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Punitive justice serves to restore reciprocal cooperation in three small-scale societies

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ABSTRACT

Fines, corporal punishments, and other procedures of punitive justice recur across small-scale societies. Although they are often assumed to enforce group norms, we here propose the relation-restoration hypothesis of punitive justice, according to which punitive procedures function to restore dyadic cooperation and curtail conflict between offender and victim following violations of reciprocal obligations. We test this hypothesis's predictions using observations of justice systems in three small-scale societies. We code ethnographic reports of 97 transgressions among Kiowa equestrian foragers (North America); analyze a sample of 302 transgressions among Mentawai horticulturalists (Indonesia); and review retributive procedures documented among Nuer pastoralists (South Sudan). Consistent with the relation-restoration hypothesis, we find that third-party punishment is rare; that most third-party involvement aims at resolving conflicts; that costs paid by offenders serve to achieve forgiveness by repairing victims; that punitive justice is accompanied by ceremonial procedures aimed at limiting conflict and restoring goodwill; and that failures to impose costs contribute to a decline in reciprocal cooperation. Although we document rare instances of third-party punishment among the Kiowa (6.6% of offenses), punitive justice more often serves as restorative justice, appeasing victims' urge for revenge while not overly harming offenders' interests to ensure reconciliation.

1. Introduction

Among the Yolngu of Australia, interclan killings were sometimes followed by the *makarrata* ceremony (Warner, 1958). The two clans met on either side of a clearing. After some ritual, men in the killer's clan ran in a zigzag through the field, while the victim's clan hurled spears at them with the stone heads removed. Then the killer ran. He, too, had spears thrown at him, this time with the heads attached. "When this part of the ceremony has been completed, the whole offending group dances up to the other, and one of the latter jabs a spear through the thighs of the killers" (Warner, 1958, p. 176).

The ceremonial punishment exhibited in the *makarrata* is not unique. Many small-scale societies exhibit conventionalized procedures for inflicting costs after social transgressions, including killing, beating, and defaming transgressors, as well as seizing resources from them and requiring them to pay resources (Black, 1993; Hoebel, 2009). We refer to these procedures as *institutions of punitive justice*, defined as traditions specifying legitimate punitive responses to moral violations. We distinguish such institutions from people's actual punitive behaviors, which can violate or live up to the prescribed standards of legitimate punishment. Despite their diversity, punitive justice institutions exhibit four widespread, although not universal, features (Baumard, 2010b, 2012; Black, 1993; Hoebel, 2009; Strathern & Stewart, 2012):

i. Costs are imposed on transgressors and their kin.
ii. Benefits are transferred to victims and their kin.
iii. Parties involved have shared expectations of proportionality: The magnitude of costs imposed or benefits transferred should correspond with the severity of the transgression.
iv. Impositions of costs and transfers of benefits follow institutionalized procedures, sometimes accompanied by ritualized ceremonies.

Why do people develop and maintain punitive justice institutions? To many researchers, the answer is self-evident: enforcing norms. Norm-enforcement theories of punishment maintain that societies punish

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offenders to enforce group norms, often cooperative ones (Boyd, 2018; Boyd, Gintis, Bowles, & Richerson, 2003; Fehr & Fischbacher, 2004; Mathew & Boyd, 2011). In this view, the ultimate function of punishment is often to increase the cost of free-riding and thus to incentivize group-beneficial, cooperative behaviors. Researchers have proposed several variants of such a norm-enforcement explanation.

A widespread version argues that humans have evolved predispositions to enforce group norms through costly, third-party punishment (Boyd, 2018; Kanakogi et al., 2022). This line of work defines third-party punishment either as the punishment of an offense by an unaffected observer (Fehr & Fischbacher, 2004; Jordan, Hoffman, Bloom, & Rand, 2016) or as the punishment of free-riding on a public good (Boyd, 2018; Mathew & Boyd, 2011). In both definitions, third-party punishment involves paying individual costs to benefit the group (by incentivizing cooperation), which raises the question of how third-party punishment could have evolved in the first place. Some authors argue that third-party punishment can evolve when failure to punish is itself punished (Boyd, 2018; Mathew, 2017). Because punishment can stabilize any behavior (Boyd & Richerson, 1992), the argument goes, third-party punishment can evolve despite its individual cost, when it is itself sanctioned by second-order punishment (Boyd, 2018). As this equilibrium—where people punish both free-riders and failures to punish them—promotes cooperation, cultural group selection would then favor it over other evolutionarily stable equilibria (Boyd, 2018).

Other versions of the norm-enforcement idea insist less on third-party punishment. They argue that small-scale societies enforce cooperative norms through coordinated punishments of malefactors who threaten the shared interests of all individuals in the group (Boehm, 1999, 2012; Wrangham, 2019; see also Boyd, Gintis, & Bowles, 2010). Each individual has an immediate interest in coordinating with others to reform or incapacitate cost-inflictors, as this dilutes the cost of punishment and increases the probability of success (Boyd et al., 2010).

Norm-enforcement theories seem to describe punitive institutions in many small-scale communities (Hadfield & Weingast, 2013). Leeson (2009) showed that pirates developed laws to prevent uncooperative behaviors and that breaches of those laws were met with coordinated punishments, such as marooning, lashings, executions, or physical mutilations. Ostrom (1990) reviewed many cases of small-scale communities developing institutions for punishing free-riding on common-pool resources. Mathew and Boyd (2011, 2014) also provided evidence that Turkana pastoralists (Kenya) enforce participation in war raids through disapproval of second-order free-riding (Mathew, 2017) and third-party sanctions on deserters and cowards (although see Baumard & Liénard, 2011).

Despite the apparent prevalence of norm-enforcement, it does not seem to characterize punitive justice in many small-scale societies, where third-party punishment often appears rare if not absent. Surveys of forager ethnographies conclude that third parties are often indifferent to whether wrongdoing is sanctioned and that punishment, when it occurs, is "typically inflicted by the aggrieved party alone rather than the band as a whole" (Black, 2000, p. 110; see also Baumard, 2010a, 2016). In a systematic study of 333 customary courts cases among the Enga (Papua New Guinea), Wiessner (2020) found no evidence for third-party punishment. Even in economic games—where third-party punishment was initially observed in rich, industrialized countries (Fehr & Fischbacher, 2004; E. Fehr & Gächter, 2002; Yamagishi, 1986)—third-party punishment is less common among participants from small-scale societies (Henrich et al., 2010; Marlowe, 2009; Marlowe et al., 2008, 2011).

Second, norm-enforcement theories seem to have difficulty explaining a recurrent feature of punitive justice in small-scale societies: compensation. Restorative payments have been observed in societies as diverse as highland New Guineans (Strathern & Stewart, 2012; Wiessner, 2020), the Tlingit of the Pacific Northwest (Oberg, 1934), and Libyan Bedouins (Peters, 1967), among many others (Black, 1993, pp. 47–61, for a review). In a systematic study of Enga customary village courts (Papua New Guinea), Wiessner and Pupu (2012) found that 98% of all offenses, including murder, rape, assault, and property disputes, were followed by compensation. If inflicting costs on offenders serves to enforce norms, it is unclear why people also care that those costs deliver benefits to victims and their families.

Here, we propose another model for punitive justice in small-scale societies, the *relation-restoration hypothesis*, which accounts for both its retributive nature (inflicting costs on offenders) and its compensatory properties (transferring benefits to victims). We argue that, in many instances, punitive justice is restorative justice: Impositions of costs, as well as transfers of benefits, function to restore dyadic cooperative relationships and avoid costly conflicts. Our model draws on previous psychological and anthropological insights. Evolutionary moral psychologists have argued that retributive intuitions function to restore a balance of interests between offender and victim (André, Fitouchi, Debove, & Baumard, 2022; Baumard, 2010b, 2016; Fitouchi, André, & Baumard, in press; Sznycer, Sell, & Williams, 2021), while observers of small-scale law have noted that disputants often prioritize reparation and peace-making (Diamond, 2013; Hoebel, 2009; Wiessner & Pupu, 2012). We here integrate these insights, using the psychology of justice to explain the design and cultural evolution of punitive justice in small-scale societies. We then test predictions of this hypothesis by examining the justice systems of three small-scale societies: the Kiowa (equestrian foragers, North America), the Mentawai (horticulturalists, Indonesia), and the Nuer (pastoralists, South Sudan).

We focus on small-scale societies for two reasons. First, such societies resemble the evolutionary past in which punitive sentiments are assumed to have evolved (Boyd, 2018; Krasnow, Cosmides, Pedersen, & Tooby, 2012; Raihani & Bshary, 2019; Singh & Glowacki, 2022; Sznycer & Patrick, 2020). Second, studying small-scale societies informs our understanding of social order in the absence of centralized political and judicial authority. A large literature has examined the emergence of social order in self-governing communities (Ellickson, 1991; Leeson, 2009; McDowell, 2004; Skarbek, 2012), yet most of it has focused on groups of non-kin who otherwise lack deep histories of interaction, such as prison gangs and pirate ships. Although common today, these communities likely differ from most societies that existed during human history.

2. The relation-restoration hypothesis

2.1. The logic of relation-restoration

We propose that punitive justice often serves a restorative function. Specifically, it culturally evolves in small-scale societies to restore dyadic cooperation and prevent the escalation of conflict following violations of reciprocal obligations.

To understand the problems punitive justice solves, consider two individuals, Léo and Manvir, involved in a reciprocal cooperative relationship. When Léo violates an obligation toward Manvir, such as by stealing Manvir's pig, Manvir is incentivized to cease cooperating with Léo, because the benefits of cooperation decline as Léo feels comfortable exploiting Manvir (André et al., 2022; Axelrod, 2006; Trivers, 1971). Moreover, Manvir has an incentive to inflict a retaliatory cost on Léo to deter future exploitation, either from Léo himself or from pig-hungry onlookers (McCullough, Kurzban, & Tabak, 2013). The ultimate benefits of deterrence seem to have shaped revenge, which shows design features consistent with this function (McCullough et al., 2013).

Ceasing cooperation and entering a conflictual relationship can carry mutual costs. First, both parties lose the benefits of future cooperation (Axelrod, 2006; see also Wiessner, 2020). Second, retaliation can trigger counter-punishment (McCullough et al., 2013). Were Manvir to attack Léo, Léo would be incentivized to attack back to deter subsequent aggression from both Manvir and bystanders. Such cycles of revenge and counter-revenge are common in experimental studies of punishment (Raihani & Bshary, 2019) and in small-scale societies lying beyond

colonial and state control (Boehm, 1987; Ericksen & Horton, 1992; Hoebel, 2009). Not only do Manvir and Léo have an interest in limiting conflict and restoring their cooperation, but their kin do as well, given the collective costs of feuding (Glowacki, 2022)

Institutions of punitive justice, we argue, culturally evolve as people design and retain forms of justice that appear effective for restoring cooperation and limiting conflict following violations of reciprocal obligations. They function by prescribing transfers of benefits to victims and inflicting costs on offenders. The magnitude of benefits transferred and costs imposed are calibrated to appease victims' urge for revenge while not overly harming offenders' interests.

