**I stand in firm negation of the resolution, Resolved: Humans are primarily driven by self-interest.**

**I offer two definitions to clarify the debate.**

**First, “primarily” means “for the most part” according to Merriam-Webster Dictionary.**

**Secondly, “self-interest,” according to Dictionary.Com, means ““regard for one's own interest or advantage, especially with disregard for others”**

**Thus, in order to win today’s debate, the affirmative must conclusively prove that, more than all other motivations put together, human beings are driven by a regard for their own advantage, without regard for how their actions affect others. The affirmative will be unable to prove this. To negate, I offer three contentions, each drawing on a different branch of evolutionary biology. You should prefer these evidence-based approaches to the question as they are more empirically verifiable than philosophical pronouncements of human good or evil.**

**My first contention is Ontogenetics, or the study of development.**

**It can be difficult to decipher the motives of human beings. Humans are often evasive, dishonest, or themselves confused about why they do the things they do. Thus, researchers such as Felix Warnaken and Michael Tomasello of the Max Planck Institute for Evolutionary Anthropology, have begun to study human beings when their intentions are the most pure – infancy. They explain their results thusly, in 2007:**

<Felix and Michael, Max Planck Institute for Evolutionary Anthropology Leipzig, Germany, “Helping and Cooperation at 14 Months of Age,” INFANCY, 11(3), 271-294>#SPS

Our claim is thus that **the altruistic tendencies seen in early human ontogeny reflect a natural predisposition.** Socialization can build upon this predisposition, but it is not its primary source. Human cultures cultivate rather than implant altruism in the human psyche. And even if we are wrong about this ontogenetic proposal, and human adults do in fact train altruism in developing young, it is worth asking where this tendency of adults came from? We do not see the adults of other species attempting to implant altruistic tendencies in their offspring. If the data we have presented here are valid, infants are genuinely altruistic early in ontogeny. The starting state of altruism in ontogeny is characterized by children’s tendency to help others spontaneously (i.e. in novel situations, without being encouraged to help, and without the expectation of rewards). It even appears that infants help rather indiscriminately, without taking into account if the beneficiary is a relative or a stranger, whether the other will reciprocate, or how their behaviour will affect their reputation. However, it is implausible from an evolutionary perspective that such a naive altruism in which people help without regard of any of these factors could persist. As Dennis Krebs points out: ‘Evolutionary theory leads to the expectation that dispositions to engage in indiscriminate altruism should not evolve.’ (Krebs, 2006, p. 48). For altruism to be sustained as an evolutionarily stable strategy, it must be complemented by safety measures to avoid being exploited by others and bias altruism towards certain individuals under certain circumstances. Thus, mechanisms that make altruism function selectively must be operative as well. However, this does not necessarily imply that all these mechanisms are co-present with the altruistic tendencies in early ontogeny. For instance, the ability to detect cheaters who profit from altruistic acts but do not repay the costs in the future is potentially of less relevance early in ontogeny when children are mainly surrounded by family members, who – even if not always trustworthy – at least share genes with the altruist so that inclusive fitness benefits are likely. The ability to tell apart other altruists from cheaters probably becomes important only later in life as the interaction with strangers increases. Our proposal is thus that children start out as rather indiscriminate altruists who become more selective as they grow older. Children’s emerging social-cognitive understanding and new experiences will enable them to act altruistically more frequently and across a variety of situations, but this should not just blindly lead to more helping, but more selective helping. This general notion of a differentiation process of prosocial behaviours across development has first been introduced by Dale Hay (1994), who quotes Machiavelli’s motto that ‘A prince must learn how not to be good.’ and hypothesizes that factors such as individual differences, gender roles and other norms should lead to a differentiation later in childhood. Our model corresponds to that by Hay in the general statement that a rather undifferentiated prosocial predisposition is differentiated out during later childhood (see also Caplan, 1993; Peterson, 1982), but in our model we focus on other factors as the cause of this differentiation. Namely, we derive our model from evolutionary theory, leading to the proposal to investigate how the proximate mechanism entailed in different evolutionary models begin to play a role during children’s development. Namely, these are kin selection, direct reciprocity, indirect reciprocity, and the transmission of norms.

