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Abstract

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Egalitarianism in young children

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Human social interaction is strongly shaped by other-regarding preferences. These preferences are key for a unique aspect of human sociality – large scale cooperation with genetic strangers – but little is known about their developmental roots. We show here that young children's other-regarding preferences assume a particular form – inequality aversion – that develops strongly between the ages of 3 and 8. At age 3-4, the overwhelming majority of children behave selfishly, while the vast majority at age 7-8 prefers resource allocations that remove advantageous or disadvantageous inequality. Moreover, inequality aversion is strongly shaped by parochialism, a preference for favouring the members of one's own social group. These results indicate that human egalitarianism and parochialism have deep developmental roots, and the simultaneous emergence of altruistic sharing and parochialism during childhood is intriguing in view of recent evolutionary theories which predict that the same evolutionary process jointly drives both human altruism and parochialism.

Other-regarding preferences are decisive for the human ability to achieve and maintain cooperation in large groups of genetic strangers[1,2]. If an individual cares for the welfare of other group members, he or she is more likely to refrain from free-riding in cooperative projects. Likewise, if an individual dislikes the free-riding of others – because it is associated with inequality[3-5] or because it represents a norm violation[6] – the individual is more likely to

punish free-riders [7-9]. This punishment then constitutes an incentive for potential free-riders to cooperate. Other-regarding preferences also play an important role in public life and politics[10] and they powerfully amplify reputational incentives in strategic interactions, thus contributing to the cooperation enhancing force of reputation opportunities[11-14].

The developmental origins and proximate mechanisms behind other-regarding preferences are not well understood, however, despite recent progress[15-22]. Since we know little about when young children start to take the welfare of others into account, we conducted experiments with 229 young, genetically unrelated, Swiss children (127 girls, 102 boys) between age 3 and 8. An understanding of the development of other-regarding preferences in children may enable us to gain deeper insights into the proximate and ultimate sources of species differences in preferences and cooperation. The study of children's preferences is also of particular interest in light of recent experiments in nonhuman primates[23-27], allowing a more direct comparison between humans and nonhuman primates. Experiments with nonhuman primates have, for example shown that chimpanzees show little willingness to provide food to a familiar conspecific in situations where they could do so with no or small cost[23,24,27]. In view of this result it is interesting to study whether and, if so, when children become willing to provide valuable resources to their partners. In this way, the large species differences in cooperation between humans and nonhuman primates can be more directly traced back to species differences in other-regarding preferences.

There is a rich tradition in psychology that studies the development of moral judgment[28] and prosocial behaviour[29-35] but there is a surprising lack of studies that isolate the development of other-regarding preferences from the development of other forms of prosocial behaviour. The experimental study of other-regarding preferences in humans involves the conduct of one-shot experiments with anonymous interaction partners because the behaviour in non-anonymous face-to-face interactions or in repeated interactions with the same partner can easily be affected by selfish motives. A subject could, for example, behave prosocially because of the expectation of future benefits from the partner that accrue as a result of prosocial behaviour in the current interaction. Selfish motives could therefore drive prosocial behaviours such as sharing a valuable resource in non-anonymous face-to-face interactions or in repeated interactions between the experimental subjects. Measuring other-regarding

preferences without such confounds thus requires the conduct of anonymous one-shot experiments.

Testing for inequality aversion in children

For this reason, we conducted experiments with young children that enable us to measure other-regarding preferences such as inequality aversion. In the context of our experiments, inequality aversion prevails if subjects prefer allocations that reduce the inequality between themselves and their partner, regardless of whether the inequality is to their advantage or to their disadvantage.[3]

Each subject participated in the three treatments described below and was paired with one other anonymous partner in each treatment. Each treatment condition was explained in detail to the decision-maker so that we could be sure that the child had completely understood the experiment and the consequences of the different choices (see methods section and supplementary methods). In all treatments, the decision-maker allocated units of sweets (smarties, jellybabies, or fizzers), to himself and/or to the partner. In the "prosocial" treatment, which was inspired by recent experiments with chimpanzees[23,24], the subject could choose between the allocation (1,1), i.e., (1 for himself, 1 for partner), and the allocation (1,0). This treatment measures some elementary form of prosociality because, by choosing (1,1) the subject can at no cost to himself deliver a benefit to the partner and, thus, avoid advantageous inequality. In principle, the choice of (1,1) can be driven by the equality motive[3] or by a motive to increase the partner's payoff or both parties joint payoff[36]. Economic self-interest is not involved in the prosocial game because the decision-maker receives one unit regardless of which choice he makes. It is therefore also possible that a selfish individual who does not care about the partner's payoff will choose (1,1). In fact, because there is no reason for a selfish individual to make either choice, a population of self-interested individuals would choose (1,1) in 50% of the cases. For this reason, evidence for other-regarding behaviour in the prosocial game requires that the population of children choose (1,1) significantly above 50% frequency.