To appease a victim's urge for revenge, two costs must be repaid: the direct cost of exploitation and the cost of ensuing exploitation (André et al., 2022). The direct cost of exploitation is repaid through a transfer of benefits to the victim. Léo should restore the difference between the benefits initially owed to Manvir (not stealing Manvir's pig) and the (lower) payoffs resulting from exploitation (stealing the pig). Consistent with this logic, psychological evidence indicates that the payment of compensatory damages lowers the perceived immorality of an offense (Mittlaender, 2019) and promotes forgiveness and reconciliation (De Cremer, 2010; Fehr & Gelfand, 2010; Komiya, Ohtsubo, Oishi, & Mifune, 2018; Witvliet et al., 2008), while under-compensation fails to fully restore cooperation between conflicting parties (Haesevoets, Reinders Folmer, De Cremer, & Van Hiel, 2013).

Although a restorative payment recoups the direct cost of transgression, it does not address the threat of ensuing exploitation. Victims will thus demand an imposition of costs on transgressors beyond remuneration to ensure that transgressors and others will not exploit them in future interactions (McCullough et al., 2013; Ohtsubo & Watanabe, 2009).

Disputants will converge on an infliction of costs and transfers of benefits that is proportionate to the severity of the infraction (André et al., 2022; Baumard, 2010b). Manvir prefers that Léo pay some amount to satisfy his urge for revenge and deter future pig-stealing. But if this cost is too high, it may disincentivize Léo from investing in the relationship and even motivate counter-punishment. Accordingly, experimental research shows that people intuit that the appropriate level of cost-infliction and benefit-transfer is proportional to the severity of the transgression (Carlsmith & Darley, 2008; Heffner & FeldmanHall, 2019; Smith & Warneken, 2016), while disproportionate punishment can be perceived as illegitimate and trigger counter-punishment (see Heffner & FeldmanHall, 2019; Raihani & Bshary, 2019).

In short, a regular problem for restoring cooperation after a transgression is to restore victims' lost benefits and satisfy their thirst for revenge while restraining disproportionate retaliation. As people attempt to restore goodwill, they should adopt and retain procedures that appear efficient for restoring and appeasing victims while not overly harming offenders' interests, driving the cultural evolution of punitive justice institutions.

This account differs from norm-enforcement theories primarily in the function of punishment. We argue that costs are imposed on aggressors to restore dyadic, reciprocal cooperation. This contrasts with norm enforcement theories, according to which punishment serves to enforce group norms. It is true that punishment can serve to restore relations yet incidentally enforce group norms. However, the two approaches make divergent predictions about how punitive justice should function.

2.2. Predictions

The relation-restoration hypothesis generates at least 7 predictions about punitive justice in small-scale societies.

First, it makes predictions about third-party involvement. Most norm-enforcement theories predict that punishment should be administered (at least in part) by third-parties, as they assume people to punish not only to protect their own self-interest but to deter norm violations, as well (Fehr & Fischbacher, 2004; Marshall & McAuliffe, 2022). By contrast, the relation-restoration hypothesis predicts that:

Prediction 1. Third parties should be concerned with facilitating reconciliation and limiting conflict more than with imposing costs on offenders. Insofar as they are interested in offenders accepting costs, this should stem more from an interest in reinstating goodwill (see prediction 7) than from a retributive sentiment. We thus expect that:

Prediction 1a. Third-party punishment of offenses should be rare.

Prediction 1b. Third parties should intervene to mediate disputes, stop fights, and urge reconciliation.

Second, our account makes predictions about the content of justice procedures. Norm-enforcement theories predict that justice procedures should mostly inflict costs on transgressors to deter future norm-violation. They do not predict that justice procedures should transfer benefits to victims. Indeed, what matters for deterring norm-violation is that wrongdoers do not benefit from cheating—not that victims are compensated for the cost they incurred. By contrast, relation-restoration predicts not only that costs should be imposed on offenders (to appease victims), but also that offenders should compensate victims for the harm done, as this favors forgiveness and reconciliation (Komiya et al., 2018; Wenzel & Okimoto, 2014; Witvliet et al., 2008). In fact, compared to brute cost-infliction, transferring benefits to victims should be more efficient for relation-restoration, as it carries a smaller risk of escalating violence (see Heffner & FeldmanHall, 2019). We thus expect that:

Prediction 2. Following a transgression, transfers of benefits to victims should be preferred to brute cost-infliction.

Because disproportionate cost-infliction on transgressors is likely to spark cycles of escalating conflicts, we also expect that:

Prediction 3. Prescribed benefits transferred to victims and costs imposed on transgressors should be proportionate to the tort inflicted on the victim.

We acknowledge that Prediction 3 can also derive from a norm-enforcement account, as efficient norm-enforcement may require that punishments do not appear disproportionate in order to be accepted by transgressors (Ostrom, 1990).

Third, if institutions of punitive justice aim at restoring cooperation and preventing conflict, they should also incorporate other ritual procedures perceived as facilitating reconciliation—a feature irrelevant to deterrence of norm-violation. We thus expect that:

Prediction 4. Justice procedures should be accompanied with procedures that constrain rash retaliation and protect against feuding, such as mediators, go-betweens, norms distancing the quarreling parties, or prohibitions on interacting while angry.

Prediction 5. Justice procedures should be coupled with ceremonial traditions that facilitate reconciliation, such as food exchange, communal feastings, marriage pacts, or collective dancing.

Fourth, in our model, imposing costs and transferring benefits are necessary for restoring reciprocal cooperative interactions. This is not the case with non-conditional forms of cooperation, such as kin-altruism (Hamilton, 1964) and cooperation for "shared interests" (Leimar & Hammerstein, 2010; West, Cooper, Ghoul, & Griffin, 2021). In such "interdependent" interactions (Cronk, Steklis, Steklis, van den Akker, & Aktipis, 2019), individuals benefit from providing benefits to their

partners irrespective of partner reciprocation, because they have a fitness stake in their partners' welfare (Tomasello, Melis, Tennie, Wyman, & Herrmann, 2012). For more interdependent relationships, then, restoring cooperation after transgressions will be less dependent on the imposition of costs and transfer of benefits to the victim, as victims are regardless incentivized to invest in the relationship. We thus expect that:

Prediction 6. The more transgressors and victims are interdependent—for example, by being genetically related—the less important imposing costs and transferring benefits should be for relationship restoration.

We see no reason that norm enforcement theories should make prediction 6. Indeed, insofar as punishment functions to enforce group norms, we would expect that individuals should be punished similarly, regardless of whether they transgress on family members or strangers.

Finally, if, as we propose, punitive justice institutions function to restore cooperation, we expect that:

Prediction 7. When costs fail to be imposed on transgressors, reciprocal cooperation should suffer.

To our understanding, norm enforcement theories do not make predictions about how punishment should impact dyadic cooperation; prediction 7 is thus unique to the relation-restoration hypothesis.

2.3. The present studies

Below, we test these predictions by investigating institutionalized punishment in three small-scale societies: the Kiowa, the Mentawai, and the Nuer. We study these societies using distinct but complementary methodologies: the coding of existing ethnographic retrospective reports of offenses and punishment for the Kiowa; an analysis of first-hand, case-level punishment data for the Mentawai; and a qualitative review of retributive procedures documented among the Nuer.

3. Kiowa

3.1. Ethnographic background

The Kiowa were equestrian bison hunters of the American Great Plains. Before 1875, when they were confined to their reservation lands, they controlled the region between the Arkansas and Red Rivers, covering modern-day Oklahoma and parts of Kansas, Arkansas, and Colorado (Kracht, 2017). They exhibited many traits distinctive of indigenous Plains groups, such as bison subsistence, military societies, and the Sun Dance (Wissler, 1914).

The Kiowa transitioned between two social configurations. For most of the year, they lived in small bands, trailing the bison in the fall and spring and subsisting on preserved food in the winter (Mishkin, 1940). These bands, or *topadogas*, were typically composed of a group of brothers and their wives and children living in a cluster of tipis, and were headed by a leader, the *topadok'i* (Richardson, 1940). In the pre-reservation period, the Kiowa population of 1,600 comprised twenty such *topadogas*, ranging in size from twelve to fifty tipis (Richardson, 1940). During a two-month interval in the summer, however, all bands assembled for the Sun Dance, a season marked by religious activity, large-scale revenge expeditions, and communal celebrations (Mishkin, 1940; Richardson, 1940).

Three actors are of particular importance for understanding Kiowa law and justice:

i. The band leader, or *topadok'i* was responsible for maintaining within-group order, managing economic cooperation, and protecting from outgroup attacks (Richardson, 1940). His authority, however, depended on the ongoing support of band members, who could choose another *topadok'i* if dissatisfied with their leader (Richardson, 1940).
ii. The Ten Medicine Keepers were religious specialists, each of whom oversaw one of the ten Medicine Bundles, which controlled the supernatural welfare of the whole tribe. Aside from their religious function, the Ten Medicine Keepers were in charge of offering the peace-pipe to quarreling parties (Richardson, 1940). Smoking the peace-pipe constituted an oath that disputants would undertake no further revenge.
iii. The five military societies encompassed the male population of the tribe. They assumed a policing function during the Sun Dance period (Hoebel, 2009; Richardson, 1940). They enforced the Sun Dance "harmony rule," which prescribed that "all quarrels and jealousies were to be forgotten, no one was to be angry for any reason whatsoever, and clandestine affairs of one's spouse were to be tolerated with good humor" (Richardson, 1940, p. 9). They were allowed to punish trouble-makers, to the point of killing them if needed, when they posed a real danger to the public peace and order (Richardson, 1940). One military society also policed the tribal bison hunt (Richardson, 1940).

3.2. Methods

3.2.1. Sample

In 1935, the Laboratory of Anthropology in Santa Fe sponsored a field school to document as much as they could about the pre-reservation Kiowa. A member of the project, Richardson (1940), interviewed older informants and gathered 92 cases of transgressions, including murder, adultery, wife-stealing, property disputes, and disturbances of bison hunts (Table 1). We coded these cases to test our predictions regarding punitive justice.

We excluded cases for which we independently concluded that (i) it was unclear whether a transgression occurred at all ($n = 2$); (ii) the transgression was committed by or against an outgroup member (e.g., a Cheyenne or Comanche) (n = 2); or (iii) the case involved suicide of one party, making the punitive procedure difficult to interpret (n = 2). Four cases reported by Richardson (1940) involved several transgressions, which we treated as separate cases, yielding a final sample size of 91 cases.

Table 1
Common types of transgressions in the Kiowa and Mentawai samples.

Kiowa		Mentawai	
Transgressions ($N = 91$)	*Count (%)*	*Transgressions* ($N = 276$)	*Count (%)*
Adultery/wife-stealing	42 (46%)	Stealing or harming pig	41 (15%)
Murder	10 (11%)	Stealing or harming chicken	26 (9%)
Horse-stealing/property violation	8 (9%)	Stealing banana	23 (8%)
Marriage-related violation (e.g., levirate violation)	7 (8%)	Sexual misconduct	19 (7%)
Wife beating	6 (7%)	Impregnating unmarried girl	18 (7%)
Disturbing public peace	3 (3%)	Black magic	13 (5%)
Violation of affine obligations	2 (2%)	Stealing taro	10 (4%)
Leader misbehavior	2 (2%)	Assault	9 (3%)
Rape	2 (2%)	Stealing or damaging canoe	9 (3%)
Disturbing bison hunt	1 (1%)	*Ganti rugi*	8 (3%)
Treason	1 (1%)	Threatening	7 (3%)
Sorcery	1 (1%)	Molestation	6 (2%)
Other	6 (7%)	Other	87 (32%)

[a]*Ganti rugi* refers in Mentawai to when a student must drop out of school and another family, deemed responsible, must pay (typically when a female student becomes pregnant).

