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Review

How small-scale societies achieve large-scale cooperation

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Abstract

For most of our species' history, humans have lived in relatively small subsistence communities, often called small-scale societies. While these groups lack centralized institutions, they can and often do maintain large-scale cooperation. Here, we explore several mechanisms promoting cooperation in small-scale societies, including (a) the development of social norms that encourage prosocial behavior, (b) reciprocal exchange relationships, (c) reputation that facilitates high-cost cooperation, (d) relational wealth, and (e) risk buffering institutions. We illustrate these with ethnographic and psychological evidence from contemporary small-scale societies. We argue that these mechanisms for cooperation helped past and present small-scale communities adapt to diverse ecological and social niches.

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Cooperation in small-scale societies

Small-scale societies—relatively small, decentralized, subsistence communities with limited food surplus—characterized most human groups throughout our evolutionary history [1]. Small-scale societies are commonly perceived as having localized and limited cooperation, primarily among individuals who are related to each other [2,3]. Recent evidence suggests that this view is mistaken. Small-scale societies can and do achieve large-scale cooperation, including extensive trade networks, natural resource management, and wide-spread food sharing [4]. Rather than relying on formal centralized institutions, we argue that small-scale societies promote prosocial behavior through bottom-up processes that have allowed humans to adapt to a wide variety of social and ecological niches [5]. In what follows, we outline several mechanisms through which small-scale societies maintain cooperation, including the development of social norms promoting prosocial behavior, reciprocity, reputation, relational wealth, and risk buffering institutions. Throughout, we illustrate our argument using anthropological and psychological evidence from small-scale societies, including foragers, pastoralists, horticulturalists, and agriculturalists.

Development of social norms

Cooperation between community members is coordinated through social norms, defined by Tomasello and Vaish [6] as "mutual agreements or commitments about the way that individuals ought to behave in certain situations". Social norms organize all aspects of social life, including how and when communities share food, pool labor, care for children, seek status, and express aggression.

From an early age, young children are eager cooperators [6]. Experimental evidence suggests that two- to five-year-old children from rural Vanuatu help others independently from cues which indicate that helping is necessary [7]. Hadza forager children in Tanzania share food as soon as they begin participating in foraging, around the age of three [8]. Pumé forager children in Venezuela spend much of their time caring for other children [9]. Through the development of social norms, children come to coordinate their prosocial behavior with other community members.

Children learn social norms from adults in early life [10,11]. Kalahari San parents encourage eight-month-olds when they give objects to others [12]. Indian Nayaka parents teach their children to share by sending them to distribute plates to other households [13]. Inuit parents in the Canadian Arctic describe antisocial scenarios to children and ask them to resolve them [14]. Children also learn social norms from other children. During pretense play, children across a range of small-scale societies emulate the gendered division of

foraging labor, resolve disputes, and carefully share resources with each other [15—17]. Cross-cultural experimental research from eight societies shows that children's prosocial behavior matches that of adults by middle childhood, suggesting that social norms have been internalized by this age [18].

When transgressed, social norms are enforced through punishment [19]. Central African Aka forager children report that if they refuse to babysit, their parents will withhold food, hit them, insult them, or gossip about them [20]. Malaysian Batek parents tease children who act aggressively [21]. By three years of age, children themselves enforce social norms [22]. Aka children report refusing to share and reprimanding others who have hidden food [20]. Norm enforcement continues into adulthood. While severe sanctions are rare in small-scale societies [23], individuals who disregard social norms are likely to be subject to gossip, criticism, avoidance [24], or are believed to be subject to supernatural sanctions [25]. Some societies, such as the Enga in Papua New Guinea, may institute fines for serious norm violations [26]. In cases of high-cost cooperation, such as warfare, defectors may be subject not only to gossip and fines but to physical punishment as well [27]. In sum, cooperation is developed in childhood through the acquisition of social norms and enforced during childhood and adulthood through the threat of sanctions.

Reciprocity

Exchanges of food, labor, and information are structured by reciprocity in small-scale societies. Reciprocity can include multiple currencies such as exchanging food for coalitional support [28], other items of value such as trade goods [29], delayed support when sick or injured [30], alloparenting [31], and teaching [32]. Direct reciprocity involves repeated cooperative or prosocial acts between the same individuals [33], and is usually dependent upon interpersonal history [34]. Indirect reciprocity depends on conditionally treating others based on their reputation, with a reputation for prosocial behavior likely to confer social benefits [33]. Reciprocity is an important force motivating day-to-day cooperation in small-scale societies [35]. Across five Bolivian Tsimane horticulturalist communities, reciprocal exchange had a large effect on cooperation independent of kinship and proximity [36]. Food sharing between households is near universal in small-scale societies and strongly influenced by reciprocity including among Hadza children [37], Indonesian whalers [38], Inuit communities [39], San foragers [29], and Paraguayan Ache households [40].

