

etary variance to acceptable levels. If hunters in a small foraging band are not closely related (e.g., Hill et al. 2011), then reciprocal altruism encompassing the hunters of all families would be a well-grounded prediction.

As the authors note, in subsistence societies reciprocal altruism is a more common means of allocating assistance, even though there are a number of studies that show that kinship largely determines sharing. While this is true, the far more critical question is why. We still are unable to predict under what conditions kinship, reciprocity, or a mixture of the two predicts the transfer of resources and services between households. My review of the kin-selection literature (Hames, forthcoming) leads me to believe that low-cost assistance is more frequently based on reciprocal altruism, while high-cost assistance is based on kinship. A potential example of this in one society would be Chagnon's Yanomamö ax fight analysis (Alvard 2009; Chagnon and Bugos 1979), where the costs and consequences of standing with one group or the other are enormous and far-reaching. Kinship, along with affinity, predicted coalitionary alignments, whereas my research on Yanomamö food sharing (Hames 2000) demonstrated that reciprocal altruism governed food exchanges, while kinship did not.

An issue I see in the paper is that, given the wide range of cooperative behaviors elicited in their survey, differences in the 10 cooperation types may reflect different adaptive problems, such as food security and family labor shortages, emphasized here, but also advantages of economies of scale and other factors. If one examines the list of cooperative behaviors, it is clear that costs and potential benefits vary considerably, from alloparenting and lending money to dispute consultation (table A1). While the authors' approach has merits in being comprehensive and has implications for understanding trade, why not test the importance of kinship or reciprocal altruism on assistance types ranked from cheap to costly? Perhaps the data they have are not up to the task because of sample size or for some other reason. Again, the idea here is that the costs and benefits of different kinds of help, along with their periodicity (e.g., near daily alloparenting to rarer monetary loans in their survey), may cause families to use different mechanisms to solve particular adaptive problems.

I think that the growing literature on cooperation may show that behavioral ecologists may need to be better cultural anthropologists by directly asking informants about why they rely on particular households for certain kinds of assistance, about worries concerning nonreciprocation, or about cases of broken relationships. In this regard, the authors' insights about the aged and kin conflict are very valuable. This is not to say that informants will necessarily provide accurate answers. Just as ours, their explanations have to be turned into testable hypotheses. Nevertheless, informants may provide important insights that we can use to better formulate our hypotheses.

I feel it safe to say that in the 1980s and 1990s, after many of us had grasped Hamilton's theory of kin selection, we

though that we could quite easily establish how the flow of assistance was based on the metric of relatedness in the context of appropriate costs and benefits. After all, anthropology had always emphasized kinship as the basis for cooperation. This work shows that it is not so simple and that we still have a long way to go.

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Form Follows Function: Reciprocity, Trade, and Socioeconomic Transformation

We welcome the timely focus on individual differences in cooperation and the effects of socioeconomic change on cooperative networks. It helps move the behavioral ecology of cooperation beyond timeless food-exchange patterns among foragers, especially in its attempt to address what Polanyi (1944) referred to as the "great transformation" of exchange networks in the face of increasing market integration. Overall, the target article is to be commended for its combination of comprehensive ethnography, rigorous quantitative analyses, and detailed comparative review. Our commentary delves further into the theoretical motivations underlying cooperation and aims to stimulate further discussion.

The authors attempt to determine the relative contributions of reciprocal altruism and kin selection to cooperation among the Pimbwe, yet critical information about what motivates cooperation in the first place is missing. The authors mention risk buffering, wherein reciprocal exchange can help reduce the risk of food shortfalls, illnesses, or other shocks, assuming that risk is not highly correlated among individuals (Winterhalder 1986). Kin selection, however, supports unilateral investment when need is not distributed equally, for example, older generations supporting younger ones (Hooper et al. 2015). To assess the utility of either model for managing risk, one needs to know who experienced different shocks and whether help was received in the necessary currency during periods of need (Gurven et al. 2015). In the absence of such data, the present findings of reciprocal helping across varied domains of behavior could instead reflect trade supporting divisions of labor, rather than risk buffering.