3.2.2. Coding procedure

For each case, we coded 6 free-response variables and 11 categorical variables (see Codebook for the list of all variables). Data, code, and a codebook are available at https://osf.io/sh96k/.

One rater (L.F.) coded all 17 variables on the 91 cases; the other (M. S.) coded 11 variables (7 categorical) on a subsample of 53 cases. Inter-rater agreement was assessed on these 53 cases for the 7 categorical variables coded by both raters. Overall inter-rater agreement was substantial (Cohen's $\kappa = 0.76$, $p < .001$). Inter-rater agreement computed for each variable separately ranged from $\kappa = 0.57$ to $\kappa = 1$. Only one variable ("Third-party intervention") had a $\kappa < 0.61$, usually considered the lower bound of "substantial" agreement (Landis & Koch, 1977; Warrens, 2015). Our disagreement emerged from misunderstandings about whether intervention by immediate kin of conflicting parties, such as wives or brothers, should be considered as third-party intervention. We concluded that only intervention by individuals who are not immediate kin should be considered third-party intervention. Resolving discrepancies accordingly brought inter-rater agreement on third-party intervention to $\kappa = 0.69$ ($p < .001$) and overall κ to 0.78 ($p < .001$).

3.3. Results

Prediction 1a. For the Kiowa, we define punishment as actively inflicting a cost on an offender, such as by beating them, killing them, killing some of their horses, destroying their tipi, seizing resources, actively demanding compensation, or withdrawing benefits. Punishment does not include receiving compensatory benefits willingly offered by offender. Following previous uses in the literature, our definition of third-party punishment encompasses instances in which both uninvolved parties punish on an a victim's behalf (see Jordan et al., 2016) and individuals bear the costs of punishing free-riding on public goods (see Boyd, 2018; Boyd et al., 2003; Mathew & Boyd, 2011).

Third-party punishment was present in 6 of 91 cases (6.6%). Two additional cases feature credible threats of third-party punishment, which reformed the transgressor without imposing costs (2.2%; see cases 2C and 22 in Supplementary Table 1). From here onwards, we count such credible threats as instances of third-party punishment.

Among the 8 cases of third-party punishment, 4 involved band leaders or military societies fulfilling their policing function, such as enforcing Sun Dance rules, preserving tribal peace, and policing the bison hunt. Four other offenses, involving murder, treason, rape, and leader misbehavior, were punished by third parties without clear policing roles (Fig. 1; see Supplementary Table 1 for descriptions of the 8 instances of third-party punishment and the potential uncertainties associated with each case).

Notably, third-party punishment was the least common response to offenses (8.8%; Fig. 1). The most common response was no punishment, whether from second or third parties (43.9%). Individuals most likely to punish were victims (29.7% of offenses), followed by victims' kin (16.5%) (Fig. 1).

To investigate predictors of third-party punishment, we coded whether the ethnographer classified each transgression as a "crime," that is, a transgression threatening the welfare of the entire tribe, such as killing a tribesman, disturbing peace, committing treason, using sorcery, or violating the peace-pipe oath (Richardson, 1940, p. 18). These contrast with what the ethnographer called "private grievances", such as adultery, wife-stealing, and property disputes. Third-party punishment was more frequent for transgressions threatening the public welfare than for private grievances, $\chi^2(1, N = 91) = 19.3$, $p < .001$ (Fig. 2). Using a more inclusive definition of crimes produces similar results (see Supplementary Fig. 1).

Prediction 1b. We define interventions as efforts to mediate disputes, stop fights, or urge disputants to reconcile. Third-party interventions occurred in 34 of 91 cases (37.4%). They were more frequent than third-party punishments (6.6%) or threats of third-party punishment (2.2.%).

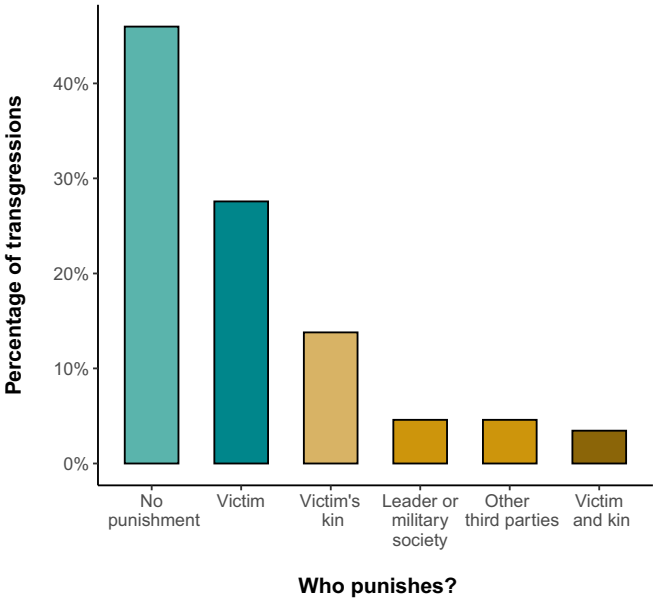

Fig. 1. Proportion of transgressions among the Kiowa that were punished by nobody, the victim, victim's kin, and third parties. Punishment is here defined as actively inflicting a cost on an offender, such as by beating them, killing them, destroying their property, seizing resources, actively demanding compensation, and withdrawing benefits. It does not include the reception of compensatory benefits willingly offered by offender. Third-party punishment on this graph comprises punishment by "leader or military society" and punishment by "other third parties." Two cases of punishments by "leader or military society" concern credible threats of third-party punishment (2.2% of transgressions).

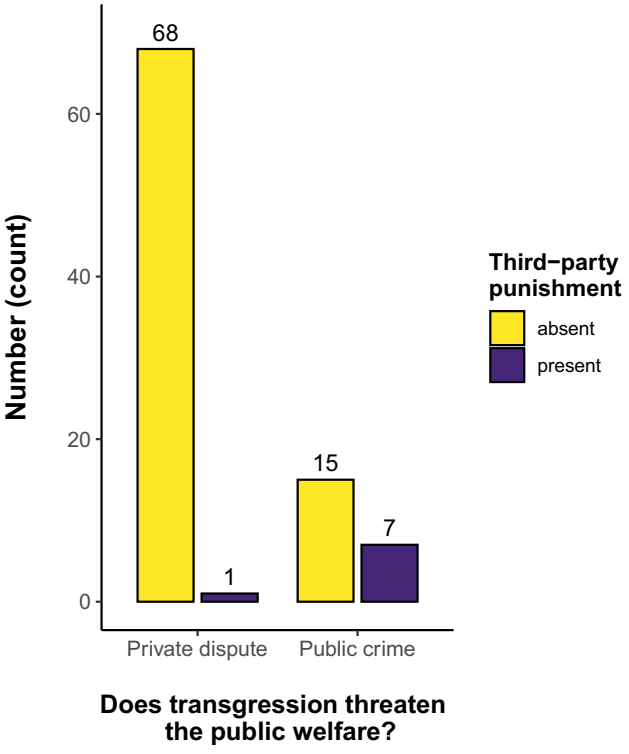

Fig. 2. Number of third-party punishments among the Kiowa for "private disputes," or transgressions of dyadic reciprocal obligations (e.g., adultery, property disputes), compared to "crimes", or transgressions threatening the public welfare (e.g., disturbing tribal peace, ruining a bison hunt, murder).

Third parties spontaneously intervened in 20 cases (58.8% of third-party interventions), often with leaders or bystanders separating disputants and pressuring them for peace. In 12 cases (35.3% of third-party interventions), conflicting parties or their kin invited a third party to mediate the dispute and facilitate reconciliation. They typically invited a Ten Medicine Keeper to offer the peace-pipe to the more vengeful party to prevent revenge and facilitate peace-making.

If third parties' reactions to transgressions are geared toward restoring cooperation and curtailing conflict, third parties should intervene more when a transgression risks a cycle of revenge and counter-revenge. To test this prediction, we coded, for each case, whether the victims' revenge sparked counter-punishment, escalating into a fight. Third-party intervention was more frequent for offenses that escalated into fights than for offenses that did not escalate, $\chi^2(1, N = 88) = 14.4$, $p < .001$ (Fig. 3).

Prediction 2. Benefits, typically horses or other valuables, were transferred to victims after 23 transgressions (25.3%). In 6 additional cases, compensation was offered but refused by one of the parties (6.69%). People thus resorted to compensation, albeit not always successfully, in 29 cases (31.9%).

Contrary to our prediction, transfers of benefits to victims were less frequent than brute cost-inflictions on transgressors. Of the 91 transgressions, 42 were met by brute cost-infliction (46.2%). These ranged from violent retaliations, such as killing the offender or destroying their property, to a less violent withdrawal of benefits, such as when a woman's kin withdrew her from her husband following his misbehavior. Ten transgressions involved both a transfer of benefits to victims and a brute cost-infliction on offenders (11.0%).

Prediction 3. The available data do not allow us to test this prediction among the Kiowa.

Prediction 4. The Kiowa accompanied punitive justice procedures with practices that protect against feuding. The peace-pipe ceremony served this function:

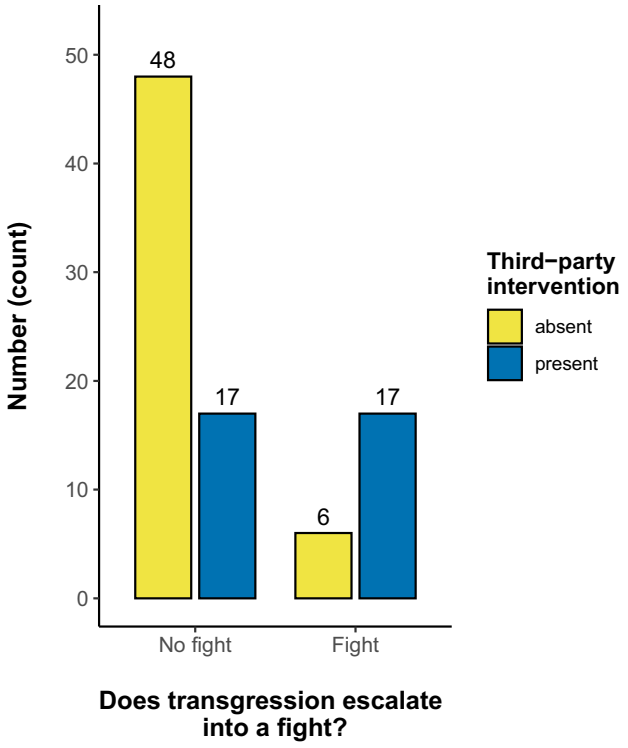

Fig. 3. Number of third-party interventions among the Kiowa for offenses that escalated into a fight versus those that did not. Third-party interventions refer to efforts by third-parties to mediate disputes, stop fights, or urge disputants to reconcile.

> The legal procedure was as follows: it was possible for the relatives of any defendant, fearing for his life, to seek [a Ten Medicine Keeper] and ask him to offer a pipe to the plaintiff…Smoking constituted an oath that there would be no further [retaliatory] action. Compensation might be stipulated by the plaintiff at that time and could not be refused. The use of the peace pipe involved no judgment as to who was right and who was wrong. Consequently there was no loss of face on either side. This mechanism effectively inhibited a *lex talionis* [eye for an eye]. (Richardson, 1940, p. 11).

