

- Boyd, R., & Richerson, P. (1995). Why does culture increase human adaptability? *Ethology and Sociobiology*, *16*, 125–143.
- Dickson, D. B., Olsen, J., Dahm, F., & Wachtel, M. (2005). Where do you go when you die? A cross-cultural test of the hypothesis that infrastructure predicts individual eschatology. *Journal of Anthropological Research*, *61*(1), 53–79.
- Dreber, A., Rand, D. G., Fudenburg, D., & Nowak, M. A. (2008). Winners don't punish. *Nature*, *452*, 348–351.
- Fehr, E., & Gächter, S. (2000). Cooperation and punishment in public goods experiments. *The American Economic Review*, *25*, 63–87.
- Henrich, J. (2004). Cultural group selection, coevolutionary processes and large-scale cooperation. *Journal of Economic Behavior & Organization*, *53*, 3–35.
- Hodge, K. M. (2011a). On imagining the afterlife. *Journal of Cognition and Culture*, *11*, 367–389.
- Hodge, K. M. (2011b). Why immortality alone will not get me to the afterlife. *Philosophical Psychology*, *24*(3), 395–410.
- Johnson, D. (2005). God's punishment and public goods. *Human Nature*, *16*(4), 410–446.
- Johnson, D. (2016). *God is watching you: How the fear of God makes us human*. New York: Oxford University Press.
- Johnson, D., & Krüger, O. (2004). The good of wrath: Supernatural punishment and the evolution of cooperation. *Political Theology*, *5*(2), 159–176.
- McKay, R., Efferson, C., Whitehouse, H., & Fehr, E. (2011). Wrath of God: Religious primes and punishment. *Proceedings of the Royal Society: Biological Sciences*, *278*, 1858–1863.
- Norenzayan, A. (2013). *Big Gods: How religion transformed cooperation and conflict*. Princeton: Princeton University Press.
- Peregrine, P. (1996). The birth of the gods revisited: A partial replication of Guy Swanson's (1960) cross-cultural study of religion. *Cross-Cultural Research*, *30*(1), 84–112.
- Purzycki, B. G. (2013). The minds of gods: A comparative study of supernatural agency. *Cognition*, *129*, 163–179.
- Schloss, J., & Murray, M. (2011). Big gods were made for big groups. *Religion, Brain, & Behavior*, *1*, 89–93.
- Shariff, A., & Norenzayan, A. (2011). Mean Gods make good people: Different views of God predict cheating behavior. *International Journal for the Psychology of Religion*, *21*, 85–96.
- Soltis, J., Boyd, R., & Richerson, P. (1995). Can group-functional behaviors evolve by cultural group selection?: An empirical test. *Current Anthropology*, *36*(3), 473–494.
- Swanson, G. (1960). *The birth of the Gods: The origin of primitive beliefs*. Ann Arbor: University of Michigan Press.
- Wakano, J. Y., & Aoki, K. (2006). A mixed strategy model for the emergence and intensification of social learning in a periodically changing natural environment. *Theoretical Population Biology*, *70*, 486–497.
- Watts, J., Sheehan, O., Greenhill, S. J., Gomes-Ng, S., Atkinson, Q. D., Bulbulia, J., & Gray, R. D. (2015). Pulu: Database of austronesian supernatural beliefs and practices. *PLoS ONE*, *10*(9), e0136783.
- Whitehouse, H. (2008). Cognitive evolution and religion; cognition and religious evolution. In J. Bulbulia, R. Sosis, E. Harris, R. Genet, C. Genet, & K. Wyman (Eds.), *The evolution of religion: Studies, theories, & critiques* (pp. 31–41). Santa Margarita, CA: Collins Foundation Press.
- Williams, G. C. (1966). *Adaptation and natural selection: A critique of some current evolutionary thought*. Princeton: Princeton University Press.

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Sacredness as an implied threat of supernatural punishment: the case of need-based transfers

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Maasai pastoralists in East Africa have a system of livestock sharing that they refer to by their word for “umbilical cord”: *osotua*. In *osotua* relationships, individuals ask for help only if they are in

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genuine need and give if they are asked and able to help without falling below the threshold of cattle required to support their families. If help is given, the recipient is not expected to pay it back. There is no debt and credit in the osotua system. This generosity is a puzzle in the context of a standard reciprocity framework. Why would individuals give without expecting a return, and how could a system of giving like this be stable in the face of potential cheaters who might feign need or fail to help when they are able? One potential answer is that the sacredness of the osotua bond helps to stabilize this sharing system. In Johnson's book *God is Watching You: How the Fear of God Makes Us Human*, he suggests that divine power can act as a threat of supernatural punishment to those who break the rules of the system. Here we explore whether sacredness of relationships such as osotua can stabilize sharing systems that are based on need, which we call "need-based transfers."

