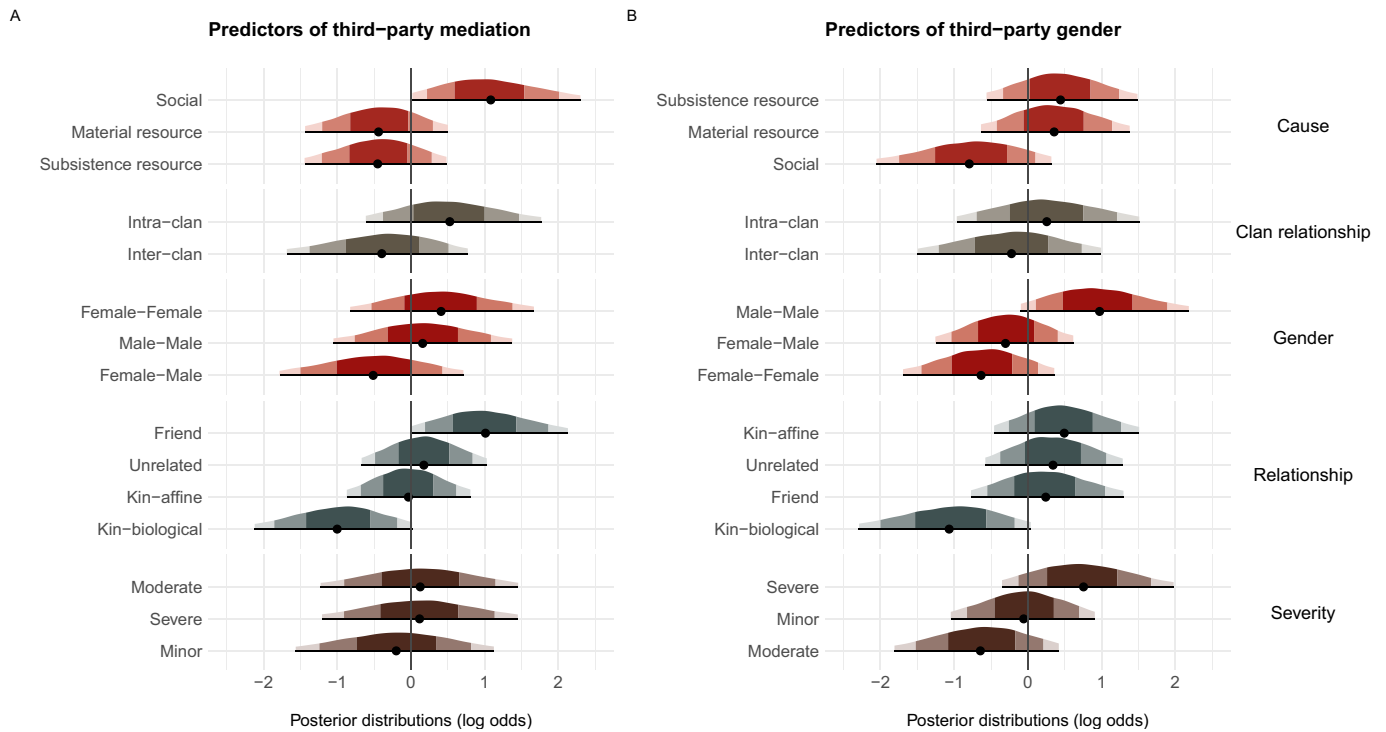


Fig. 3. Posterior distributions in log odds of coefficients from categorical-level predictors of the probability that a third-party was involved in resolving the conflict (A) and third-party gender (B). Points and error bars are posterior means with 90% credible intervals. The shaded areas and distributions respectively represent 50, 80 and 90% of the posterior distributions. B: For third-party gender outcome male = 1, female = 0.

0.92, LCI 0.202, UCI 2.25), as well as for conflicts between friends compared to conflicts between biological kin ($\Delta\hat{\beta} = 0.84$, LCI 1.35, UCI 2.53). There was also a small effect of third-party mediation being more likely for more severe (and moderate) conflicts compared to minor ones ($\Delta\hat{\beta} = 0.33$, LCI -1.36, UCI 2.04).

More men than women were reported as third-party conflict mediators (43 men, 31 women). To determine the features of socioecology most predictive of conflict mediation by women or men, we used the same modeling approach described above for a subset of the data when conflicts involved third parties with mediator gender as the outcome (*male* = 1, *female* = 0).

Fig. 3B similarly plots posterior distributions for each level of the categorical predictors predicting the presence of a male (compared to female) third-party mediator. Men were more likely to mediate male-male conflicts and women were more likely to mediate female-female conflicts ($\Delta\hat{\beta} = 1.6$, LCI 0.601, UCI 3.06). Also, men were more likely than women to mediate male-male conflicts compared to female-male conflicts (contrast between *Male-Male* and *Female-Male*: $\Delta\hat{\beta} = 1.3$, LCI 0.472, UCI 2.43; contrast between *Female-Female* and *Female-Male*: $\Delta\hat{\beta} = 0.33$, LCI 0.0588, UCI 0.757). The posterior mean for *Female-Male* conflicts predicting the gender of the third-party mediator was $\hat{\beta} = -0.3$ (LCI -1.22, UCI 0.593), suggesting women and men are equally likely to be involved as third-party mediators in inter-gender conflicts.