Social norms and supernatural beliefs surrounding the pipe further illustrate its relation-restoration function. Disputants were prohibited both from refusing a pipe more than three times and from attacking the other party after having smoked (Richardson, 1940, pp. 55–56). Violations of these prohibitions were considered severe transgressions, triggering social ostracism and automatic supernatural punishment, bringing ill luck and ultimately death to the pipe violator (Richardson, 1940). Notably, the supernatural punishment of pipe violation was similar to that of the most serious crimes such as murder (Richardson, 1940).

Of our 91 cases, the pipe was brought to conflicting parties in 17 cases (18.7%). It was accepted in 14 cases (15.38%) and refused in 3 cases (3.29%). Of our 91 transgressions, two were violations of the pipe (Table 1). In these two cases, a victim of cuckoldry fired arrows at the adulterer, despite having previously made an oath to make peace with him by smoking the pipe. In one case, this pipe violation triggered threat of third-party punishment by a band leader, who was ready to fight the pipe-violator for having "violated the law," before they were separated by bystanders. The other case was met by strong reproval from the pipe-violator's brother-in-law.

Prediction 5. Aside from the peace-pipe ceremony, we did not find other evidence of ceremonial practices geared toward reconciliation.

Prediction 6. To investigate whether disputants' interdependence affected the probability of cost-infliction and transfers of benefits, we coded (i) whether disputants were related by blood and/or affinal ties and (ii) whether a case resulted in neither cost-infliction nor a transfer of benefit to the victim. In total, 28 transgressions were followed by neither a cost infliction nor a benefit transfer (30.8%). Absence of cost-infliction and transfer of benefits was more likely when disputants were genetic kin ($\beta = 0.416$, $F(1,82) = 5.17$, $p = .025$). Affinal ties, however, did not predict cost-infliction or the transfer of benefits following the transgression ($\beta = -0.141$, $F(1,82) = 1.26$, $p = .26$).

Prediction 7. The available data do not allow us to test this prediction among the Kiowa.

4. Mentawai

4.1. Ethnographic context

4.1.1. General background

The Mentawai inhabit the Mentawai Archipelago, approximately 150 km off the west coast of Sumatra (Tulius, 2012). Most research was conducted with a community in southern Siberut Island.

The Siberut Mentawai are rainforest horticulturalists who subsist primarily on the processed pith of sago palms. Organized into exogamous patrilineal clans, fellow clan members share land and key resources on it (Schefold, 1988; Tulius, 2012). Clans exhibit some degree of corporate responsibility; clan members are often responsible for donating bridewealth or contributing to compensatory payments for transgressions (*tulou*).

Traditionally, the Siberut Mentawai resided in longhouses and small houses constructed nearby (Schefold, 1988). Following government settlement programs, most people have moved to settlement villages, which host clinics, schools, mosques, and churches and which increase residential proximity between members of different clans.

As of January 2020, the primary study community had three

government officials, all of them members of local clans and drawn from the local community (Singh & Garfield, 2022). The *Kepala Dusun* (head of the sub-village) is responsible for demographic record-keeping (reporting deaths and births) and organizing development projects, such as installing cement roads. The *Badan Permusyawaratan Dusun* (sub-village council representative) is responsible for representing the community's aspirations to the *Kepala Dusun* and ensuring honest governance. The *Perlindungan Masyarakat* officer, or *Linmas*, is responsible for resolving conflict in collaboration with the *Kepala Dusun*.

4.1.2. Tulou

Punitive justice in Mentawai centers around *tulou*, a payment of resources from the offender to the victim. Typically comprising resources such as pigs, sago trees, and cooking pots, a *tulou* payment is often said to include a replacement to make up for lost or stolen resources (*silinia*) and an additional penalty (*tulounia*). *Tulou* payments follow most transgressions, including committing adultery, impregnating an unmarried girl, and, most frequently, stealing or damaging property (Singh & Garfield, 2022). Although food-sharing constitutes a major cooperative domain in Mentawai society (Schefold, 1982; Singh, Kaptchuk, & Henrich, 2021), violations of food-sharing norms are almost never followed by fines.

In the study communities, individuals demand and negotiate *tulou* in several ways. The injured party sometimes visits transgressors and negotiates without mediation. Other times, the injured party hires a mediator, known as *pasuili* or *patalaga* (from *talaga*, or "middle"), to visit the offender and negotiate payment. The mediator travels between the parties until a decision is made and *tulou* is paid (or not). The injured party and the offender may also meet in a common place with the mediator structuring the discussion. Following payment, victims pay mediators for their services.

4.2. Methods

These data were previously presented and analyzed by Singh and Garfield (2022). For more details, see their report.

In 2017, M.S. conducted 199 interviews with 95 participants, including with a member of each household in the primary study community. Interviews were conducted in the Rereiket dialect of Mentawai. All participants were paid 15,000 IDR (Indonesian rupiah; 1.13 USD on July 1, 2017) as compensation for their time.

Participants were asked to share details about any *tulou* payments they were aware of, focusing on cases in which they were involved. They were also asked about cases in which an individual transgressed but no *tulou* was paid. For each case, they were asked to specify the identities of the disputants, the transgression, the identity of the *patalaga* (mediator), an estimate of when the case happened, its location, whether *tulou* was paid, and, if it was paid, its original composition. If a payment appeared especially cheap or expensive, participants were asked why. Details about cases were corroborated in one of four ways: (i) Multiple participants spontaneously described the same case; (ii) M.S. attended discussions of *tulou* payments or was otherwise aware of a payment; (iii) participants were explicitly asked to corroborate cases that others mentioned; or (iv) participants were re-interviewed to corroborate previous reports.

Details about 444 cases were collected. Because much of the data comprise retrospective reports, Singh and Garfield (2022) used a set of conservative exclusion criteria to increase reliability. Cases were excluded in any of the following categories: (i) the case referred to a general expectation rather than to an actual case; (ii) key details remained unresolved, confusing, or missing; (iii) the research assistant or other people interviewed expressed skepticism about the case's reliability; (iv) the case resulted in an outcome other than a *tulou* payment or lack of payment (e.g., a transgression sparked a counter-attack ultimately concluding in an exchange of resources); and (v) all corroborations failed. Cases in category 4 were previously excluded for ease of analysis rather than because of problems in reliability. For that reason, we will discuss some of these cases here.

Tulou payments were composed almost exclusively of local resources such as pigs, chickens, cooking woks, durian trees, and sago gardens. To convert these into a common currency, M.S. arranged a focus group at the end of data collection (December 2017) and determined the value of all resources in Indonesian rupiah.

4.3. Results

Results previously reported by Singh and Garfield (2022) include a reference to their paper. Otherwise, the results derive from data and ethnographic cases that they did not publish (see predictions 1a, 2, and 3) or ethnographies published by other anthropologists (see predictions 5 and 6).

Prediction 1a. Of 302 cases analyzed by Singh and Garfield (2022), none provided evidence of direct third-party punishment. In a small number of cases, a transgressor refused to pay a fine and, in turn, had resources seized. In all such cases, however, punishment was imposed by victims and never by third parties.

Reviewing the cases excluded by Singh and Garfield (2022) (see 4.2), we found one case that may qualify as involving third-party punishment. The case, described in **Box 1**, was excluded originally both because key details remained unresolved and because it ended with a mutual exchange of resources rather than a *tulou* payment. Note the exceptional circumstances of this case; punishment seems incidental. The community experienced a threat—a large, male pig burst into the village—and Luka Kerei's decision to kill the pig seemed aimed less at punishing the pig's owner and more at incapacitating the threat. Moreover, much of the village was deemed responsible for killing the pig, and many people contributed to compensating the pig's owner.

Prediction 1b. Third parties are frequently invited to mediate (Singh & Garfield, 2022). Of 217 cases for which data were available, Singh and Garfield found that 108 (49.8%) involved mediation. At least 81 were mediated by non-governmental mediators. Of 71 cases mediated by non-governmental mediators and for which the relevant data were available, 53 (74.6%) were mediated by individuals who did not share clan membership with either disputant.

Despite the high frequency of third-party mediation, there is no evidence that third parties were sought out as mediators (Singh & Garfield, 2022). Instead, disputants appeared to seek out shamans and elders, many of whom were incidentally third parties. Although no quantitative data were collected concerning spontaneous mediation, Singh and Garfield's (2022) descriptions of cases show that third parties sometimes observe *tulou* negotiations, interjecting to offer advice or calm angry disputants.

Prediction 2. As mentioned above, the central form of punitive justice in Mentawai is a transfer of benefits from the offender to the victim (*tulou*). Brute cost-infliction, although much more infrequent than a transfer of resources, primarily takes three forms:

First, people sometimes kill or harm animals who behave in inappropriate ways, recorded in at least four instances (see an example in Box 1).

Second, in very rare cases, people are violently attacked as the first response to a transgression. For instance, a man outside of the study community was known to have visited a distant village, where he had sex with a local (presumably unmarried) woman. Her brothers attacked him with machetes, leaving near-lethal injuries.

The final form of attempted brute cost-infliction is sorcery. People are apprehensive about discussing sorcery; a single accusation of malicious sorcery makes one an easy suspect after later misfortunes. Despite these reputational costs, there is a common belief that spirits are more understanding of retaliative sorcery, especially when one suffers at the hands of an aggressor who hides their identity. Sorcery in these situations serves both to punish and identify secretive aggressors. For instance, a man admitted to M.S. that he paid a shaman for sorcery

Box 1
Case: A large, male pig bursts into a village and is killed

All names here are pseudonyms. This case was reconstructed through 4 interviews with 3 people: Luka Kerei (interviewed twice) and two sons of Aman Silu (each interviewed once).

Aman Silu's large male pig (*babui*) burst into the government settlement village of Paliou. This can be dangerous for both people and property. Large pigs can attack people, as well as dogs and chickens, and will eat crops. Many people followed it, presumably trying to kill it. Luka Kerei successfully killed it. (Both of Aman Silu's sons remarked that "many people" in Paliou were responsible for the pig's death while specifying that Luka Kerei was the one who killed it.) Aman Silu retaliated against Luka Kerei, killing his large, male pig. The interviewees agreed that Aman Silu also tried to kill one of Luka Kerei's large female pigs (*sigelag*), although they disagreed about whether he was successful (one claimed he was successful, two that he was unsuccessful).

With the help of mediators, the parties resolved the conflict. Aman Silu paid Luka Kerei two pigs (one large male, one large female). Luka Kerei, with contributions from other residents of Paliou, purchased a large, male pig and delivered it to Aman Silu.

knowledge, but only after one or more unknown thieves had repeatedly stolen the man's chickens. We located only one case in which a person admitted to using retaliative sorcery—a well-known case in which a shaman threatened to use sorcery, and eventually did, against whoever had injured his pig.

Prediction 3. To investigate whether *tulou* payments are proportionate to the costs imposed by transgressions, we tested whether the value of the resource stolen or damaged predicts the value of the *tulou* payment for the 42 cases that passed Singh and Garfield's (2022) exclusion criteria and for which the value of resources was available. We found a positive relationship between *tulou* payment and the costs imposed by the transgression (Fig. 4; adjusted $R^2 = 0.272$, $F(1,40) = 16.32$, $p < .001$, $\beta = 0.408$).