**Our earliest instinct is not for self-interest, but rather to help others whenever we can. Thus, human nature is one of selfless-ness, not self-interest.**

**Our second contention is Cultural Evolution**

**Evolution is the theory of survival of the fittest. Often omitted from discussions of evolution, however, are how survival of the fittest COMMUNITIES is also important. Since humans evolved in small tribes and groups, individual evolution does not explain all of our nature. Rather, those who could more easily live in groups had an advantage over those who could not – and those who could act selflessly could more easily live in groups. Ernst Fehr and Urs Fischbacher of the University of Zurich explain in 2003:**

<Ernst and Urs, University of Zürich, Institute for Empirical Research in Economics; “The nature of human altruism,” Nature volume 425, pages 785–791 (23 October 2003), http://www.nature.com.proxy-um.researchport.umd.edu/articles/nature02043>#SPS

Gene–culture coevolution The birth of modern sociobiology is associated with scepticism against genetic group selection[67](http://www.nature.com.proxy-um.researchport.umd.edu/articles/nature02043#ref67); although it is possible in theory, and in spite of a few plausible cases[25](http://www.nature.com.proxy-um.researchport.umd.edu/articles/nature02043#ref25), genetic group selection has generally been deemed unlikely to occur empirically. The main argument has been that it can at best be relevant in small isolated groups because migration in combination with within-group selection against altruists is a much stronger force than selection between groups. The migration of defectors to groups with a comparatively large number of altruists plus the within-group fitness advantage of defectors quickly removes the genetic differences between groups so that group selection has little effect on the overall selection of altruistic traits[68](http://www.nature.com.proxy-um.researchport.umd.edu/articles/nature02043#ref68). Consistent with this argument, genetic differences between groups in populations of mobile vertebrates such as humans are roughly what one would expect if groups were randomly mixed[69](http://www.nature.com.proxy-um.researchport.umd.edu/articles/nature02043#ref69). Thus, purely genetic group selection is, like the gene-based approaches of reciprocal altruism and indirect reciprocity, unlikely to provide a satisfactory explanation for strong reciprocity and large-scale cooperation among humans. However, the arguments against genetic group selection are far less persuasive when applied to the selection of culturally transmitted traits. Cultural transmission occurs through imitation and teaching, that is, through social learning. There are apparent large differences in cultural practices of different groups around the world and ethnographic evidence indicates that even neighbouring groups are often characterized by very different cultures and institutions[70](http://www.nature.com.proxy-um.researchport.umd.edu/articles/nature02043#ref70). In addition, a culture-based approach makes use of the human capacity to establish and transmit behavioural norms through social learning—a capacity that is quantitatively, and probably even qualitatively, distinctly human [1](http://www.nature.com.proxy-um.researchport.umd.edu/articles/nature02043#ref1),[71](http://www.nature.com.proxy-um.researchport.umd.edu/articles/nature02043#ref71). Recent theoretical models of cultural group selection[72](http://www.nature.com.proxy-um.researchport.umd.edu/articles/nature02043#ref72),[73](http://www.nature.com.proxy-um.researchport.umd.edu/articles/nature02043#ref73) or of gene–culture coevolution[71](http://www.nature.com.proxy-um.researchport.umd.edu/articles/nature02043#ref71),[74](http://www.nature.com.proxy-um.researchport.umd.edu/articles/nature02043#ref74) could provide a solution to the puzzle of strong reciprocity and large-scale human cooperation. They are based on the idea that norms and institutions—such as food-sharing norms or monogamy—are sustained by punishment and decisively weaken the within-group selection against the altruistic trait. If altruistic punishment is ruled out, cultural group selection is not capable of generating cooperation in large groups ([Fig. 4](http://www.nature.com.proxy-um.researchport.umd.edu/articles/nature02043#f4)). Yet, when punishment of non-cooperators and non-punishers is possible, punishment evolves and cooperation in much larger groups can be maintained [73](http://www.nature.com.proxy-um.researchport.umd.edu/articles/nature02043#ref73). This is due to the fact that the altruistic punishment of non-cooperators in combination with the imitation of economically successful behaviours prevents the erosion of group differences with regard to the relative frequency of cooperating members. If there are a sufficient number of altruistic punishers, the cooperators do better than the defectors because the latter are punished. Therefore, cooperative behaviour is more likely to be imitated. Moreover, when cooperation in a group is widespread, altruistic punishers have only a small or no within-group disadvantage relative to pure cooperators who do not punish. At the limit, when everybody cooperates, punishers incur no punishment costs at all and thus have no disadvantage. Thus, small cultural group selection effects suffice to overcome the small cost disadvantage of altruistic punishers that arises from the necessity of punishing mutant defectors. To what extent is there evidence for the role of culture and group selection in human altruism? There is strong evidence from intergenerational ultimatum and trust games that advice from players who previously participated in the experiment increases altruistic punishment and altruistic rewarding [75](http://www.nature.com.proxy-um.researchport.umd.edu/articles/nature02043#ref75). Recent intergenerational public good games where advice is given indicate that later generations achieve significantly higher cooperation levels even in the absence of punishment opportunities[76](http://www.nature.com.proxy-um.researchport.umd.edu/articles/nature02043#ref76). Ultimatum and dictator games with children of different ages show that older children are more generous and more willing to punish altruistically [77](http://www.nature.com.proxy-um.researchport.umd.edu/articles/nature02043#ref77). Although these changes in children's behaviour could be a result of genetic developmental processes, it seems at least as plausible to assume that they are also a product of socialization by parents and peers. Why, after all, do parents invest so much time and energy into the proper socialization of their children if this effort is futile? Perhaps the strongest evidence for the role of cultural norms comes from a series of experiments in 15 small-scale societies[23](http://www.nature.com.proxy-um.researchport.umd.edu/articles/nature02043#ref23), showing decisive differences across societies in the behaviour of proposers and responders in the ultimatum game. Some tribes like the Hazda from Tanzania exhibit a considerable amount of altruistic punishment whereas the Machiguenga from Peru show little concern about fair sharing. Thus, taken together, there is fairly convincing evidence that cultural forces exert a significant impact on human altruism.