Women were also more likely than men to be involved in the mediation of social conflicts compared to conflicts over resources ($\Delta\hat{\beta} = 1.2$, LCI 0.301, UCI 2.48), conflicts between biological kin (compared to all other relationship types, *Kin-biological* - *Friend* contrast: $\Delta\hat{\beta} = 1.3$, LCI 0.305, UCI 2.73), and in the mediation of moderate conflicts compared to severe conflicts ($\Delta\hat{\beta} = 1.4$, LCI 0.383, UCI 2.92).

3.2.2. The outcomes of conflict

Although most conflicts are resolved (*n* = 128, 81%), in some cases conflicts go unresolved, potentially inhibiting positive social

relationships, i.e., friendships. Of the 147 conflicts where data were available, 27 (18%) resulted in the individuals severing or avoiding a positive social relationship. We used the same modeling approach described above to discover the predictors of unresolved conflicts and severed social relationships – outcomes which stand to undermine cooperative relationships and group cohesion. Here, we additionally include third-party mediation as a predictor (*yes* = 1, *no* = 0).

Fig. 4A plots posterior distributions for each level of the categorical predictors predicting unresolved conflicts. Holding other measures constant, social conflicts were more likely to go unresolved than conflicts over resources (*Social* - *Subsistence resource* contrast: $\Delta\hat{\beta} = 2$, LCI 0.848, UCI 3.34). Conflicts within gender were also more likely to go unresolved compared to inter-gender conflicts (*Female-Male* - *Male-Male* contrast: $\Delta\hat{\beta} = 1.6$, LCI 0.494, UCI 2.98), as were conflicts between biological kin (*Kin-biological* - *Unrelated* contrast: $\Delta\hat{\beta} = 1.3$, LCI 0.488, UCI 2.46). Severe conflicts were more likely to go unresolved compared to moderate conflicts ($\Delta\hat{\beta} = 2.1$, LCI 0.911, UCI 3.42), however minor conflicts were also more likely to go unresolved than moderate ones ($\Delta\hat{\beta} = 1.9$, LCI 0.824, UCI 3.25). Lastly, the involvement of a third-party mediator was strongly associated with the resolution of conflicts ($\Delta\hat{\beta} = 2$, LCI 0.679, UCI 3.59).

Fig. 4B similarly plots posterior distributions for each level of the categorical predictors predicting if the parties in conflict severed (or failed to develop) a positive social relationship following the conflict. Holding other measures constant, again, social conflicts compared to conflicts over resources were more likely to predict severed relationships (*Social* - *Subsistence resource* contrast: $\Delta\hat{\beta} = 2$, LCI 0.979, UCI 3.33) as were conflicts between men compared to inter-gender conflicts ($\Delta\hat{\beta} = 1.5$, LCI 0.525, UCI 2.9). Relationships between friends were more robust to conflict compared to other relationship types (*Friend* - *Unrelated* contrast: $\Delta\hat{\beta} = 1.7$, LCI 0.696, UCI 2.85) and conflicts between affinal kin were more likely to lead to severed relationships compared to conflicts between biological kin ($\Delta\hat{\beta} = 0.66$, LCI 0.234, UCI 1.34).