Prediction 4. Critical for curbing tensions following a dispute in Mentawai are mediators, known in southern Siberut as *patalaga* or *pasuili*. Hired by victims and their kin, *patalaga* go between the disputants to negotiate a *tulou* payment. That they are often elders and shamans likely discourages aggressors from hassling them. The *patalaga* institution thus allows conflicts to be resolved without parties meeting face-to-face and risking explosive conflicts. Negotiations for *tulou* payments can also occur with disputants meeting in a common place and mediators guiding the discussion, a scenario that has likely become more common with state incorporation and the suppression of violence. Consistent with mediation serving to curtail tension, victims are more likely to call mediators when infractions are more severe and, it seems, when conflicts are between clans rather than within clans (Singh &

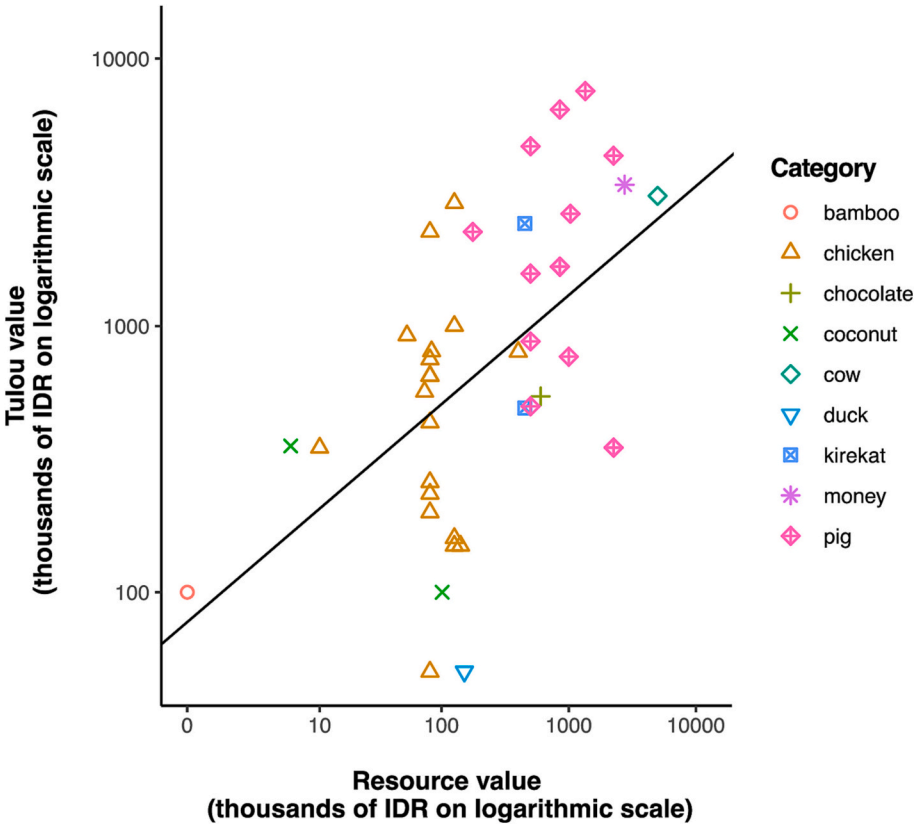

Fig. 4. Among the Mentawai, the value of resources damaged or stolen (x-axis) predicts the value of *tulou* payments (y-axis). All values are shown in Indonesian rupiah, and the axes are plotted on a log-10 scale. The category of the damaged or stolen resource is represented by both shape and color. A *kirekat* is a durian tree that has been memorialized for a dead person. In the case involving chocolate, the offender stole approximately 40 young chocolate trees.

Garfield, 2022).

Prediction 5. The Mentawai engage in peace-making ceremonies (*paabad*) following both spontaneous bouts of violence and enduring cycles of rivalry and feuding. Associated with restitutive payments, presumably *tulou*, *paabad* ceremonies involve communal feasting. Darmanto (2020, p. 61) observed one such ceremony in the southern Siberut village of Maileppet. Remarking at the "lavish and enormous communal meal" consisting of pork, chicken, sago, taro, and various imported foods, he reported that a ceremony that ends without violence inaugurates ritualized friendship between the men of the disputing clans.

Prediction 6. *Tulou* payments were less likely for within-clan conflicts compared to between-clan conflicts (Singh & Garfield, 2022). Meanwhile, in their explanations of why certain fines were particularly cheap or expensive, more participants mentioned kinship (25%) than another any reason. Although most said that kinship led to cheaper *tulou* payments, one participant said that a payment was especially expensive because it was among in-laws.

Prediction 7. There are two indications that aggressors' refusal to pay penalties can dissolve cooperation. First, according to some Mentawai, their clans' historic movements were spurred by conflicts following a refusal to pay *tulou*. Tulius (2012) recorded a story of the Samongilailai kin-group wherein a member the Sapokka clan killed a pig and refused to pay *tulou*. The pig's owner, in turn, killed two members of Sapokka, then fled. The story shows how people conceptualize the choice between paying *tulou* and inviting violence:

> Emeiboblo addressed a question to them as he was sitting next to them, "Why do you not fulfil the request of the negotiators whom I sent to talk to you, namely: that you have to pay me a pig as replacement for the one you shot?" The Sapokka deliberately ignored Emeiboblo's request and answered him, "We do not want to pay it because we just do not want to do so. If you want to have it you have to do that with the shiny, sharpened machete and spear." (Tulius, 2012, p. 141).

Second, participants sometimes explained that transgressors who underpaid or refused to pay had little interest in a cooperative relationship. For instance, after a man cut another man's rattan palm, the victim demanded a large iron cooking wok (worth approx. 1,000,000 IDR) as *tulou*. After the aggressor handed over 1 coconut tree (approx. 100,000 IDR), the victim explained to M.S. that the aggressor was not interested in *palejat* (friendship).

5. Nuer

5.1. Ethnographic background

The Nuer are a Nilotic people. At the time of observation, they were most prominently cattle pastoralists, although they also engaged in small-scale agriculture and opportunistic foraging, growing millet and maize while gathering wild foodstuffs (Evans-Pritchard, 1969).

Nuer society was segmentary. The largest political unit was the tribe. This was the level at which people tried to resolve disputes, chiefly to maintain alliances in conflicts against similar-sized political units (Evans-Pritchard, 1969). In the 1930s and 1940s, there were about 15 Nuer tribes. Each tribe was composed of primary segments, which were composed of tertiary segments and then villages. People of the same segment cooperated in warfare and in economic activities, but levels of cooperation were much more consistent and intense within smaller groups, especially in the tight kinship groups making up villages.

To evaluate whether the relation-restoration hypothesis predicts features of Nuer punitive justice, we consulted qualitative ethnographic descriptions reported by anthropologists or experts, following a method previously used by Dyson-Hudson and Smith (1978) in their study of human territoriality. Specifically, we read ethnographic texts through the lens of our seven predictions and report here whether those predictions are supported or rejected. Although this method lacks the quantitative dimension of the Kiowa and Mentawai analyses, it draws on rich ethnographic observations deriving from long and in-depth fieldwork.

The description of Nuer law reviewed here primarily comes from two sources that cover several parts of Nuerland from about 1930 until the early 1950s. First are those observations reported by Evans-Pritchard (1969) who studied the Nuer in the 1930s at the request of the Government of the Anglo-Egyptian Sudan. Second is Howell (1954). As the Assistant District Commissioner of a region that covered three Nuer tribes, Howell was regularly called to assist in dispute arbitration. He also witnessed the development of a formalized court system, ultimately enforced by the threat of coercion and colonial moral preferences. Intended for both administrators and academics, his book describes Nuer legal behavior before the institution of formal courts, as well as the response of the Nuer to these new legal systems.

5.2. Results

Prediction 1a. According to Howell (1954), injured parties were the only individuals who demanded punishment. Regarding homicide, "If there was any sense of retributive justice, it was held by an isolated group of persons, the group to which the deceased belonged" (Howell, 1954, p. 40). For the kinsmen of the slain, responses toward homicide were "a reaction of indignation at personal loss, reduction in their numbers, and the damage to the continuity of their group" (Howell, 1954, p. 207).

Third parties, by contrast, were largely indifferent to whether transgressors were punished: "There appears to be no formal reaction on the part of the community as a whole to an act of homicide, nor any general expression of reprobation" (Howell, 1954, p. 206). Third parties may have become involved, but only when they risked "find[ing] themselves involved in a feud which may spread along traditional lines of political cleavage" (Howell, 1954, p. 207). By contrast, "those outside the specific groups affected are not interested" (Howell, 1954).

In writing about fines for theft, Howell (1954, p. 201) remarked that the Nuer understood that punishment deters crime, which raises the possibility that third parties were interested in whether transgressors suffer costs. Nevertheless, he clarified that notions of deterrence apparently did not encourage third parties to become involved and that justice was dyadic:

> There was certainly no organized political body capable of enforcing payment. To steal an article of this nature was a private delict and could only be settled by payment of compensation sufficient to appease the owner. (Howell, 1954, p. 201).

An exception to third parties' disinterest and the private nature of law was the murder of evil magical agents, such as suspected *let* (werewolves) and *rodh*, ghoulish people believed to kill people, disinter corpses, and mutilate them (Howell, 1954, pp. 40, 56; Howell & Lewis, 1947). These individuals were executed with the consent of the community. Typically, no compensation was demanded after their deaths.

Prediction 1b. Despite third parties' general disinterest in punishment, they intervened to limit conflict, preserve social harmony, and urge reconciliation (see also Prediction 4). In particular, compensatory cattle might not have been paid without the "pressure on the part of the community in which [the two parties] live, and there will be pressure in proportion to the extent to which the men's mutual animosity disturbs the tranquility of that community" (Howell, 1954, p. 24). The Nuer were "acutely conscious of the need for unity," and were constantly searching for mechanisms or leaders that might "check the process of fission which to the Nuer is highly undesirable" (Howell, 1954, p. 33).

Prediction 2. The Nuer prioritized the payment of cattle in dealing with transgressions, which aimed at restoring relationships: "If good relations are to continue, certain breach of conduct usually require the payment of compensation" (Howell, 1954, p. 25). Committing adultery with another man's wife, for example, "will require the payment of

cattle as an indemnity" (Howell, 1954). Compensation was also recognized as the ideal way to deal with theft (Howell, 1954, pp. 200–202), homicide (Howell, 1954, pp. 25, 54–55), and bodily harm (Howell, 1954, p. 25). Howell (1954, p. 25) noted that brute retaliation was less desirable because it was less efficient in restoring peaceful relationships: "The principle of a life for a life rarely led to permanent peace even if honour was satisfied in the moment."

Prediction 3. The magnitude of legitimate compensation was proportional to the tort inflicted on the victim. Such "scales of compensation for wrongs can be quoted by the older generation of Nuer with surprising consistency" (Howell, 1954, p. 25). For example,

> Adultery…requires six head of cattle [for restoring the relationship]; bodily injuries require compensation in proportion to the seriousness of the injury and there are complicated scales laid down in tradition. Homicide requires the transference of forty head of cattle from the kinsmen of the killer to those of the deceased in order to restore the balance between them. (Howell, 1954, p. 25).

).

Prediction 4. Nuer institutions of punitive justice were intertwined with procedures constraining rash retaliation and protecting against feuding. Most important in this respect was the leopard-skin chief (Evans-Pritchard, 1969; Greuel, 1971; Howell, 1954) and the religious beliefs associated with his activity (Fig. 5). He was important in three respects for restoring reciprocal cooperation.