**Cultural norms clearly played a part in the creation of the human person, and thus humans are likely to have evolved to act, if not entirely selflessly, certainly not selfishly.**

**Our third contention is Strong Reciprocity. Ernst Fehr and Bettina Rockenbach define the term:**

<Ernst, Institute for Empirical Research in Economics, University of Zurich, and Bettina, Chair in Microeconomics, University of Erfurt, Nordhaeuser, “Human altruism: economic, neural, and evolutionary perspectives,” Current Opinion in Neurobiology, Volume 14, Issue 6, December 2004, Pages 784-790, https://www-sciencedirect-com.proxy-um.researchport.umd.edu/science/article/pii/S0959438804001606?\_rdoc=1&\_fmt=high&\_origin=gateway&\_docanchor=&md5=b8429449ccfc9c30159a5f9aeaa92ffb&ccp=y#!>#SPS

Why is cooperation observed at all and what are the mechanisms that enable and sustain human cooperation in social dilemma situations, even in an environment with (a considerable number of) selfish subjects? Recent research indicates that **strong reciprocity** is crucial for the establishment of cooperation in groups with a share of selfish individuals. A person who is willing to reward fair behavior and to punish unfair behavior, **even though this is often quite costly and provides no material benefit for the person, is called a ‘strong reciprocator’** [13.](https://www-sciencedirect-com.proxy-um.researchport.umd.edu/science/article/pii/S0959438804001606?_rdoc=1&_fmt=high&_origin=gateway&_docanchor=&md5=b8429449ccfc9c30159a5f9aeaa92ffb&ccp=y" \l "bib13), [14.](https://www-sciencedirect-com.proxy-um.researchport.umd.edu/science/article/pii/S0959438804001606?_rdoc=1&_fmt=high&_origin=gateway&_docanchor=&md5=b8429449ccfc9c30159a5f9aeaa92ffb&ccp=y" \l "bib14), [15.•](https://www-sciencedirect-com.proxy-um.researchport.umd.edu/science/article/pii/S0959438804001606?_rdoc=1&_fmt=high&_origin=gateway&_docanchor=&md5=b8429449ccfc9c30159a5f9aeaa92ffb&ccp=y" \l "bib15). Because strong reciprocity is costly for the individual reciprocator, the question arises as to how such behavior could evolve evolutionarily. It has been shown, however, that a positive share of strong reciprocators in the population can be part of an evolutionarily stable situation [16.••](https://www-sciencedirect-com.proxy-um.researchport.umd.edu/science/article/pii/S0959438804001606?_rdoc=1&_fmt=high&_origin=gateway&_docanchor=&md5=b8429449ccfc9c30159a5f9aeaa92ffb&ccp=y" \l "bib16), [17.](https://www-sciencedirect-com.proxy-um.researchport.umd.edu/science/article/pii/S0959438804001606?_rdoc=1&_fmt=high&_origin=gateway&_docanchor=&md5=b8429449ccfc9c30159a5f9aeaa92ffb&ccp=y" \l "bib17), [18.](https://www-sciencedirect-com.proxy-um.researchport.umd.edu/science/article/pii/S0959438804001606?_rdoc=1&_fmt=high&_origin=gateway&_docanchor=&md5=b8429449ccfc9c30159a5f9aeaa92ffb&ccp=y" \l "bib18). Strong reciprocity has been observed in sequential social dilemma experiments, even in interactions with completely anonymous strangers [14.](https://www-sciencedirect-com.proxy-um.researchport.umd.edu/science/article/pii/S0959438804001606?_rdoc=1&_fmt=high&_origin=gateway&_docanchor=&md5=b8429449ccfc9c30159a5f9aeaa92ffb&ccp=y#bib14), [19.](https://www-sciencedirect-com.proxy-um.researchport.umd.edu/science/article/pii/S0959438804001606?_rdoc=1&_fmt=high&_origin=gateway&_docanchor=&md5=b8429449ccfc9c30159a5f9aeaa92ffb&ccp=y" \l "bib19), [20.](https://www-sciencedirect-com.proxy-um.researchport.umd.edu/science/article/pii/S0959438804001606?_rdoc=1&_fmt=high&_origin=gateway&_docanchor=&md5=b8429449ccfc9c30159a5f9aeaa92ffb&ccp=y" \l "bib20), across many different cultures [[21]](https://www-sciencedirect-com.proxy-um.researchport.umd.edu/science/article/pii/S0959438804001606?_rdoc=1&_fmt=high&_origin=gateway&_docanchor=&md5=b8429449ccfc9c30159a5f9aeaa92ffb&ccp=y" \l "bib21), and under stake sizes of up to three months income [[22]](https://www-sciencedirect-com.proxy-um.researchport.umd.edu/science/article/pii/S0959438804001606?