In the “envy” treatment, the subject could choose between (1,1) and (1,2). Here again, it is possible to deliver a benefit to the partner at no cost but the choice (1,2) leads to disadvantageous inequality for the decision-maker. Thus, if an individual just wants to increase the partner’s or the joint payoff, he should choose (1,1) in the prosocial treatment and (1,2) in the envy treatment. In contrast, if the equality motive drives behaviour in these two conditions, the subject chooses (1,1) in both treatments, thus avoiding the unequal allocations (1,0) in the prosocial treatment and (1,2) in the envy treatment. However, as in the prosocial treatment, a purely selfish individual has no reason to make either choice in the envy treatment. For this reason, evidence for the equality motive in the envy game again requires that the population of children choose (1,1) significantly above 50% frequency.

In a third condition, the “sharing” treatment, the subject could choose between (1,1) and (2,0). This treatment measures a strong form of inequality aversion because the provision of a benefit for the partner is costly for the subject. Selfish children should therefore never make the egalitarian choice in this treatment, implying that the choice of (1,1) unambiguously indicates an other-regarding preference. Note also that the sharing treatment enables us to measure altruism as defined by evolutionary biology because sharing implies a costly transfer of a valued resource to another individual.

In addition to these treatments, we also implemented an ingroup and an outgroup condition “across subjects”. In the ingroup condition, the partner came from the same playschool or kindergarten or school, while the partner came from another playschool, kindergarten, or school in the outgroup condition. The rationale for the outgroup condition is provided by evidence and theory indicating that parochialism strongly shapes adult human altruism[37-39], and that the same evolutionary process might determine the development of both human altruism and parochialism[40].

From self-interest to inequality aversion

Among the 3-4 year old children, the vast majority of the children behave selfishly in the ingroup condition of the sharing game because only 8.7% of the children are willing to share (Fig. 1). The fact that the frequency of (1,1) choices does not differ significantly from 50% in

the prosocial game and in the envy game further supports the low incidence of other-regarding preferences at this age (Binomial test; $p = 0.21$ for the prosocial game, $p = 0.68$ for the envy game, $N = 23$). The prevalence of selfish behaviour in the sharing game decreases slightly for 5-6 year old children, but 78% are still not willing to share at this age. And, as in the case of 3-4 year old children, the frequency of egalitarian choices in the prosocial and the envy game is not significantly different from 50% (Binomial test; $p = 0.24$ for the prosocial game, $p = 0.41$ for the envy game, $N = 36$). A substantially different picture emerges, however, for children at age 7-8 (Fig. 1): 45% of them display sharing behaviour, and we also find strong evidence for other-regarding preferences in the other two games. 77% of the 7-8 year old children prefer the egalitarian allocation in the prosocial game, refuting the null hypothesis of random choices (Binomial test, $p < 0.001$, $N = 56$). Likewise, an overwhelming majority of 80% prefers the egalitarian alternative in the envy game at this age (Binomial test, $p < 0.001$, $N = 56$).

Taken together, the behavioural patterns across all three games suggest that children at age 3-4 display little willingness to share resources but a non-negligible percentage of the children is willing to make choices that benefit the recipient if it is not costly. Following this age, other-regarding preferences develop, which take the form of inequality aversion instead of a simple preference for increasing the partner's or the joint payoff. If the motive to increase the partner's or the joint payoff were to drive the children's other-regarding preferences, they would have then chosen the alternative (1,2) in the envy game. In fact, however, the overwhelming majority of the children at age 7-8 preferred the egalitarian allocation.