First, the leopard-skin chief was a middleman (Howell, 1954). As with the Mentawai *pasuili* and Kiowa Ten Medicine Keepers, he approached the aggrieved party on behalf of the transgressor's group, appealing for a peaceful settlement. Because reputational concerns dictated that the aggrieved party resist accepting compensation, even though they were "anxious to come to an agreement" (Howell, 1954, p. 46), the leopard-skin chief sometimes resorted to threats and curses, even on occasion engaging in a mock battle. He thereby allowed disputants to pursue resolution without provoking conflict while permitting victims to save face and give the appearance of unappeasable wrath.

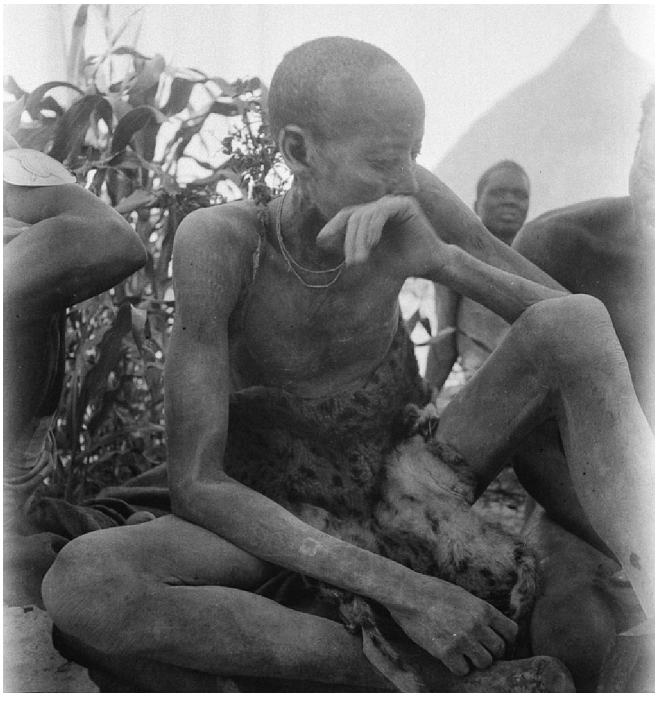

Fig. 5. A Nuer leopard-skin chief (Kuaar Muon), photographed by E. Evans-Pritchard in 1935–1936 (Source: Pitt Rivers Museum, University of Oxford; accession number: 1998.346.227). The leopard-skin chief acted as a mediator in disputes and helped parties pursue resolution without provoking conflict (Evans-Pritchard, 1969; Howell, 1954).

Second, the leopard-skin chief's home was an asylum for the murderer (Howell, 1954). The group who sought vengeance could not enter, and people were prohibited from bringing spears into his house or even carrying them in his presence. As a result, a killer and his kinsmen would stay with the leopard-skin chief until the aggrieved party had cooled down. By providing a slayer with sanctuary, the leopard-skin chief curtailed violent retaliation until the dead person's kin were receptive to negotiation.

Third, the chief could cleanse people of spiritual contamination, two forms of which are relevant here. For one, a murderer was forbidden from eating or drinking until he was bled by a leopard-skin chief (Evans-Pritchard, 1969; Howell, 1954). This ensured that a killer swiftly escaped to the chief's house where he could enjoy protection. Moreover, whenever a killing occurred, the deceased's group and the killer's group entered a state of spiritual contamination (Evans-Pritchard, 1969, p. 154; Howell, 1954, pp. 45–47). They could neither eat nor drink together, nor intermarry, at the risk of painful diarrhea or even death. This state sometimes continued for many generations, averting social contact and the eruption of violence. The leopard-skin chief alone could remove this contamination, but did so rarely, after compensation was delivered and the families partook in several final ceremonies that restored goodwill.

Prediction 5. With the exception of ceremonies for making peace between tribes with longstanding feuds (Howell, 1954, pp. 46–47, 58), neither Howell nor Evans-Pritchard described regular practices for promoting social bonding associated with institutionalized cost imposition.

Prediction 6. Compensatory payments were cheaper for more closely related individuals. For adultery between close kinsmen, "it is rare that anything more than this one cow will be demanded" (Howell, 1954, p. 24). Similarly, the accidental killing of a kinsman required a lower indemnification than the accidental killing of an unrelated person (Howell, 1954, p. 54). Notably, however, "the more remote the relationship the greater the indemnification necessary but the smaller the likelihood that the wrong will be rectified at all." (Howell, 1954, p. 25).

Prediction 7. Howell suggested that, if compensation fails to be paid by the offender, good relations are unlikely to continue between disputants, while feuding becomes more likely (Howell, 1954, pp. 25, 59). Compensation for adultery, for instance, had to be paid "if social relations are to continue between the two parties and the possibility of retaliation on the part of the wronged husband is to be removed" (Howell, 1954, pp. 24).

6. Discussion

6.1. Punitive justice and relation-restoration

We proposed that institutions of punitive justice culturally evolve in small-scale societies to constrain rash retaliation and restore dyadic, reciprocal cooperation after transgressions. Examining three societies, we find abundant evidence for this proposal.

First, third parties were rarely involved in punishment (prediction 1). Rather, punitive procedures overwhelmingly occurred within the context of reciprocal, cooperative dyads. Among the Kiowa, the Mentawai, and the Nuer, punishment was almost always administered by the victim or their kin. Except for 6.6% to 8.8% of transgressions among the Kiowa, third parties did not intervene to punish violations of group norms. These results add to a growing body of evidence that costly third-party punishment is rare in small-scale societies (Baumard, 2010a; Baumard & Liénard, 2011; Guala, 2012; Marlowe, 2009; Marlowe et al., 2008, 2011; Singh and Garfield, 2022; von Rueden, Gurven, & Guala, 2012; Wiessner, 2020) and that people are infrequently motivated to punish transgressions that do not harm their own inclusive fitness-interests (Pedersen et al., 2019; Pedersen, Kurzban, & McCullough,

2013; Pedersen, McAuliffe, & Mccullough, 2018).

Second, third-party interventions were almost always aimed at mitigating dyadic conflict following offenses (prediction 2), consistent with punitive procedures serving to secure future cooperation. Leaders and other high-status individuals—such as the Kiowa *topadok'is* and Ten Medicine Keepers, Mentawai shamans and elders, and the Nuer leopard-skin chief—had prominent roles in this regard, echoing patterns observed in other small-scale societies (Garfield, 2021; Garfield, Syme, & Hagen, 2020; Glowacki & von Rueden, 2015; von Rueden et al., 2012). According to one interpretation, some of these interventions may qualify as third-party punishments in a broad sense of the term. We doubt, however, that this could apply to most cases. Indeed, third-party mediators most often lacked enforcement power: they could attempt to convince offenders to pay compensation but could not force them to do so (Evans-Pritchard, 1969; Howell, 1954; Richardson, 1940).

Third, among the Mentawai and Nuer, punitive justice institutions prescribed penalties and restorative payments in proportion to the harm done as the preferred way to right wrongs. This is consistent with a relation-restoration function, as proportionate compensation facilitates achieving forgiveness (Komiya et al., 2018; Wenzel & Okimoto, 2014; Witvliet et al., 2008) and restoring a fair balance of interests between cooperative partners (André et al., 2022; Baumard, 2010b; Heffner & FeldmanHall, 2019) while avoiding reckless retaliation that may escalate conflict. These results converge with similar quantitative, case-based studies among the Enga of Papua New Guinea (Wiessner, 2020; Wiessner & Pupu, 2012).

Fourth, punitive justice was intertwined with procedures and ceremonies designed to facilitate reconciliation and curtail conflict (predictions 4 and 5). In the Kiowa peace-pipe ceremony, disputants promised to make peace and refrain from retaliation or otherwise suffer social disapproval and supernatural sanctions. Mentawai compensatory payments are often supervised by mediators allowing negotiation to take place without angry parties meeting face-to-face. The Nuer leopard-skin chief played a similar role, facilitating transfer of cattle to the victim while preventing retaliation that could spark feuding.

Fifth, disputants' relationships modulated the likelihood and strength of justice responses, in line with a relation-restoration function (prediction 6). The absence of any compensation or punishment was more likely for offenses against blood relatives among the Kiowa; compensation toward kin was cheaper among the Nuer; and compensation was both less likely and cheaper for within-clan conflicts among the Mentawai. This echoes psychological evidence that relational closeness shapes responses to moral violations committed by kins or friends (Weidman, Sowden, Berg, & Kross, 2020).

Finally, among the Mentawai and the Nuer, the failure to impose costs on offenders increased the risk of feuding or dissolving cooperation. Punitive justice, in sum, appears geared toward preventing dyadic cooperation from breaking down—and conflict from escalating—following offenses in reciprocal interactions.

Our study suffers from important limitations. First, we have only observed three societies. Given the diversity of cooperative institutions (Henrich & Muthukrishna, 2021), human societies likely exhibit many more patterns of punitive justice. Second, we have worked with diverse, heterogenous datasets. The Mentawai and Kiowa data involve retrospective reports with all the biases and uncertainties they imply. This is especially problematic for the Kiowa interviews, some of which were conducted decades after transgressions. Our reports of Nuer punishment, meanwhile, rely on general ethnographic observations without quantitative analysis. Still, these diverse methodologies produced not only convergent results in culturally distant societies but findings similar to those reported for other small-scale societies (Wiessner, 2020; Wiessner & Pupu, 2012), suggesting some generalizability of our findings.

6.2. Coordinated executions and third-party norm-enforcement

Although most observations of punishment were consistent with relation restoration, several instances of punishment served other functions.

First, a small number of cases involved the capital punishment of individuals threatening the interests of the group. The Nuer collectively executed suspected werewolves and other suspected evil murderers (Howell, 1954; Howell & Lewis, 1947). In one Mentawai case, a man killed, with his community's support, a large male pig threatening his village. These are consistent with Boehm's (1999, 2012) and Wrangham's (2019) arguments that the coordinated execution of dangerous individuals has been frequent in small-scale societies during human evolution. These executions, however, are more likely instances of punishment-as-incapacitation rather than norm-enforcement, as they seem aimed more at suppressing an immediate threat rather than at teaching transgressors a lesson (Darley, Carlsmith, & Robinson, 2000).

Second, third parties punished a small number of violations among the Kiowa (8.8%). Some individuals paid costs to enforce cooperation on the behalf of the community who granted them the right and power to do so. Similar behaviors have been observed among other indigenous Plains groups who entrusted military societies the role of policing social order and coordinated activities that required high levels of discipline, such as bison hunts (Hoebel, 2009).

How can such third-party punishments be stable? As widely noted, the enforcement of public goods contributions faces a second-order free-rider problem, as people are incentivized to let others pay the costs of punishment while reaping the benefits of the cooperation that punishment generates (Mathew, 2017; Ostrom, 1990; Yamagishi, 1986). Researchers argue that costly norm-enforcement can nonetheless be stable because incentivized by second-order punishment (Boyd, 2018; Mathew, 2017). Although our data may provide little ability to detect such second-order effects, we did not find evidence for second-order sanctions.

Another possibility is that third-party punishment can be stable when carried out by high-status individuals. As a result of their higher bargaining power, coalitional support, and lower risk of retaliation, these individuals pay lower costs to punish (Singh & Boomsma, 2015; von Rueden et al., 2012). In line with this logic, third-party punishment among the Kiowa was carried out mostly by high-status individuals, including leaders and military societies. In fact, according to Garfield et al. (2020), punishment was a leadership role in almost 50% of a sample of 59 mostly non-industrial societies. These lower punishment costs may be recouped by reputational benefits, in line with psychological evidence (Barclay, 2006; Jordan et al., 2016; Kurzban, Descioli, & Obrien, 2007) and ethnographic observations in other small-scale communities (Ostrom, 1990).