Expanding the scope of cooperation beyond food sharing is a strength of the current study, but summing help across domains ignores that each potential shock or need may have its own particular response and social safety net. For example, child care and advice may be consistent with one-way flows among kin, meal sharing may reflect balanced invitations among affines, and field labor may be reciprocated

during peak seasonal harvests or traded for food or money. The presence of multiple commodities thus adds further nuance to theoretical expectations regarding exchange patterns (Barclay 2013; Noë and Hammerstein 1994): individuals are expected to trade commodities that they possess in high supply for those for which they have high demand. Exchanges in kind are expected only when supply and demand vary over time (e.g., foraging returns) or when turn-taking generates economies of scale (e.g., agricultural labor). The majority of commodities, however, should be in high supply for some individuals but low supply for others, resulting in trade. In this context, individual properties such as wealth, age, and neediness can indicate relative supply and demand and predict individual differences in their exchange (Barrett et al. 1999; Jaeggi et al. 2014). Combining multiple currencies into one dimension of helping behavior may give a general sense of dyadic social engagement, but then we lose specificity about the dynamics that characterize each separate currency.

The theoretical expansions outlined above highlight the need for a fuller account of the finding that wealthier Pimbwe appear to disengage from reciprocal-helping networks. Some unanswered questions include Do the wealthier opt out because they have greater access to alternative means of managing risks? Does Pimbwe wealth buffer against all types of risk, or does wealth imperfectly substitute for traditional social insurance? Even if wealth is a good buffer, is access to material wealth predictable over time, such that disengagement from more traditional exchange networks does not carry an insurance risk? Are there self-selected traits of wealthier individuals that make them less eager to participate in social exchange networks? Might they be at lower risk of experiencing a variety of shocks (e.g., because of their preexisting wealth or by being healthier) in the first place, and so less in need of buffering? Finally, given the cross-sectional study design and people's tendency to always mourn how conditions were better in the past, how can we be sure that sharing networks have eroded over time?

Whether socioeconomic change erodes social capital among Pimbwe or other populations requires knowing the functions of cooperation, factors affecting the supply and demand of different commodities that individuals exchange, and the costs and benefits of alternative options that come with change. If the function of cooperation is to buffer risk and if material wealth provides an alternative means to buffer a variety of risks without the costs of reciprocity, then the rich might indeed be expected to withdraw. If, however, commodities that the rich can provide at low marginal cost (e.g., food, money lending) can be traded for others for which they exhibit high demand (e.g., labor, political support), then the rich might invest more heavily in exchange networks (Gurven et al. 2015; Jaeggi et al. 2014). Unraveling how socioeconomic change affects exchange networks more broadly will require tests of these predictions in longitudinal studies and in cross-cultural samples.

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A long-standing challenge for anthropologists involves the emergence and maintenance of cooperation in human societies, and social-network analysis provides a critical means for disentangling this important puzzle. Kasper and Borgerhoff Mulder bring welcome attention to the role of interpersonal cooperation, advancing theories of the evolution of altruistic behavior. Whereas human behavioral ecologists have generally focused on cooperation between households, the authors address interindividual helping across multiple domains, including material support, child care, advice, and assistance with agricultural labor. Their ethnographic data on helping behavior in a developing Tanzanian community are compelling and provide key insights into the respective importance of reciprocal altruism and kin selection as explanations of cooperative relationships. Below, I focus my comments on opportunities for the authors to expand on their methods and analysis to enrich the informativeness of their central findings.

The authors develop predictions derived from kin-selection theory, which largely hinges on differences in need between kin. In this study, table 1 indicates that need was calculated as the absolute difference of the households' respective consumer-producer ratios. My concern is that, by using the absolute value of the difference, the directionality of need is masked, as the resulting matrix is symmetric on both sides of the diagonal. In other words, the same positive value for need is evidently used to predict helping scope from both individual i to individual j and from individual j to individual i . By extension, this implies that when a dyad exhibits a highly divergent consumer-producer ratio, both individuals are expected to increase their help to the other in similar ways despite the considerably greater neediness that characterizes one of the individuals.

As a test of kin selection, the authors adopt the use of interaction terms (Allen-Arave, Gurven, and Hill 2008). Specifically, they interact their measure of need with two other variables: relatedness and a dummy variable that denotes the giver in noncontingent dyads. There is apparently an assumption that unidirectional giving is directed to the individual with the greater relative need, but owing to the use of the absolute value, my interpretation is that this interaction term could equally reflect transfers from the needier individual in the noncontingent dyad. Furthermore, whereas it is conventional to report the corresponding main effects in statistical models that include interaction terms, the extended models in table 2 seemingly do not report the main effects of need (N) and unidirectional giving (U) or the two-way interactions that underlie the three-way interaction term. Therefore, it is difficult to discern how need-based helping among kin contrasts with need-based helping more generally. Can the authors address how "kin-directed altruism" differs from other need-based assistance?