_rdoc=1&_fmt=high&_origin=gateway&_docanchor=&md5=b8429449ccfc9c30159a5f9aeaa92ffb&ccp=y" \l "bib22). Strong reciprocity contributes to moderate levels of cooperation in sequential dilemma settings. If, however, effective punishment opportunities are available, high levels of cooperation are achieved because the cooperative group members can discipline selfish subjects [23.](https://www-sciencedirect-com.proxy-um.researchport.umd.edu/science/article/pii/S0959438804001606?_rdoc=1&_fmt=high&_origin=gateway&_docanchor=&md5=b8429449ccfc9c30159a5f9aeaa92ffb&ccp=y" \l "bib23), [24.](https://www-sciencedirect-com.proxy-um.researchport.umd.edu/science/article/pii/S0959438804001606?_rdoc=1&_fmt=high&_origin=gateway&_docanchor=&md5=b8429449ccfc9c30159a5f9aeaa92ffb&ccp=y" \l "bib24). In these experiments, subjects are given the possibility of reducing the other subjects’ income at their own cost after having seen the others’ contribution to the public good. **These punishment possibilities are heavily used**, and the lower an individual's contribution relative to the group average, the more the individual is punished. As a result, a large increase in cooperation is observed (see [Figure 1](https://www-sciencedirect-com.proxy-um.researchport.umd.edu/science/article/pii/S0959438804001606?_rdoc=1&_fmt=high&_origin=gateway&_docanchor=&md5=b8429449ccfc9c30159a5f9aeaa92ffb&ccp=y" \l "fig1)). Punishment in this experiment could, in principle, be attributed to selfish incentives because of repeated interactions between the subjects. The absence of any material gain from punishment is ensured in the study by Fehr and Gächter [[25]](https://www-sciencedirect-com.proxy-um.researchport.umd.edu/science/article/pii/S0959438804001606?_rdoc=1&_fmt=high&_origin=gateway&_docanchor=&md5=b8429449ccfc9c30159a5f9aeaa92ffb&ccp=y" \l "bib25), because the punished and the punishing subjects never interact again. Nevertheless, punishment is frequently observed, and punished subjects typically increase their cooperation in future interactions with other subjects, so the future interaction partners of the punished subjects benefit from the punishment. Recent evolutionary models show that altruistic punishment even survives evolutionary pressures in relatively large groups [16.••](https://www-sciencedirect-com.proxy-um.researchport.umd.edu/science/article/pii/S0959438804001606?_rdoc=1&_fmt=high&_origin=gateway&_docanchor=&md5=b8429449ccfc9c30159a5f9aeaa92ffb&ccp=y#bib16), [18.](https://www-sciencedirect-com.proxy-um.researchport.umd.edu/science/article/pii/S0959438804001606?_rdoc=1&_fmt=high&_origin=gateway&_docanchor=&md5=b8429449ccfc9c30159a5f9aeaa92ffb&ccp=y#bib18).What are the proximate mechanisms behind strong reciprocity? Recent neuroeconomic studies that scan subjects’ brains while they are making decisions in interactive economic experiments provide interesting results on the neural foundations of strong reciprocity [33.](https://www-sciencedirect-com.proxy-um.researchport.umd.edu/science/article/pii/S0959438804001606?_rdoc=1&_fmt=high&_origin=gateway&_docanchor=&md5=b8429449ccfc9c30159a5f9aeaa92ffb&ccp=y" \l "bib33), [34.](https://www-sciencedirect-com.proxy-um.researchport.umd.edu/science/article/pii/S0959438804001606?_rdoc=1&_fmt=high&_origin=gateway&_docanchor=&md5=b8429449ccfc9c30159a5f9aeaa92ffb&ccp=y" \l "bib34), [35.](https://www-sciencedirect-com.proxy-um.researchport.umd.edu/science/article/pii/S0959438804001606?_rdoc=1&_fmt=high&_origin=gateway&_docanchor=&md5=b8429449ccfc9c30159a5f9aeaa92ffb&ccp=y" \l "bib35), [36.••](https://www-sciencedirect-com.proxy-um.researchport.umd.edu/science/article/pii/S0959438804001606?_rdoc=1&_fmt=high&_origin=gateway&_docanchor=&md5=b8429449ccfc9c30159a5f9aeaa92ffb&ccp=y" \l "bib36), [37.••](https://www-sciencedirect-com.proxy-um.researchport.umd.edu/science/article/pii/S0959438804001606?_rdoc=1&_fmt=high&_origin=gateway&_docanchor=&md5=b8429449ccfc9c30159a5f9aeaa92ffb&ccp=y" \l "bib37). They support the hypothesis that neural representations of emotional states guide human decision-making and they suggest that **subjects derive specific rewards from mutual cooperation and the punishment of norm violators.**