6.3. Punitive justice in large- and small-scale societies

Our results speak to functional differences between justice systems of small-scale versus large-scale societies. In large-scale societies, a central function of justice is to enforce group norms—made explicit in formal laws—through third-party sanctions such as fines or imprisonments (Kümmerli, 2011). Evolutionary and psychological scientists may have over-generalized this function to all human societies, leading many researchers to conclude that "TPP [third-party punishment] of selfishness is important in all societies" (House et al., 2020, p. 1; see also Jordan et al., 2016; Jordan & Rand, 2017; Kanakogi et al., 2022).

Our results echo recent research challenging the assumption that punishment, especially by third parties, serves to enforce cooperative group norms in small-scale societies (Baumard, 2010a, 2010b; Black, 1993, 2000; Guala, 2012; von Rueden et al., 2012; Wiessner, 2020). They suggest that punitive justice in small-scale societies mostly serves a restorative function, aiming to resolve interpersonal conflicts rather than deterring violations of group norms (see also Hoebel, 2009).

Why is justice functionally different in small-scale compared to large-scale societies? One possibility is that higher degrees of interdependence in small-scale societies increase the need for relation-restoration (see also Petersen, Sell, Tooby, & Cosmides, 2012; Sznycer & Patrick, 2020). This need may be all the more pressing given that offenses are often committed by young people, who are the future of society, so that many small-scale justice systems seek to restore their moral reputation and reintegrate them in the group (Wiessner, 2020).

Another possibility is that systems of norm-enforcement are difficult to maintain in small-scale, politically decentralized contexts. Indeed, while third-party norm-enforcement would be group-beneficial, it is very costly at the individual level. Punishing offenders means risking dangerous fights and losing cooperation partners (Wiessner, 2005). Most often, then, people likely see no benefit in punishing offenses that do not harm them directly. Incentivizing third-party norm-enforcement seems often to require economic specialization and complex institutional arrangements that systematically reward third-party enforcers by, for example, paying policers for their job (Ostrom, 1990). Although such systems have evolved in some small-scale communities (Ostrom, 1990), they appear to more easily develop in more socio-economically complex, large-scale contexts (e.g., Turchin et al., 2018).

Except for the Kiowa military societies, we do not find evidence for institutions incentivizing third-party punishment in the societies studied here. As a result, when they do punish transgressors, people mostly do so to self-servingly deter future aggression or defend their kin (Krasnow et al., 2012; McCullough et al., 2013; Pedersen et al., 2018). Institutions of punitive justice seem designed to restore dyadic cooperation by appeasing victims' urge for revenge without overly harming offenders.

Declaration of competing interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.evolhumbehav.2023.03.001.

References

André, J.-B., Fitouchi, L., Debove, S., & Baumard, N. (2022). An evolutionary contractualist theory of morality [preprint]. *PsyArXiv.*. https://doi.org/10.31234/osf.io/2hxgu

Axelrod, R. M. (2006). *The evolution of cooperation* (rev. ed.). Basic Books.

Barclay, P. (2006). Reputational benefits for altruistic punishment. *Evolution and Human Behavior, 27*(5), 325–344.

Baumard, N. (2010a). Has punishment played a role in the evolution of cooperation? A critical review. *Mind & Society, 1–22*. https://doi.org/10.1007/s11299-010-0079-9

Baumard, N. (2010b). Punishment is not a group adaptation: Humans punish to restore fairness rather than to support group cooperation. *Mind & Society, 10*(1), 1–26. https://doi.org/10.1007/s11299-010-0080-3

Baumard, N. (2012). The restorative logic of punishment: Another argument in favor of weak selection. *Behavioral and Brain Sciences, 35*(1), 17.

Baumard, N. (2016). *The origins of fairness: How evolution explains our moral nature*. Oxford University Press.

Baumard, N., & Liénard, P. (2011). Second-or third-party punishment? When self-interest hides behind apparent functional interventions. *Proceedings of the National Academy of Sciences, 108*(39), E753.

Black, D. (2000). On the origin of morality. *Journal of Consciousness Studies, 7*, 107–119.

Black, D. J. (1993). *The social structure of right and wrong*. Academic Press.

Boehm, C. (1987). *Blood revenge: The enactment and Management of Conflict in Montenegro and other tribal societies*. University of Pennsylvania Press.

Boehm, C. (1999). *Hierarchy in the forest: The evolution of egalitarian behavior*. Harvard University Press.

Boehm, C. (2012). *Moral origins: The evolution of virtue, altruism, and shame*. Basic Books.

Boyd, R. (2018). *A different kind of animal: How culture transformed our species*. Princeton University Press.

Boyd, R., Gintis, H., & Bowles, S. (2010). Coordinated punishment of defectors sustains cooperation and can proliferate when rare. *Science, 328*(5978), 617–620. https://doi.org/10.1126/science.1183665

Boyd, R., Gintis, H., Bowles, S., & Richerson, P. J. (2003). The evolution of altruistic punishment. *Proceedings of the National Academy of Sciences of the United States of America, 100*(6), 3531–3535. https://doi.org/10.1073/pnas.06304431

Boyd, R., & Richerson, P. J. (1992). Punishment allows the evolution of cooperation (or anything else) in sizable groups. *Ethology and Sociobiology, 13*(3), 171–195. https://doi.org/10.1016/0162-3095(92)90032-Y

Carlsmith, K. M., & Darley, J. M. (2008). Psychological aspects of retributive justice. In , *Vol. 40. Advances in experimental social psychology* (pp. 193–236). Elsevier. https://doi.org/10.1016/S0065-2601(07)00004-4.

Cronk, L., Steklis, D., Steklis, N., van den Akker, O. R., & Aktipis, A. (2019). Kin terms and fitness interdependence. *Evolution and Human Behavior, 40*(3), 281–291. https://doi.org/10.1016/j.evolhumbehav.2018.12.004

Darley, J. M., Carlsmith, K. M., & Robinson, P. H. (2000). Incapacitation and just deserts as motives for punishment. *Law and Human Behavior, 24*(6), 659–683. https://doi.org/10.1023/A:1005552203727

Darmanto, D. (2020). *Good to produce, good to share: Food, hunger, and social values in a contemporary Mentawaian community, Indonesia*. Leiden University. https://hdl.handle.net/1887/138409.

De Cremer, D. (2010). To pay or to apologize? On the psychology of dealing with unfair offers in a dictator game. *Journal of Economic Psychology, 31*(6), 843–848. https://doi.org/10.1016/j.joep.2010.05.006

Diamond, J. M. (2013). *The world until yesterday: What can we learn from traditional societies?* Penguin.

Dyson-Hudson, R., & Smith, E. A. (1978). Human territoriality: An ecological reassessment. *American Anthropologist, 80*(1), 21–41.

Ellickson, R. C. (1991). *Order without law*. Harvard University Press.

Ericksen, K. P., & Horton, H. (1992). "Blood feuds": Cross-cultural variations in kin group vengeance. *Behavior Science Research, 26*(1–4), 57–85. https://doi.org/10.1177/106939719202600103

Evans-Pritchard, E. E. (1969). *The Nuer: A description of the modes of livelihood and political institutions of a Nilotic people*. Oxford University Press.

Fehr, E., & Fischbacher, U. (2004). Third-party punishment and social norms. *Evolution and Human Behavior, 25*(2), 63–87. https://doi.org/10.1016/S1090-5138(04)00005-4

Fehr, E., & Gächter, S. (2002). Altruistic punishment in humans. *Nature, 415*, 5.

Fehr, R., & Gelfand, M. J. (2010). When apologies work: How matching apology components to victims' self-construals facilitates forgiveness. *Organizational Behavior and Human Decision Processes, 113*(1), 37–50. https://doi.org/10.1016/j.obhdp.2010.04.002

Fitouchi, L., André, J.-B., & Baumard, N. (in press). Are there really so many moral emotions? Carving morality at its functional joints. In Al-Shawaf, L. & Shackelford, T., K. (Eds). The Oxford Handbook of Evolution and The Emotions. New York: Oxford University Press.

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., 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

Glowacki, L. (2022). The evolution of peace. *Behavioral and brain sciences*, 1–100.

Glowacki, L., & von Rueden, C. (2015). Leadership solves collective action problems in small-scale societies. *Philosophical Transactions of The Royal Society B Biological Sciences, 370*. https://doi.org/10.1098/rstb.2015.0010

Greuel, P. J. (1971). The leopard-skin chief: An examination of political power among the Nuer. *American Anthropologist, 73*(5), 1115–1120. https://doi.org/10.1525/aa.1971.73.5.02a00100

Guala, F. (2012). Reciprocity: Weak or strong? What punishment experiments do (and do not) demonstrate. *Behavioral and Brain Sciences, 35*(01), 1–15. https://doi.org/10.1017/S0140525X11000069

Hadfield, G. K., & Weingast, B. R. (2013). Law without the state: Legal attributes and the coordination of decentralized collective punishment. *Journal of Law and Courts, 1*(1), 3–34. https://doi.org/10.1086/668604

Haesevoets, T., Reinders Folmer, C., De Cremer, D., & Van Hiel, A. (2013). Money isn't all that matters: The use of financial compensation and apologies to preserve relationships in the aftermath of distributive harm. *Journal of Economic Psychology, 35*, 95–107. https://doi.org/10.1016/j.joep.2013.02.003

Hamilton, W. D. (1964). The genetical evolution of social behaviour. II. *Journal of Theoretical Biology, 7*(1), 17–52. https://doi.org/10.1016/0022-5193(64)90039-6

Heffner, J., & FeldmanHall, O. (2019). Why we don't always punish: Preferences for non-punitive responses to moral violations. *Scientific Reports, 9*(1), 13219. https://doi.org/10.1038/s41598-019-49680-2

Henrich, J., Ensminger, J., McElreath, R., Barr, A., Barrett, C., Bolyanatz, A., … Ziker, J. (2010). Markets, religion, community size, and the evolution of fairness and punishment. *Science, 327*(5972), 1480–1484. https://doi.org/10.1126/science.1182238

Henrich, J., & Muthukrishna, M. (2021). The origins and psychology of human cooperation. *Annual Review of Psychology, 72*(1), 207–240. https://doi.org/10.1146/annurev-psych-081920-042106

Hoebel, E. (2009). *The law of primitive man: A study in comparative legal dynamics*. Harvard University Press.

House, B. R., Kanngiesser, P., Barrett, H. C., Yilmaz, S., Smith, A. M., Sebastian-Enesco, C., … Silk, J. B. (2020). Social norms and cultural diversity in the development of third-party punishment. *Proceedings of the Royal Society B: Biological Sciences, 287*(1925), 20192794. https://doi.org/10.1098/rspb.2019.2794

Howell, P. P. (1954). *A manual of Nuer law: Being an account of customary law, its evolution and development in the courts established by the Sudan government*. Oxford University Press for the International African Institute.

Howell, P. P., & Lewis, B. A. (1947). *Nuer ghouls: A form of witchcraft*. Sudan Notes and Records. http://www.jstor.org/stable/41716516?seq=1#page_scan_tab_contents.