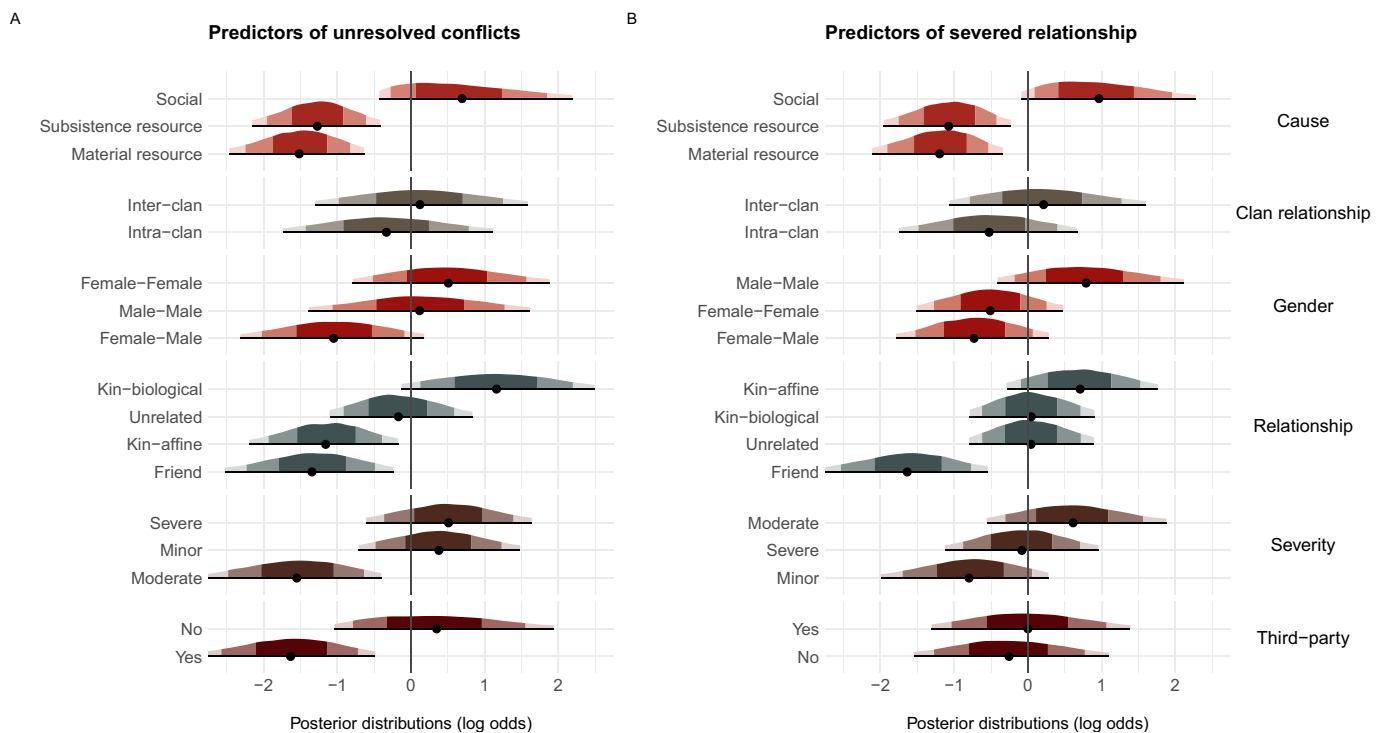


Fig. 4. Posterior distributions in log odds of coefficients from categorical-level predictors of the probability of unresolved conflicts (A) and severed relationships (B). Points and error bars are posterior means with 90% credible intervals. The shaded areas and distributions respectively represent 50, 80 and 90% of the posterior distributions.

Moderate conflicts predicted severed relationships compared to minor conflicts ($\Delta\hat{\beta} = 0.72$, LCI 0.085, UCI 1.74) and there was no effect of the involvement of a third-party mediator.

4. Discussion

Inter-individual conflicts are an inevitable feature of social living within and between levels of social organization (Roscoe, 2009; Steward, 1938; Trivers, 1974). Humans, like many social species, are endowed with both physiological and behavioral traits which facilitate conflict avoidance and/or resolution. Capacities to assess inter-individual variation in formidability or coalitional strength (Pietraszewski, 2016; Scalise Sugiyama, Mendoza, & Sugiyama, 2021; Sell et al., 2009), structured dominance hierarchies (Chen Zeng, Cheng, & Henrich, 2022; Tiger, 1970), and other social structures (Garfield, 2021; Glowacki, 2020) can all function to inhibit the emergence of conflict or facilitate resolution among those in conflict. These capacities, however, are not a panacea for inter-individual conflict. In our data, 54% of reported conflicts involved a third-party mediator. This result is strikingly consistent with results from similar data from politically autonomous, subsistence-based societies. von Rueden (2022) found among Tsimane horticulturalists in the Bolivian Amazon across four villages (and seven sampling waves), self-reported conflicts (by men) involved a third-party mediator 56% of the time, on average (SD = 5.03). Similarly, Singh and Garfield (2022) found among Mentawai horticulturalists in Indonesia across 217 cases of inter-individual disputes, 49.8% involved third-party mediation, whereas the remainder were resolved between the disputants. Taken together, these findings – which rely on divergent methods (i.e., self-report, peer-report, observation) and stem from culturally and ecologically diverse communities (i.e., agro-pastoralists in Ethiopia, forager-horticulturalists in the Amazon, horticulturalists in Indonesia) – suggest that about half of inter-individual conflicts elicit the intervention of a third-party mediator.

Pastoralists, however, face unique challenges. The social, cultural, and economic lives of pastoralists are heavily influenced by their subsistence regime (which includes livestock, agriculture, and hunting and gathering) and their associated socio-cultural structures such as age-sets, ritual statuses, and kinship systems. Our data suggest livestock and subsistence related conflicts are the most common conflicts in this Hamar community, and we hypothesize this trend is broadly generalizable across rural Hamar communities and across other East African pastoralists. Quantitative results revealed that conflicts among women, however, are more likely to concern social disputes, even though in focus groups women emphasized conflicts over cattle are most common. The demarcation and formalization of private property, such as livestock and land, creates novel opportunities for conflict. We expect a shift towards more conflicts over resource control and private property characterizes economic transitions from foraging to greater subsistence intensification. For example, among the Tsimane conflicts over land were the most common reported between men accounting for 30.5% of all reported conflicts (Redhead & Von Rueden, 2021). Conflict mediation was more concentrated in the most politically influential men and in denser more market-integrated communities relative to more market-distant, less densely settled communities (von Rueden, 2022). Our results on male-male conflicts being biased towards livestock and resource control and the emphasis on conflicts of livestock which emerged in focus group interviews are consistent with results from Redhead and Von Rueden (2021) (Fig. 2). Future work will explore the influence status and network dynamics in shaping conflict and mediation patterns among the Hamar.

Although common, conflicts over subsistence resources are often not severe. Of the 94 reported subsistence related conflicts, only 48% were reported to be severe conflicts. Livestock grazing in an agricultural plot can be devastating, but such conflicts are not especially severe, nor are they more likely to involve third parties (Fig. 3) or be associated with

negative social relationships (Fig. 4). We are uncertain why subsistence-based conflicts are not usually severe, despite being potentially devastating. We speculate that the responsibilities of monitoring livestock and protecting fields with thorn fences places culpability on both parties and the unpredictable nature of livestock behavior means such conflicts can occur haphazardly. Alternatively, there may be stronger norms regarding resolution of subsistence-based conflicts due to their potential importance. Future work should investigate the factors that lead to the resolution of potentially devastating subsistence-based conflicts.