**As Fehr and Rockenbach hint to, strong reciprocity explains a great deal of human interaction. In particular, modern understandings of neurobiology prove that this method of altruism is deeply engrained in human beings. Fehr and Rockebach continue:**

<Ernst, Institute for Empirical Research in Economics, University of Zurich, and Bettina, Chair in Microeconomics, University of Erfurt, Nordhaeuser, “Human altruism: economic, neural, and evolutionary perspectives,” Current Opinion in Neurobiology, Volume 14, Issue 6, December 2004, Pages 784-790, https://www-sciencedirect-com.proxy-um.researchport.umd.edu/science/article/pii/S0959438804001606?\_rdoc=1&\_fmt=high&\_origin=gateway&\_docanchor=&md5=b8429449ccfc9c30159a5f9aeaa92ffb&ccp=y#!>#SPS

A recent study [[36••]](https://www-sciencedirect-com.proxy-um.researchport.umd.edu/science/article/pii/S0959438804001606?_rdoc=1&_fmt=high&_origin=gateway&_docanchor=&md5=b8429449ccfc9c30159a5f9aeaa92ffb&ccp=y#bib36) demonstrated the importance of the interplay of emotions and cognition in economic decision-making. Nineteen participants who responded to fair and unfair offers in a bargaining game were scanned using functional magnetic resonance imaging (fMRI). Less fair offers activated the bilateral insula, which has been implicated in negative emotional states such as disgust, pain, hunger, and thirst. Subjects with stronger insula activation to unfair offers were also more likely to reject these offers. Unfair offers from a human partner also caused stronger insula activation than unfair offers from a computer partner, which suggests the importance of the social context for the insula activation. Unfair offers also activated the dorsolateral prefrontal cortex (DLPFC) and the anterior cingulate cortex (ACC). These activations are interesting because the DLPFC is a region that is often associated with goal maintenance and executive control and the ACC has been implicated in detection of cognitive conflict. In fact, if the insula activation to unfair offers was stronger than the DLPFC activation subjects tended to reject the offer, whereas subjects tended to accept an unfair offer if the DLPFC activation was stronger. **fMRI analysis of subjects playing a PD indicates that mutual cooperation with a human partner yields stronger activation of the brain's reward circuit** (components of the mesolimbic dopamine system including the striatum and the orbitofrontal cortex) than mutual cooperation with a computer partner that yields the same monetary payoff does [[34]](https://www-sciencedirect-com.proxy-um.researchport.umd.edu/science/article/pii/S0959438804001606?_rdoc=1&_fmt=high&_origin=gateway&_docanchor=&md5=b8429449ccfc9c30159a5f9aeaa92ffb&ccp=y#bib34). Moreover, there is also evidence implying a negative response of the dopamine system if a subject cooperates but the opponent defects. **These findings indicate that there is a neural basis for strong reciprocity.** This interpretation receives further support from an imaging study that scanned subjects while they were making gender judgments of faces that were previously attached to opponent players in a sequentially played PD [[38••]](https://www-sciencedirect-com.proxy-um.researchport.umd.edu/science/article/pii/S0959438804001606?_rdoc=1&_fmt=high&_origin=gateway&_docanchor=&md5=b8429449ccfc9c30159a5f9aeaa92ffb&ccp=y" \l "bib38). Some faces were associated with cooperative decisions, some with defections, and some were neutral. The study shows that the presentation of faces of intentional cooperators caused increased activity in left amygdala, bilateral insula, fusiform gyrus, superior temporal sulcus, and **reward-related areas.