Reputation

Having a reputation for prosociality generally confers access to more social partners, and by extension, resources, across a range of small-scale societies [41]. Among communities in highland Peru, known cooperators have more social support partners [42]. Australian Martu hunters who were more generous in sharing meat from foraging had more cooperative partners and were more central in the social network [43]. East African pastoralists who were raid leaders were more central in the social network and had a greater number of friends than non-leaders [44]. In Dominican villages, men with more prosocial reputations were able to organize larger labor groups and had a greater number of reciprocal partnerships than men with less prosocial reputations [45].

While dominance and prestige are dual pathways to social status in post- industrial settings [46], dominance appears to be less important in small-scale societies due to status levelling mechanisms [47]. Individuals who attempt to assert dominance over others are typically avoided, shunned, and possibly sanctioned [48]. Instead, high levels of costly cooperation including through providing public goods, such as big-game hunting, providing animals for ceremonies or rituals, or special insight or leadership, generates prestige [49—51]. Competition for prestige may promote investments in prosocial behavior fueling greater investments in cooperation and collective goods [52]. Prestige often results in ancillary benefits, such as increased reproductive opportunities, childcare, and social support [47,53]. Among forager-horticulturalists in Bolivia, prestigious men have higher fertility and lower offspring mortality [54]. Meriam men in Australia who provide public goods through turtle hunting have earlier ages of reproduction and higher age-specific reproductive success [55]. The relationship between prestige and reproductive benefits appears cross-culturally robust. A meta-analyses including data from 33 small-scale societies found a strong association between men's status and reproductive success that held regardless of status measure and subsistence strategy [56]. In sum, developing a reputation for cooperation confers direct and indirect benefits.

Relational wealth

While local residential groups often number between 10 and 30 individuals [57], many small-scale societies have fluid residence with members frequently changing camps several times a year or more. In a cross-cultural study of 32 forager societies, Hill et al. [58] found that most individuals in a residential group are genetically *unrelated* to each other. Affinal kin and friendships connect unrelated individuals, creating many opportunities for knowledge exchange [59]. As a result, individuals are exposed to hundreds, or even thousands, of interaction partners over a lifetime. An analysis of foraging groups in Tanzania and Paraguay showed that the typical number of interaction partners over a lifetime was an order of magnitude more than chimpanzees [60]. Hadza men, for example, are expected to converse with over 400

men, hunt with over 300, and watch tool making from nearly 400 other men over a lifetime. The total number of indirect interactions in which individuals may learn social information from is more than 1000.

The social organization of small-scale societies facilitates the accumulation of relational wealth in the form of social ties which promote food sharing and other forms of assistance [61]. These social ties are maintained through kinship, clan membership, or friendship [62]. For example, data from foragers in the Philippines and Republic of Congo suggest that a multilevel structure, with strong links between non-kin, facilitates access to social relationships that buffer against daily variance in foraging and support our hyper-cooperative livelihoods that include alloparenting and wide-spread resource sharing [59,63]. Relationships with outgroup members are also maintained across long-distances to buffer periods of food scarcity [64,65]. In sum, while small-scale populations may have small local residential groups, high mobility and social relationships with non-kin promote large-scale social interactions and exchanges.

Risk-buffering institutions

Small-scale societies often have limited means to accrue surplus, especially food. Thus, they rely heavily on social structures and informal institutions that distribute risk across individuals, families, or communities. Among foraging societies, the most common of these is central place foraging and food sharing where individual or small group surplus is brought back to a central location, such as a camp, where other individuals are able to access a share [66]. Many risk-pooling institutions involve exchange networks such as *hxaro* among the San [34], the East African Maasai gift-giving system of *osotua* [67], and bond friendships among pastoralists [66]. Many small-scale societies also buffer risk by providing rights for accessing territory based on one's relationships (either kinship or membership in a corporate group). For example, among the San, people may forage at any place where their parents, spouse, or parents-in-law had rights [68]. Among pastoralists, individuals often gain rights to territory through membership in territorial sections inherited from their father or husband [5]. Such systems ensure that individuals can access the resources for survival if needed.

Large-scale cooperation in small-scale societies

Small-scale societies, including foragers, often engaged in large-scale cooperation and collective action involving dozens to hundreds of people and likely did so well until the Pleistocene [69]. Boyd and Richerson [4] showed that Holocene and Pleistocene foragers across the globe engaged in large-scale communal hunting, management of the local environment, construction of shared facilities, trade, and warfare. For example, intergroup warfare in small-scale societies sometimes involves hundreds of combatants, many of whom are unrelated to each other [27,70]. Communal hunting was often conducted utilizing drivelines dozens of kilometers long requiring hundreds of participants for their construction [4]. Many populations engaged in extensive resource management including the use of fire regimes [71]. While most cooperation in small-scale societies was local involving kin or reciprocal relationships, this evidence suggests that large-scale high-cost cooperation was not anomalous.

Conclusion

A large part of our evolutionary history was spent living in small-scale societies. With little surplus, the social and ecological challenges faced by small-scale societies were acute. Small-scale societies met these challenges through a combination of social norms promoting cooperation, reciprocity, reputation, relational wealth, and risk buffering institutions. This demonstrates that while hierarchical, centralized, and coercive structures—features that characterize our own society—may facilitate large-scale cooperation, they are not necessary for human expansion and success.

Conflict of interest statement

Nothing declared.

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