Social structures and relatedness may interact with conflict severity in influencing the likelihood of conflict mediation. Focus group participants suggested family members may more easily get in more intense conflicts. Our quantitative results suggested, however, third-party mediation was associated with social conflicts and between members of the same clan and between friends. Similarly, quantitative results implicated severe, social conflicts between members of different clans as more likely to go unresolved and conflicts between members of different clans and between affinal kin as more likely to end social relationships. One interpretation of this discrepancy between qualitative and quantitative results is that severe conflicts within kin groups may be more salient and given involvement of third-party mediators, therefore more likely to be the subject of gossip within communities.

We also identified differences in intra-gender conflicts. In Hamar society women do not typically own livestock, although they may be responsible (and held responsible) for the livestock of their household, and therefore are sometimes involved in livestock related conflicts. Nonetheless, most conflicts between women were social conflicts. There is a large gender-bias in most Hamar communities, given that many young men spend long periods of time (up to many years) away at cattle camps. Our census data reflect this pattern (all adult community members surveyed included 104 women and 73 men) and the absent men tend to be those between the ages of 20 and 40. We suspect community demographics and gendered divisions of labor may play a strong role in facilitating social conflicts between women. Based on our time in Hamar communities we have observed that women are the ones most involved in daily activities which involve interacting with many other community members. That is, their lives are simply more social. They share tools and other essential goods between houses, fetch firewood and water daily, travel to markets, and monitor fields. The older men in the community tend to live a more “retired” lifestyle, having already accomplished their primary economic productivity as younger men when they were away at the cattle camps for, potentially, many years of their lives. It seems, therefore, that the gendered division of labor increases women’s opportunity for socializing more broadly with their local communities. In other other subsistence-based and more “egalitarian” societies the opposite has been suggested, i.e., men travel more and are more socially active within and between communities (e.g., Dahlberg, 1981; Draper, 1975; Garfield & Hagen, 2020; von Rueden et al., 2018; von Rueden et al., 2014).

Hamar society is patriarchal and gerontocratic (Calvert, 2016). Women have much less opportunity to own property, have less decision-making autonomy, have less mobility, and have less material wealth compared to men (Thubauville & Gabbert, 2014; also based on our ethnographic experience and unpublished data). However, we found women are often involved in conflict resolution, and conflicts among women are likely to be resolved by women. Women are also involved in resolving inter-gender conflicts (Fig. 3B). This is perhaps evidence of what Lydall, Widlok, and Tadesse (2004) have referred to as, “another reality in which [Hamar] women also act as household and homestead heads, maintain and control assets, and direct the labor of household members. In short, behind the apparent male domination, we find a hidden, but nonetheless effective, female domination.” Conflict resolution is likely a key component of social influence among Hamar women and across diverse socio-cultural contexts (Brown & Kerns, 1985; Garfield, Hubbard, & Hagen, 2019; Hagen & Garfield, 2019). Future work will explore in more detail the nature of women’s social influence in

conflict resolution and other domains.

We found most conflicts are resolved, are not associated with negative social outcomes for inter-individual relationships, and that third-party mediators are effective in facilitating conflict resolution. Results suggest, however, that ties within clans are more robust to conflict, those between clan are more fragile, and, unsurprisingly, more severe conflicts are more likely to be associated with damaged relationships. In anthropology, structural functionalists, drawing on ethnographic case studies, have long emphasized the importance of social structures such as segmentary lineages and corporate kinship groups, facilitating social cohesion and mitigating conflict. Such social technologies are critical institutions for integrating multiple sets of closely related individuals for larger-scale cooperation (Enke, 2019; Pasternak, 1972). Nested kin groups can scale their organization and cooperation more effectively if individuals within clans maintain close ties while avoiding and effectively resolving conflicts. Conflict avoidance and effective resolution within clans is likely a necessary condition for larger scale social structures, such as maximal lineages or larger segments, to coalesce.

The salience of within-clan social cohesion is exemplified by the potential for between-clan conflict and related social structures and roles to mitigate between-clan conflicts. Among Nuer pastoralists in South Sudan and western Ethiopia for example, the role of leopard skin-priests was conceptualized as existing outside of the clan structure in order to allow these respected experts to provide critical leadership functions and mediate conflicts between clans. Evans-Pritchard (1956) (p. 292) describes the role:

Lineages of leopard-skin priests are found in all tribal sections, and in most parts of Nuerland they are in the category of *rul*, strangers, and not of *dial*, members of the clans which own the tribal territories. It is necessary that they should be widely spread, because their services are essential to Nuer everywhere, and it is significant that they are generally not members of lineages identified with political groups, because they have to act as peacemakers between such groups.

Maintaining strong social cohesion within lower-order kin groups, or local clans, is important to facilitate the scaling of kin-based groups in the context of more intensified conflicts or threats. Our results support the important role of within and between-clan dynamics in shaping inter-individual conflicts.