The Human Generosity Project is a transdisciplinary effort to investigate the interrelationship between biological and cultural influences on human generosity, focusing on need-based transfers (systems of risk-pooling based on generosity toward those in need). This project began as an investigation of the osotua system of the Maasai and has expanded to include eight societies around the world with similar systems of need-based transfers. Need-based transfers differ from transfers referred to variously as balanced, tit-for-tat, account-keeping, or debt-based reciprocity in that they do not create debt and need not be repaid. Need-based transfers are most common when needs arise unpredictably, and computer models show that in volatile environments, need-based transfers do a better job of pooling risk and of keeping agents alive than do transfers of the debt-based variety (Aktipis et al., 2016; Aktipis, Cronk, & de Aguiar, 2011; Campenni, Cronk, & Aktipis, 2015; Hao, Aktipis, Armbruster, & Cronk, 2015). When needs are predictable, in contrast, debt-based arrangements can be maintained. For example, ranchers in the American Southwest rely on their neighbors for help with routine, predictable chores such as branding calves and marketing cattle. Such favors are remembered, and they are expected to be repaid in kind in a back-and-forth, tit-for-tat manner. However, when those same ranchers experience unpredictable needs, such as a shortage of labor due to an illness, injury, or death in the family, their neighbors routinely do the needed work free of charge and without any expectation of repayment (i.e., as a need-based transfer; Cronk, 2015).

Systems of cooperation that include conflicts of interest are vulnerable to various forms of cheating. Cheating might be tempting for people involved in both need-based transfers and debt-based systems, but cheating in the two systems takes very different forms. In debt-based systems, cheating consists of failing to repay a debt. Such behavior is impossible to hide and has immediate real-world consequences: people who do not repay their debts do not receive any more loans. In need-based transfer systems, cheating consists of feigning need in order to elicit generosity and refusing to give to those who are genuinely in need when one is actually able to do so. Depending on the nature of the help requested, such behavior might be quite easy to get away with. And, if the cheater is not caught, the real-world consequences of such behavior might be minimal. If one elicits aid from a risk-pooling partner when one is not really in need, the partner may be marginally less able to provide aid at some future time when one is truly in need, but the aid received might also enable one to weather that future need without any outside help. If one fails to give to one's genuinely needy risk-pooling partner even though one is able to do so, the needy partner may be unavailable to help in the future, but chances are that he or she was only one of several risk-pooling partners anyway, and the wealth thus retained may also make it easier to avoid becoming needy in the future.

Given how tempting cheating might be in systems of risk-pooling based on need-based transfers, what makes them stable? Johnson's book suggests one possible answer: a sacredness that constitutes an implied threat of divine or at least supernatural punishment to those who break the rules of the system. The Maasai osotua system is a good example of a risk-pooling system imbued with just such a sense of sacredness (Aktipis et al., 2011; Aktipis et al., 2016; Cronk, 2007; Cronk, 2017; Cronk & Wasielewski, 2008; Hao et al., 2015). The evocative metaphor at the heart of osotua symbolically and emotionally links the relationships formed between osotua partners (*isotuatin*) to the sacred and emotionally charged relationship between a mother and her child. Osotua partners agree to help each other whenever a need arises. However, osotua gifts are given only in response to requests,

and such requests are made only when one has a genuine need. If the partner to whom a request is made is able to help, he or she is obligated to do so. Gifts given between osotua partners do not create debt (*esile*), and they need not be repaid. If one partner is repeatedly in need and the other is able to help, then the flow may be quite one-sided, even over a long period of time. Such relationships are imbued with such a deep sense of respect (*enkanyit*), responsibility, and sacredness that Maasai interviewees insist that it would be unthinkable for anyone to break the rules of osotua by feigning need or by failing to respond positively to a request if able to do so.

It is worth noting that the kinds of situations that give rise to systems of risk-pooling based on need-based transfers are also the kinds of situations where one is most likely to find superstition and magical thinking. As Johnson explains, there is a widely observed and well-documented relationship between risk and uncertainty on one hand and magical thinking and superstitions on the other. This “uncertainty hypothesis” was first inspired by Malinowski’s (1922) observation that, in the Trobriand Islands, magic was more often associated with dangerous activities such as open ocean fishing than with safe activities such as lagoon fishing. Gmelch (1971, 1992; see also Burger & Lynn, 2005) provided an entertaining example of this phenomenon among professional baseball players: superstitions regarding rituals, routines, and magical charms are frequently related to activities that have high rates of failure, such as pitching and hitting, and are rarely associated with activities with high rates of success, such as fielding. It is thus worth considering the possibility that the sacredness with which need-based transfers are often imbued is enhanced by their association with high-risk situations and thus with superstition and magical thinking. If so, then superstition and magical thinking may have practical, real-world benefits in the form of more stable systems of risk-pooling.