Jordan, J. J., Hoffman, M., Bloom, P., & Rand, D. G. (2016). Third-party punishment as a costly signal of trustworthiness. *Nature, 530*(7591), 473–476. https://doi.org/10.1038/nature16981

Jordan, J. J., & Rand, D. G. (2017). Third-party punishment as a costly signal of high continuation probabilities in repeated games. *Journal of Theoretical Biology, 421*, 189–202. https://doi.org/10.1016/j.jtbi.2017.04.004

Kanakogi, Y., Miyazaki, M., Takahashi, H., Yamamoto, H., Kobayashi, T., & Hiraki, K. (2022). Third-party punishment by preverbal infants. *Nature Human Behaviour, 1–9*. https://doi.org/10.1038/s41562-022-01354-2

Komiya, A., Ohtsubo, Y., Oishi, S., & Mifune, N. (2018). Providing compensation promotes forgiveness for replaceable, but not irreplaceable, losses. *The Journal of Social Psychology, 158*(6), 680–693. https://doi.org/10.1080/00224545.2017.1395792

Kracht, B. R. (2017). *Kiowa belief and ritual*. University of Nebraska Press.

Krasnow, M. M., Cosmides, L., Pedersen, E. J., & Tooby, J. (2012). What are punishment and reputation for? *PLoS One, 7*(9), Article e45662. https://doi.org/10.1371/journal.pone.0045662

Kümmerli, R. (2011). A test of evolutionary policing theory with data from human societies. *PLoS One, 6*(9), Article e24350. https://doi.org/10.1371/journal.pone.0024350

Kurzban, R., Descioli, P., & Obrien, E. (2007). Audience effects on moralistic punishment☆. *Evolution and Human Behavior, 28*(2), 75–84. https://doi.org/10.1016/j.evolhumbehav.2006.06.001

Landis, J. R., & Koch, G. G. (1977). The measurement of observer agreement for categorical data. *Biometrics, 33*(1), 159–174.

Leeson, P. T. (2009). *The invisible hook: The hidden economics of pirates*. Princeton University Press.

Leimar, O., & Hammerstein, P. (2010). Cooperation for direct fitness benefits. *Philosophical Transactions of the Royal Society, B: Biological Sciences, 365*(1553), 2619–2626. https://doi.org/10.1098/rstb.2010.0116

Marlowe, F. W. (2009). *Hadza cooperation second-party punishment, Yes; Third-Party Punishment, No*.

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

Marlowe, F. W., Berbesque, J. C., Barrett, C., Bolyanatz, A., Gurven, M., & Tracer, D. (2011). The 'spiteful' origins of human cooperation. *Proceedings of the Royal Society B: Biological Sciences, 278*(1715), 2159–2164. https://doi.org/10.1098/rspb.2010.2342

Marshall, J., & McAuliffe, K. (2022). Children as assessors and agents of third-party punishment. *Nature Reviews Psychology, 1–11*. https://doi.org/10.1038/s44159-022-00046-y

Mathew, S. (2017). How the second-order free rider problem is solved in a small-scale society. *American Economic Review, 107*, 578–581.

Mathew, S., & Boyd, R. (2011). Punishment sustains large-scale cooperation in prestate warfare. *Proceedings of the National Academy of Sciences, 108*(28), 11375–11380. https://doi.org/10.1073/pnas.1105604108

Mathew, S., & Boyd, R. (2014). The cost of cowardice: Punitive sentiments towards free riders in Turkana raids. *Evolution and Human Behavior, 35*(1), 58–64. https://doi.org/10.1016/j.evolhumbehav.2013.10.001

McCullough, M. E., Kurzban, R., & Tabak, B. A. (2013). Cognitive systems for revenge and forgiveness. *Behavioral and Brain Sciences, 36*(1), 1–15. https://doi.org/10.1017/S0140525X11002160

McDowell, A. G. (2004). Real property, spontaneous order, and norms in the gold mines. *Law & Social Inquiry, 29*(4), 771–818.

Mishkin, B. (1940). *Rank and warfare among the plains Indians*. J. J. Augustin Publisher.

Mittlaender, S. (2019). Morality, compensation, and the contractual obligation: Morality, compensation, and the contractual obligation. *Journal of Empirical Legal Studies, 16*(1), 119–142. https://doi.org/10.1111/jels.12211

Oberg, K. (1934). Crime and punishment in Tlingit society. *American Anthropologist, 36*(2), 145–156.

Ohtsubo, Y., & Watanabe, E. (2009). Do sincere apologies need to be costly? Test of a costly signaling model of apology. *Evolution and Human Behavior, 30*(2), 114–123. https://doi.org/10.1016/j.evolhumbehav.2008.09.004

Ostrom, E. (1990). *Governing the commons: The evolution of institutions for collective action*. Cambridge University Press.

Pedersen, E., McAuliffe, W., & Mccullough, M. (2018). The unresponsive avenger: More evidence that disinterested third parties do not punish altruistically. *Journal of Experimental Psychology. General, 147*. https://doi.org/10.1037/xge0000410

Pedersen, E. J., Kurzban, R., & McCullough, M. E. (2013). Do humans really punish altruistically? A closer look. *Proceedings of the Royal Society B: Biological Sciences, 280*(1758), 20122723. https://doi.org/10.1098/rspb.2012.2723

Pedersen, E. J., McAuliffe, W. H. B., Shah, Y., Tanaka, H., Ohtsubo, Y., & McCullough, M. E. (2019). When and why do third parties punish outside of the lab? A cross-cultural recall study. *Social Psychological and Personality Science*. https://doi.org/10.1177/1948550619884565, 1948550619884565.

Peters, E. L. (1967). Some structural aspects of the feud among the camel-herding Bedouin of Cyrenaica. *Africa, 37*(3), 261–282. https://doi.org/10.2307/1158150

Petersen, M. B., Sell, A., Tooby, J., & Cosmides, L. (2012). To punish or repair? Evolutionary psychology and lay intuitions about modern criminal justice. *Evolution and Human Behavior, 33*(6), 682–695. https://doi.org/10.1016/j.evolhumbehav.2012.05.003

Raihani, N. J., & Bshary, R. (2019). Punishment: One tool, many uses. *Evolutionary Human Sciences, 1*, Article e12. https://doi.org/10.1017/ehs.2019.12

Richardson, J. (1940). *Law and status among the Kiowa Indians*. J. J. Augustin Publisher.

von Rueden, C. R., Gurven, M., & Guala, F. (2012). When the strong punish: Why net costs of punishment are often negligible. *Behavioral and Brain Sciences, 35*(1), 43.

Schefold, R. (1982). The culinary code in the puliaijat ritual of the Mentawaians. *Bijdragen Tot de Taal-, Land-En Volkenkunde, 138*, 64–97. https://doi.org/10.1163/22134379-90003482

Schefold, R. (1988). *Lia: Das grosse Ritual auf den Mentawai-Inseln (Indonesien)*. Dietrich Reimer Verlag.

Singh, M., & Boomsma, J. J. (2015). Policing and punishment across the domains of social evolution. *Oikos, 124*(8), 971–982. https://doi.org/10.1111/oik.02064

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*. https://doi.org/10.1016/j.evolhumbehav.2022.07.003

Singh, M., Kaptchuk, T. J., & Henrich, J. (2021). Small gods, rituals, and cooperation: The Mentawai water spirit Sikameinan. *Evolution and Human Behavior, 42*(1), 61–72. https://doi.org/10.1016/j.evolhumbehav.2020.07.008

Skarbek, D. (2012). Prison gangs, norms, and organizations. *Journal of Economic Behavior and Organization, 82*(1), 96–109. https://doi.org/10.1016/j.jebo.2012.01.002

Smith, C. E., & Warneken, F. (2016). Children's reasoning about distributive and retributive justice across development. *Developmental Psychology, 52*(4), 613–628. https://doi.org/10.1037/a0040069

Strathern, A., & Stewart, P. J. (2012). *Peace-making and the imagination: Papua New Guinea perspectives*. University of Queensland Press.

Sznycer, D., & Patrick, C. (2020). The origins of criminal law. *Nature Human Behaviour*. https://doi.org/10.1038/s41562-020-0827-8

Sznycer, D., Sell, A., & Williams, K. (2021). Justice-making institutions and the ancestral logic of conflict. *PsyArXiv.*. https://doi.org/10.31234/osf.io/dx3yv

Tomasello, M., Melis, A. P., Tennie, C., Wyman, E., & Herrmann, E. (2012). Two key steps in the evolution of human cooperation: The interdependence hypothesis. *Current Anthropology, 53*(6), 673–692. https://doi.org/10.1086/668207

Trivers, R. (1971). *The Evolution of Reciprocal Altruism. 46(1)* pp. 35–57).

Tulius, J. (2012). *Family stories: Oral tradition, memories of the past, and contemporary conflicts over land in Mentawai—Indonesia*. Leiden University.

Turchin, P., Currie, T. E., Whitehouse, H., François, P., Feeney, K., Mullins, D., … Spencer, C. (2018). Quantitative historical analysis uncovers a single dimension of complexity that structures global variation in human social organization. *Proceedings of the National Academy of Sciences, 115*(2), E144–E151. https://doi.org/10.1073/pnas.1708800115

Warner, W. L. (1958). *A black civilization: A social study of an Australian tribe*. Harper & Brothers.

Warrens, M. (2015). Five ways to look at Cohen's kappa. *Journal of Psychology & Psychotherapy, 05*. https://doi.org/10.4172/2161-0487.1000197

Weidman, A. C., Sowden, W. J., Berg, M. K., & Kross, E. (2020). Punish or protect? How close relationships shape responses to moral violations. *Personality and Social Psychology Bulletin, 46*(5), 693–708. https://doi.org/10.1177/0146167219873485

Wenzel, M., & Okimoto, T. G. (2014). On the relationship between justice and forgiveness: Are all forms of justice made equal? *British Journal of Social Psychology, 53*(3), 463–483. https://doi.org/10.1111/bjso.12040

West, S. A., Cooper, G. A., Ghoul, M. B., & Griffin, A. S. (2021). Ten recent insights for our understanding of cooperation. *Nature Ecology & Evolution, 5*(4), 419–430. https://doi.org/10.1038/s41559-020-01384-x

Wiessner, P. (2005). Norm enforcement among the Ju/'hoansi bushmen: A case of strong reciprocity? *Human Nature, 16*(2), 115–145. https://doi.org/10.1007/s12110-005-1000-9

Wiessner, P. (2020). The role of third parties in norm enforcement in customary courts among the Enga of Papua New Guinea. *Proceedings of the National Academy of Sciences, 117*(51), 32320–32328. https://doi.org/10.1073/pnas.2014759117

Wiessner, P., & Pupu, N. (2012). Toward peace: Foreign arms and indigenous institutions in a Papua New Guinea society. *Science, 337*(6102), 1651–1654. https://doi.org/10.1126/science.1221685

Wissler, C. (1914). The influence of the horse in the development of plains culture. *American Anthropologist, 16*(1), 1–25.

Witvliet, C. V. O., Worthington, E. L., Root, L. M., Sato, A. F., Ludwig, T. E., & Exline, J. J. (2008). Retributive justice, restorative justice, and forgiveness: An experimental psychophysiology analysis. *Journal of Experimental Social Psychology, 44*(1), 10–25. https://doi.org/10.1016/j.jesp.2007.01.009

Wrangham, R. (2019). *The goodness paradox: The strange relationship between virtue and violence in human evolution*. Vintage.

Yamagishi, T. (1986). The provision of a sanctioning system as a public good. *Journal of Personality and Social Psychology, 51*(1), 110.