Therefore, if we pool the children's choices across the various games, we find that both strongly and weakly egalitarian choices exhibit a large increase with age (Figure 2, supplementary figures and supplementary table). Egalitarianism, which is characterized by a (1,1)-choice both in the prosocial and the envy game (red columns in Figure 2), increases from 21% at age 3-4 to 33% at age 5-6, while 60% prefer the egalitarian allocation in both games at age 7-8. The percentage of egalitarian choices at age 7-8 differs significantly from an independent random choice in each of both games (Binomial test, $p<0.0001$, $N = 56$). If the children had made independent, random choices, only 25% of them would have chosen (1,1) in both the prosocial and the envy game. If we pool the children's choices in all three games,

the percentage of children who prefer the egalitarian allocation in all three games increases from 4% at age 3-4 to 30% at age 7-8 (Figure 2). Thus, among those children who choose the egalitarian allocation in the prosocial and the envy game at age 7-8, roughly 50% share resources in the sharing game. The other 50% choose the selfish allocation (2,0) in the sharing game.

It is also noteworthy that the share of subjects who maximize the partner's payoff by choosing both (1,1) in the prosocial game and (1,2) in the envy game (blue columns in Figure 2) decreases sharply from 43% at age 3-4 to 16% at age 7-8. In addition, the percentage of subjects who maximize the partner's payoff in all three games is only roughly 5% and does not change much with age. The across-game perspective also enables us to identify a third type of subject whom we call "spiteful" because they minimize the partner's payoff in all three games. The share of spiteful subjects is 22% at age 3-4 and 5-6 and decreases slightly to 14% at age 7-8, a percentage that is similar to the relative share of spiteful subjects observed in adult subject pools[41,42].

Parochial Egalitarianism

Parochial tendencies affected children's choices in all three treatments, and these tendencies are pervasive in the sharing and prosocial game (Fig. 3). The egalitarian choice is roughly 15-20 percentage points more likely in the prosocial game if the partner is an ingroup member (Fig. 3a). This difference is highly significant (ingroup dummy in probit regression, $p = 0.004$, $z = 2.92$, $N = 229$) and a similar ingroup-outgroup gap prevails across all ages. The most striking difference is found in the sharing game (Fig. 3b), where we observe a strong increase in the frequency of egalitarian choices if the partner is from the ingroup (age effect in probit regression, $p = 0.001$, $z = 3.33$, $N = 115$), while the children's willingness to share even slightly declines with age in the outgroup condition, although this decline is not significant (age effect in probit regression, $p = 0.123$, $z = -1.54$, $N = 114$). We observe, however, a strong interaction effect between age and outgroup condition (probit regression, $p < 0.001$, $z = 3.50$, $N = 229$), indicating that the difference between sharing in the ingroup and the outgroup conditions strongly increases with age. Thus, the children's altruism and parochialism emerges simultaneously between the age of 3 and 8 and is associated with a very strong

ingroup bias (probit regression, $p < 0.001$, $z = 3.58$, $N = 105$) at age 7-8, with very little willingness to share with an outgroup member: only 12% of the children share in the outgroup condition at this age.

The prevalence of egalitarian choices in the envy game develops earlier in the outgroup condition, where already the children at age 5-6 overwhelmingly favour the (1,1) allocation (Fig. 3c). The willingness to remove disadvantageous inequality towards ingroup members becomes so prevalent at age 7-8 that an ingroup-outgroup gap no longer exists. However, averaging across gender hides an important gender effect in the envy game: boys show much stronger parochial tendencies than do girls because boys seem to be much less averse against disadvantageous inequality if the partner is an ingroup member (Fig. 4a; outgroup dummy in probit regression controlling for age, $p = 0.001$, $z = 3.23$, $N = 102$). In contrast, girls do not differentiate in their choices between ingroup and outgroup partners (Fig. 4b; outgroup dummy in probit regression controlling for age, $p = 0.663$, $z = -0.44$, $N = 127$), but like boys, they also show an increasing trend towards egalitarian choices in the envy game as they become older.