5. Limitations

Our methods present several important limitations. Our data are based on retrospective self-reports and therefore, the content of our information on conflicts may be systematically biased towards more salient conflicts, or more recent conflicts. We did ask informants to estimate how long ago each reported conflict occurred and almost half of all reported conflicts were reported to have occurred within the past six months (54%). Also, by asking informants to report on conflicts they had helped to resolve we may have a biased sample of instances of conflict resolution, given some reports are sourced from the third-party mediators themselves, whereas other informants described when third-party mediation occurred. Although we attempted to recruit all adult community members, several individuals declined to participate and many others were not currently residing in the community. Therefore, our sample recruitment may be systematically biased. We are also unable to corroborate conflicts reported only once to preserve anonymity of informants. Lastly, these data are the product of individual memory, which is subject to bias. It is possible certain types of conflicts are more likely to be recalled or not disclosed or that certain types of individuals are more likely to recall certain features of conflict scenarios. For example, as previously mentioned, our data only include one instance of conflicts between spouses, suggesting domestic conflicts are underreported.

Our study is also limited in that we have data from one Hamar community. We therefore do not know how features of the community

such as demographic structure, population density, community-level market integration, or other particular features of geography or ecology are influencing inter-individual conflicts and their mediation (see Findley, Kikuta and Denly, 2021). Future work will aim to expand our sample to include other communities and track changes in patterns of conflict over time (e.g., von Rueden, 2022). Also, because our data are retrospective and because there is some residential fluidity among Hamar communities, we cannot assess how community structure and relatedness among community members may be influencing conflict emergence and mediation. We also lack full genealogical data for all reported alters. We do expect both the causes of conflicts and the qualities of mediators to be impacted by socio-economic and political transitions. We would predict that larger, denser, and more market-integrated communities would have more conflicts over material resources, relative to subsistence resources, and conflict mediators would be more likely to be individuals associated with governmental positions. Greater access to market-purchased grain alcohol, however, will likely drive more intense social conflicts. Further data is required to assess such trends.

Although our data are limited, they provide important insights into how features such as subsistence livelihoods, private property, material wealth, gender dynamics and social structures shape the likelihood of disputes, conflict severity and resolution. Understanding the evolution of human conflict resolution requires detailed case studies across a range of societies to assess the features and social dynamics which appear to be universal and which appear to be context-dependent. Using such a cultural phylogenetic perspective can illuminate the evolution of human conflict resolution and how it enabled the development of human societies. Moreover, given that all societies and organizations, including contemporary nation states and large-scale organizations, depend on the ability to resolve inter-individual and inter-group conflicts, anthropological and evolutionary approaches to human behavior can provide insights that may help reveal factors that can improve social resilience across diverse societal and sociopolitical contexts.

6. Conclusion

We assessed the context of inter-individual conflicts including gender dynamics, the emergence of third-party mediation, and positive and negative post-conflict outcomes based on a sample of 160 unique conflicts in an agro-pastoralist society. The majority of conflicts in this context involve subsistence resources, specifically related to livestock and agricultural land. The development and intensification of private property may represent a substantial hurdle for inter-individual cooperation and group cohesion and may function as a selective pressure for conflict mediation. We expect that the agency and autonomy of ranging livestock contribute to both the frequency of such conflicts, but also their relatively less severe nature. Although women and men both experience severe inter and intra-gender conflicts, women are more likely to experience social disputes than are men. Based on ethnographic observations and qualitative data we suggest local demography and divisions of labor drive this pattern, in that women are over represented in the community and their economic livelihoods and daily tasks are more social in nature.

Social conflicts can be severe and third-party mediators are most likely to emerge to help resolve social disputes. We also found evidence that third-party mediation is associated with more severe conflicts, which was suggested by community members in their cultural models of conflict and resolution. Conflict mediation is strongly influenced by gender, with men and women third-party mediators each more likely to be involved in resolving conflicts among disputants of the same gender. Interestingly, however, third-party mediators of inter-gender conflicts were equally likely to be women or men. Although third-party conflict resolution by women is assumed to be more common in more egalitarian societies (Garfield & Hagen, 2020; von Rueden et al., 2018), results here suggest a potentially unexpected and overlooked role of women as

conflict mediators in an otherwise patriarchal society.

Hamar society, like many pastoralists, is strongly influenced by complex social structures and clan affiliations. Residents at the study site belong to 23 different patrilineal clans. We found that unresolved conflicts and severed social relationships were most likely to occur when members from different patrilineal clans came into conflict. This trend holds accounting for both biological and affinal kinship relationship as well as the involvement of a third-party mediator. Pastoral society is based upon a multifaceted economic and subsistence regime. Livestock are unpredictable and territory disputes are common. Given the harsh environment of the Omo Valley, crop and livestock maintenance are critical for survival. Conflicts of these subsistence resources are common, and the stakes are high. Our results suggest Hamar maintain cooperative and peaceful communities primarily through social structures, high within-clan cohesion, and gendered divisions of social and economic life, more so than through direct third-party mediation. Third parties, however, play a crucial role, especially in mediating social conflicts, and their involvement is often an effective and necessary solution for resolving severe interpersonal conflicts.

Declaration of Competing Interest

None.

Acknowledgements

We are grateful for the generosity of the focal Hamar community. Many individuals and households supported the research team, and this work would not be possible without their support. Kuna Bito, Maya Shansho, Biri Uri, Tilahun Abebe, and Haile Melkamu provided research assistance, translation services and/or logistics support during field work. This research is also supported by the University of Jinka and the South Omo Research Center; Elias Alemu provided much support facilitating these institutional affiliations. Edward Hagen, Nicole Hess, and Kristen Syme provided feedback on survey design. Barry Hewlett, Sara Petrollino, and Manvir Singh provided helpful comments and edits. Both authors acknowledge funding from the US National Science Foundation (#2214088). Zachary H. Garfield acknowledges IAST funding from ANR under grant no. ANR-17-EURE-0010 (Investissements d'Avenir programme).