** Moreover, a particularly noteworthy result is that **merely seeing cooperators’ faces** during the gender judgment task activated reward-related areas. One of the major puzzles posed by the existence of strong reciprocity is the fact that many cooperative subjects punish defectors in one-shot PD games although punishing is also costly for punisher. A new study that combines a sequential PD experiment with positron emission tomography (PET) provides a solution to this puzzle. A punishment opportunity augmented the PD in this study because the cooperating player could punish a defecting player. In the effective punishment condition the cooperator could reduce the defector's economic payoff by punishing him, whereas the cooperator could only punish the defector symbolically in a control condition, that is, the assignment of punishment points to the defector did not reduce the defector's payoff in this condition. The contrast between the effective and the symbolic punishment condition activated the dorsal striatum, which is well known for its reward processing properties. The study also shows that those subjects with a higher activation in the dorsal striatum impose a greater punishment on defectors. Moreover, additional analyses suggest that the activation in the dorsal striatum reflects the anticipated satisfaction associated with the punishment. The previous results indicate a neural basis for certain forms of strong reciprocity. However, we do not know at present the neural basis of third-party punishment [[32•]](https://www-sciencedirect-com.proxy-um.researchport.umd.edu/science/article/pii/S0959438804001606?_rdoc=1&_fmt=high&_origin=gateway&_docanchor=&md5=b8429449ccfc9c30159a5f9aeaa92ffb&ccp=y" \l "bib32), which plausibly requires empathizing with the victims of norm violations. A study in which the brain activity of humans experiencing pain was compared to the brain activity of humans observing a loved one experiencing a similar pain stimulus [[39]](https://www-sciencedirect-com.proxy-um.researchport.umd.edu/science/article/pii/S0959438804001606?_rdoc=1&_fmt=high&_origin=gateway&_docanchor=&md5=b8429449ccfc9c30159a5f9aeaa92ffb&ccp=y" \l "bib39)reveals that empathy with the pain of others does not activate the whole pain matrix, but is based on the activation of areas that represent solely the affective dimension of pain. This observation yields the neural basis of empathy (between loved ones). Hence, an interesting question is whether the same brain areas are activated in third party punishment, that is, when people empathize with strangers who became the victim of a norm violation. **Economic experiments show that strong reciprocity is a key force in human cooperation,** and evolutionary models indicate that it can be a stable and adaptive trait. In addition, neuroeconomic studies examined the neural basis of strong reciprocity. The anterior insula seems to play a crucial part in the willingness to reject unfair outcomes, and reward-related circuits involving the ventral and dorsal striatum seem to be important for human cooperation and the punishment of norm violations. These exciting results suggest that the combination of interactive economic experiments with brain imaging techniques constitutes a fertile area for future research that promises a better understanding of complex social behaviors that form the basis of human societies.