Systems of risk-pooling can arise when individuals realize that they are in environments characterized by uncertainty and that others are also vulnerable, leading to a sense of their mutual interdependence (Roberts, 2005). Thus, common knowledge (i.e., everybody knows that everybody knows they are all interdependent) may be critical, as it may help solve coordination problems around creating risk-pooling systems and engaging in other forms of risk management (Chwe, 2001; Cronk & Leech, 2013). How might such common knowledge arise? Here, again, religion may play a role. Religious rituals may lead to shared attention (Tomasello, 2009), encouraging mental state modeling in general terms and sometimes even specifically calling attention to the vulnerability of individuals engaging in the ritual (e.g., circumcision ceremonies) or the challenges faced by the community (e.g., in shared prayers). This shared attention can make participants more aware of the ways in which they are mutually interdependent, leading to a shared intention regarding a need to collectively manage risks.

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References

- Aktipis, C. A., de Aguiar, R., Flaherty, A., Iyer, P., Sonkoi, D., & Cronk, L. (2016). Cooperation in an uncertain world: For the Maasai of East Africa, need-based transfers outperform account keeping in volatile environments. *Human Ecology*, 44(3), 353–364.
- Aktipis, C. A., Cronk, L., & de Aguiar, R. (2011). Risk-pooling and herd survival: An agent-based model of a Maasai gift-giving system. *Human Ecology*, 39, 131–140.
- Burger, J. M., & Lynn, A. L. (2005). Superstitious behavior among American and Japanese professional baseball players. *Basic and Applied Social Psychology*, 27(1), 71–76.

- Campenni, M., Cronk, L., & Aktipis, C. A. (2015). Spatial-temporal constraints on risk-pooling strategies in volatile environments: An agent-based model of foraging behavior. Göttinger Freilandtage. Deutsches Primatenzentrum, Leibniz-Institut für Primatenforschung, Göttingen, Germany.
- Chwe, M. S.-Y. (2001). *Rational ritual. Culture, coordination, and common knowledge*. Princeton, NJ: Princeton University Press.
- Cronk, L. (2007). The influence of cultural framing on play in the trust game: A Maasai example. *Evolution and Human Behavior*, 28, 352–358.
- Cronk, L. (2015). “Neighboring”: A preliminary look at generosity and mutual aid among ranchers in the American Southwest. <http://humangenerosity.org>
- Cronk, L. (2017). Culture’s influence on behavior: Steps toward a theory. *Evolutionary Behavioral Sciences*, 11(1), 36–52.
- Cronk, L., & Wasieleski, H. (2008). An unfamiliar social norm rapidly produces framing effects in an economic game. *Journal of Evolutionary Psychology*, 6(4), 283–308.
- Cronk, L., & Leech, B. L. (2013). *Meeting at Grand Central: Understanding the social and evolutionary roots of cooperation*. Princeton, NJ: Princeton University Press.
- Gmelch, G. (1971). Baseball magic. *Society*, 8(8), 39–41.
- Gmelch, G. (1992). Superstition and ritual in American baseball. *Elysian Fields Quarterly*, 11(3), 25–36.
- Hao, Y., Aktipis, C. A., Armbruster, D., & Cronk, L. (2015). Need-based transfers on a network: A model of risk-pooling in ecologically volatile environments. *Evolution and Human Behavior*, 36(4), 265–273.
- Malinowski, B. (1922). *Argonauts of the Western Pacific*. London: Routledge & Kegan Paul.
- Roberts, G. (2005). Cooperation through interdependence. *Animal Behaviour*, 70(4), 901–908.
- Tomasello, M. (2009). *Why we cooperate*. Cambridge, MA: MIT Press.

Assuaging the doubts of Thomas: the need for robustness in the institution of supernatural punishment

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In writing *God is Watching You: How the Fear of God Makes Us Human*, Dominic Johnson (2016) has provided a great service to the burgeoning field of evolutionary religious studies. For those already familiar with the supernatural punishment hypothesis, very little in this book will be new. Nevertheless, it is extremely useful to have the hypothesis and its supporting evidence so clearly and engagingly laid out in one place. I anticipate it will serve as both a reference and teaching text for many years to come.

Fortunately for my purposes, the thrust of *God is Watching You* will be so familiar to readers of *Religion, Brain & Behavior* that I feel no compelling need to provide a synopsis. I should, however, acknowledge that having all the arguments in favor of the supernatural punishment hypothesis neatly laid out in a single volume greatly clarified my thoughts on the subject. What follows should not be regarded as a critique of Johnson’s work, but rather a call for a program of research to address questions that, left unanswered, will leave the supernatural punishment hypothesis, as well as its cousin the big gods hypothesis, incomplete.

Robustness of cultural systems

And Diagoras of Melos, the dithyrambic poet, was at first, they say, godfearing above all others; for he began his poem in this fashion – “By Heaven’s will and Fortune all things are accomplished” but when he had been wronged by a man who had sworn falsely and suffered no punishment for it, he changed round and asserted that God does not exist. (Sextus Empiricus, 1936, p. 29)