References

- Archer, J. (2004). Sex differences in aggression in real-world settings: A meta-analytic review. *Review of General Psychology*, 8(4), 291–322. <https://doi.org/10.1037/1089-2680.8.4.291>
- Bartlett, J. W., Frost, C., & Carpenter, J. R. (2011). Multiple imputation models should incorporate the outcome in the model of interest. *Brain*, 134(11), e189.
- Bliege-Bird, R. (1999). Cooperation and conflict: The behavioral ecology of the sexual division of labor. *Evolutionary Anthropology: Issues, News, and Reviews*, 8, 65–75.
- Boehm, C. (1982). The evolutionary development of morality as an effect of dominance behavior and conflict interference. *JSOBBS Journal of Social and Biological Structures*, 5(4), 413–421.
- Boehm, C. (1999). *Hierarchy in the forest: The evolution of egalitarian behavior*. MA: Harvard University Press Cambridge.
- Boserup, E. (2007). *Woman's role in economic development*. Earthscan.
- Bowser, B., & Patton, J. (2010). Women's leadership: Political alliance, economic resources, and reproductive success in the Ecuadorian Amazon. In K. J. Vaughn, J. W. Eerkins, & J. Kanter (Eds.), *The evolution of leadership: Transitions in decision making from small-scale to middle-range societies* (pp. 51–71). Sante Fe: SAR.
- Boyd, R., & Mathew, S. (2021). Arbitration supports reciprocity when there are frequent perception errors. *Nature Human Behaviour*, 5(5), 596–603. <https://doi.org/10.1038/s41562-020-01008-1>
- Boyd, R., & Richerson, P. J. (2009). Culture and the evolution of human cooperation. *Philosophical Transactions of the Royal Society, B: Biological Sciences*, 364(1533), 3281–3288. <https://doi.org/10.1098/rstb.2009.0134>
- Brown, D. E. (1991). *Human universals*. New York: McGraw-Hill.
- Brown, J. K., & Kerns, V. (1985). *In her prime: A new view of middle-aged women*. South Hadley, MA: Bergin and Garvey Publishers.
- Calvert, S. C. (2016). *Religion, cooperation, and reproductive suppression among the Hamar Agropastoralists of Southwest Ethiopia* (PhD thesis). Washington State University

- Carpenter, B., Gelman, A., Hoffman, M. D., Lee, D., Goodrich, B., Betancourt, M., & Riddell, A. (2017). Stan: A probabilistic programming language. *Journal of Statistical Software*, 76(1), 1–32.
- Chen, H., Cohen, P., & Chen, S. (2010). How big is a big odds ratio? Interpreting the magnitudes of odds ratios in epidemiological studies. *Communications in Statistics - Simulation and Computation*, 39(4), 860–864. <https://doi.org/10.1080/03610911003650383>
- Chen Zeng, T., Cheng, J. T., & Henrich, J. (2022). Dominance in humans. *Philosophical Transactions of the Royal Society, B: Biological Sciences*, 377(1845), 20200451. <https://doi.org/10.1098/rstb.2020.0451>
- Dahlberg, F. (1981). *Woman the gatherer*. New Haven: Yale University Press.
- Draper, P. (1975). !Kung women: Contrasts in sexual egalitarianism in foraging and sedentary contexts. In R. R. Reiter (Ed.), *Toward an anthropology of women* (pp. 77–109). New York: Monthly Review Press.
- Dubosson, J., Clack, T., & Brittain, M. (2018). The Hamar: Living by, for and with the cattle. In *The river* (pp. 125–132). Oxford: Archaeopress Publishing Ltd.
- Enke, B. (2019). Kinship, Cooperation, and the Evolution of Moral Systems. *The Quarterly Journal of Economics*, 134(2), 953–1019. <https://doi.org/10.1093/qje/qjz001>
- Erickson, K. P., & Horton, H. (1992). Blood feuds: Cross-cultural variations in kin group vengeance. *Cross-Cultural Research*, 26, 57–85.
- Evans-Pritchard, E. E. (1956). *Nuer religion*. New York: Oxford Univ Press.
- Fehr, E., & Fischbacher, U. (2003). The nature of human altruism. *Nature*, 425(6960), 785–791. <https://doi.org/10.1038/nature02043>
- Findley, M. G., Kikuta, K., & Denly, M. (2021). External validity. *Annual Review of Political Science*, 24(1), 365–393. <https://doi.org/10.1146/annurev-polisci-041719-102556>
- Fitouchi, L., & Singh, M. (2022). Institutionalized punishment serves to restore reciprocal cooperation in three small-scale societies. <https://doi.org/10.31234/osf.io/bjwn7>
- Fratkin, E. (2001). East African pastoralism in transition: Maasai, Boran, and Rendille cases. *African Studies Review*, 44(3), 1–25. <https://doi.org/10.2307/525591>
- Fratkin, E., Galvin, K. A., & Roth, E. A. (1994). *African pastoralist systems: An integrated approach*.
- Gabry, J., & Češnovar, R. (2021). *Cmdstanr: R interface to CmdStan*.
- Garfield, Z. H. (2021). Correlates of conflict resolution across cultures. *Evolutionary Human Sciences*, 3. <https://doi.org/10.1017/ehs.2021.41>
- Garfield, Z. H., & Glowacki, L. (2022). *Zhgarfield/hamarconflictdata: Initial release*. <https://doi.org/10.5281/zenodo.7267338>
- Garfield, Z. H., & Hagen, E. H. (2020). Investigating evolutionary models of leadership among recently settled Ethiopian hunter-gatherers. *Special Issue on Evolution and Biology of Leadership*, 31(2), Article 101290. <https://doi.org/10.1016/j.leaqua.2019.03.005>
- Garfield, Z. H., Hubbard, H., & Hagen, E. H. (2019). Evolutionary models of leadership: Tests and synthesis. *Human Nature*, 30(1), 23–58. <https://doi.org/10.1007/s12110-019-09338-4>
- Garfield, Z. H., Syme, K. L., & Hagen, E. H. (2020). Universal and variable leadership dimensions across human societies. *Evolution and Human Behavior*, 41(5), 397–414. <https://doi.org/10.1016/j.evolhumbehav.2020.07.012>
- Garfield, Z. H., von Rueden, C., & Hagen, E. H. (2019). The evolutionary anthropology of political leadership. *The Leadership Quarterly*, 30(1), 59–80. <https://doi.org/10.1016/j.leaqua.2018.09.001>
- Gavrilets, S. (2015). Collective action problem in heterogeneous groups. *Philosophical Transactions of the Royal Society B*, 370, 20150016.
- Gintis, H. (2011). Geneculture coevolution and the nature of human sociality. *Philosophical Transactions of the Royal Society, B: Biological Sciences*, 366(1566), 878–888. <https://doi.org/10.1098/rstb.2010.0310>
- Glowacki, L. (2020). The emergence of locally adaptive institutions: Insights from traditional social structures of East African pastoralists. *Biosystems*, 104257. <https://doi.org/10.1016/j.biosystems.2020.104257>
- Glowacki, L. (2022). The evolution of peace. *Behavioral and Brain Sciences*, 1–100. <https://doi.org/10.1017/S0140525X22002862>
- Glowacki, L., & von Rueden, C. (2015). Leadership solves collective action problems in small-scale societies. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences*, 370(20150010). <https://doi.org/10.1098/rstb.2015.0010>
- Curven, M., Winking, J., Kaplan, H., von Rueden, C., & McAllister, L. (2009). A bioeconomic approach to marriage and the sexual division of labor. *Human Nature*, 20, 151–183. <https://doi.org/10.1007/s12110-009-9062-8>
- Hagen, E. H., & Garfield, Z. (2019). *Leadership and prestige, mothering, sexual selection, and encephalization: The computational services model [Preprint]*. <https://doi.org/10.31219/osf.io/9bcdc>
- Hames, R. (2015). Kin selection. In D. Buss (Ed.) (2nd ed., Vol. 2. *The handbook of evolutionary psychology* (pp. 505–523). Hoboken, New Jersey: John Wiley & Sons, Inc.
- Henrich, J., Boyd, R., & Richerson, P. J. (2012). The puzzle of monogamous marriage. *Philosophical Transactions of the Royal Society, B: Biological Sciences*, 367(1589), 657–669. <https://doi.org/10.1098/rstb.2011.0290>
- Hill, K. R., Walker, R. S., Bozicević, M., Eder, J., Headland, T., Hewlett, B., & Wood, B. (2011). Co-residence patterns in hunter-gatherer societies show unique human social structure. *Science*, 331, 1286–1289. <https://doi.org/10.1126/science.1199071>
- Hruschka, D. J. (2010). *Friendship: Development, ecology, and evolution of a relationship*. University of California Press.
- Johnson, A. W., & Earle, T. K. (1987). *The evolution of human societies: From foraging group to agrarian state*. Stanford Univ Pr.
- Johnson, G. A. (1982). Organizational structure and scalar stress. *Theory and Explanation in Archaeology*, 389–421.
- Levine, R. A. (1961). Anthropology and the study of conflict: An introduction. *Journal of Conflict Resolution*, 5(1), 3–15. <https://doi.org/10.1177/002200276100500102>

- Lewis, J. (2014). Egalitarian social organization: The case of the Mbendjele BaYaka. In *Hunter-gatherers of the Congo Basin* (pp. 219–244). New York: Routledge.
- Low, B. (1992). Men, women, resources, and politics in pre-industrial societies. In J. van der Dennen (Ed.), *The nature of the sexes: The sociobiology of sex differences and the battle of the sexes* (pp. 149–169). Groningen, Netherlands: Origin Press.
- Lydall, J., Widlok, T., & Tadesse, W. (2004). The power of women in an ostensibly male-dominated agro-pastoral society. In *Property and equality: Volume II: Encapsulation, commercialization, discrimination* (p. 152).
- Marlowe, F. W., Berbesque, J. C., Barr, A., Barrett, C., Bolyanatz, A., Cardenas, J. C., & Tracer, D. (2008). More “altruistic” punishment in larger societies. *Proceedings of the Royal Society B: Biological Sciences*, 275(1634), 587–592. <https://doi.org/10.1098/rspb.2007.1517>
- McElreath, R. (2020). *Statistical rethinking: A Bayesian course with examples in R and Stan (Second)*. <https://doi.org/10.1201/9780429029608>
- Parker, G. A., Royle, N. J., & Hartley, I. R. (2002). Intrafamilial conflict and parental investment: A synthesis. *Philosophical Transactions: Biological Sciences*, 357(1419), 295–307.
- Pasternak, B. (1972). *Kinship & community in two Chinese villages*. Stanford, Calif: Stanford University Press.
- Petrollino, S. (2017). *A grammar of Hamar. A south Omotic language of Ethiopia*. Köln: Rüdiger Köppe Verlag.
- Pietraszewski, D. (2016). How the mind sees coalitional and group conflict: The evolutionary invariances of n-person conflict dynamics. *Evolution and Human Behavior*, 37, 470–480.
- Redhead, D., & Von Rueden, C. (2021). Coalitions and conflict: A longitudinal analysis of men’s politics. *Evolutionary Human Sciences*, 1–28. <https://doi.org/10.1017/ehs.2021.26>
- Roscoe, P. (2009). Social signaling and the organization of small-scale society: The case of contact-era New Guinea. *Journal of Archaeological Method and Theory*, 16, 69–116.
- von Rueden, C., Alami, S., Kaplan, H., & Gurven, M. (2018). Sex differences in political leadership in an egalitarian society. *Evolution and Human Behavior*, 39(4), 402–411. <https://doi.org/10.1016/j.evolhumbehav.2018.03.005>
- von Rueden, C., Gurven, M., Kaplan, H., & Stieglitz, J. (2014). Leadership in an egalitarian society. *Human Nature*, 25(4), 538–566. <https://doi.org/10.1007/s12110-014-9213-4>
- von Rueden, C. R. (2022). Unmaking egalitarianism: Comparing sources of political change in an Amazonian society. *Evolution and Human Behavior*. <https://doi.org/10.1016/j.evolhumbehav.2022.09.001>
- Scalise Sugiyama, M., Mendoza, M., & Sugiyama, L. (2021). War games: Intergroup coalitional play fighting as a means of comparative coalition formidability assessment. *Evolutionary Behavioral Sciences*, 15, 91–110. <https://doi.org/10.1037/ebs0000251>
- Sear, R. (2021). The male breadwinner nuclear family is not the ‘traditional’ human family, and promotion of this myth may have adverse health consequences. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 376(1827), 20200020. <https://doi.org/10.1098/rstb.2020.0020>
- Sell, A., Cosmides, L., Tooby, J., Szycer, D., Von Rueden, C., & Gurven, M. (2009). Human adaptations for the visual assessment of strength and fighting ability from the body and face. *Proceedings of the Royal Society B: Biological Sciences*, 276, 575–584.
- Singh, M., & Garfield, Z. H. (2022). Evidence for third-party mediation but not punishment in Mentawai justice. *Nature Human Behaviour*, 1–11. <https://doi.org/10.1038/s41562-022-01341-7>
- Singh, M., & Glowacki, L. (2022). Human social organization during the Late Pleistocene: Beyond the nomadic-egalitarian model. *Evolution and Human Behavior*, 43(5), 418–431. <https://doi.org/10.1016/j.evolhumbehav.2022.07.003>
- Steward, J. H. (1938). *Basin-plateau aboriginal sociopolitical groups* (Vol. 120). US Government Printing Office.
- Strecker, I., Lydall, J., & Baxter, P. T. W. (1984). The Hamar of Southern Ethiopia. *Man*, 19, 482–484.
- Strecker, I. A. (1976). *Traditional life and prospects for socio-economic development in the Hamar administrative district of southern Gamu Gofa: A report to the relief and rehabilitation Commission of the Provisional Military Government of Ethiopia*.
- Thubauville, S., & Gabbert, E. C. (2014). Gender and identification in patrilineal and patriarchal societies: Case studies from southern Ethiopia. *Paideuma: Mitteilungen Zur Kulturkunde*, 60, 139–154. Retrieved from <https://www.jstor.org/stable/44242846>.
- Tiger, L. (1970). Dominance in human societies. *Annual Review of Ecology and Systematics*, 1, 287–306.
- Trivers, R. L. (1974). Parent-offspring conflict. *American Zoologist*, 14, 249–264.
- Van Buuren, S., & Groothuis-Oudshoorn, K. (2011). Mice: Multivariate imputation by chained equations in R. *Journal of Statistical Software*, 45(1), 1–67.
- Walker, R. S., Hill, K. R., Flinn, M. V., & Ellsworth, R. M. (2011). Evolutionary history of hunter-gatherer marriage practices. *PLoS One*, 6(4), Article e19066. <https://doi.org/10.1371/journal.pone.0019066>
- White, D. R. (1988). Rethinking polygyny: Co-wives, codes, and cultural systems. *Current Anthropology*, 29. <https://doi.org/10.1086/203674>
- Wiessner, P. (2019). Collective action for war and for peace: A case study among the Enga of Papua New Guinea. *Current Anthropology*, 60(2), 224–244. <https://doi.org/10.1086/702414>
- Wondimu, M. S., & Woldeamayyat, E. M. (2020). Determinants of home delivery among women in rural pastoralist community of Hamar District, southern Ethiopia: A case. *Risk Management and Healthcare Policy*, 13, 2159–2167. <https://doi.org/10.2147/RMHP.S268977>
- Yitbarek, Y. (2020). Clashing values: The 2015 conflict in Hamar district of South Omo Zone, southern Ethiopia. In S. Eppele, & G. Assefa (Eds.), *Legal Pluralism in Ethiopia* (pp. 371–398). <https://doi.org/10.14361/9783839450215-017>