Birth order and sibling effects

We find a strong “only child” and “youngest child” effect in the sharing game. Only children displayed much more costly sharing behaviour than children with siblings. On average, only children are 28 percentage points more likely to share than children with siblings – a highly significant difference (probit regression, $p = 0.006$, $z = 2.75$, $N = 197$) that also exists if we control for income effects (see supplementary data). With increasing age, however, the difference between only children and those with siblings decreases slightly, as indicated by an interaction effect between “only child” and “age” in a probit regression ($p = 0.022$, $z = -2.29$, $N = 197$). Among the children with siblings, we find that – regardless of age – the youngest children in a family are 17 percentage points less willing to share than children with younger siblings (probit regression controlling for age, $p = 0.007$, $z = 2.71$, $N = 172$). Thus it seems that the mere existence of siblings or birth order may play an important role in determining altruistic behaviours. Further analyses and interpretation of the effects of birth order and other demographic and psychological characteristics can be found in the supplementary data.

Discussion

The development of inequality aversion relatively early in childhood is particularly interesting in the light of ethnographic evidence that suggests a strong role of egalitarian "instincts" in human evolutionary history. There is considerable ethnographic evidence that egalitarian concerns have shaped many human small scale societies[43,44]. For example, food-sharing across families seems to have been the rule rather than the exception in small scale societies, and egalitarian sentiments also play a role in contemporary large scale societies[4,5]. The important role of egalitarian sentiments in human evolutionary history raises the possibility that there may have been cultural or even genetic transmission that favors egalitarian behaviours. In fact, recent evidence from behavioural genetics suggests that egalitarian behaviour in the ultimatum game has a genetic component[45].

The simultaneous development of altruistic behaviour and parochialism and the gender differences in parochialism are also interesting in view of evolutionary theories that predict that the same evolutionary process[40] jointly determines human altruism and parochialism, meaning that these traits co-evolve in such a way that either both or none of them evolves. According to the theory, the driving force behind this evolutionary process is frequent intergroup conflict. Because mainly males were involved in intergroup fights, it seems possible that evolution favoured a gender bias in parochialism. In fact, a payoff advantage relative to the outgroup may have been particularly advantageous for males because it strengthened the ingroup's position in intergroup conflicts. Males bore the main cost of intergroup conflict in terms of injuries and deaths and often gained more than females in case of victory because of the increase in the pool of potential mating partners[46]. Thus, evolution may have favoured a greater sensitivity in males for payoff advantages relative to outgroup members. In view of this prediction, we find it remarkable that boys exhibit a much stronger ingroup bias than girls in the envy game.

These potential evolutionary roots of human egalitarianism and parochialism do not preclude culture and socialization from playing an important role in other-regarding preferences; they may even be a main factor in their evolution[2,47]. As the children move from an informal playgroup to kindergarten and then on to formal schools, they may learn that equality is a rule the authorities (e.g., the teachers) endorse. Thus, the children are likely to

acquire some of the normative rules of the society which surrounds them during the age period on which we focused[30]. In this context, it is interesting that the motive to increase the partner's payoff declined strongly between ages 3 and 8, while egalitarian behaviour strongly increased in this age period (Figure 2), providing a hint about the content of the normative rule they acquired. The children may also become more sensitive with regard the opinions of others about themselves, a cognition which requires the ability to understand that one's actions affect what other people believe about oneself. Recent evidence indicates that adult humans care even about what anonymous others may think about them[48,49]. Theory-of-mind and perspective taking abilities are certainly conducive to such social cognitions. Therefore, if older children care more about what anonymous others thinks about them, they may be more prone to behave in a normatively appropriate way because – due to their age – they are more likely to have theory-of-mind and perspective taking abilities[30,50].

Finally, our results also indicate important inter-species differences in other-regarding preferences when compared to the patterns observed in chimpanzees[23,24,27] and marmosets[26]. In the prosocial game, adult chimpanzees, who could allocate food in a face-to-face interaction to a familiar recipient, did not show a significant preference for the (1,1) choice[23,24,27], while the overwhelming majority of the children develops a preference for the egalitarian choice in this game even though their partner is anonymous. And, as the sharing game indicates, many children at age 7-8 are also willing to share with an anonymous ingroup member. The facts in the envy game also contrast sharply with experimental findings in both chimpanzees and marmosets. The children developed a widespread aversion against disadvantageous inequality, whereas chimpanzees have been shown to be unwilling to take actions to remove inequality between themselves and a conspecific[24], and marmosets even tend to take actions that generate disadvantageous inequality for themselves if the action provides food for the partner[26]. In view of the decisive role of other-regarding preferences for a species ability to achieve large-scale cooperation, the observed inter-species differences are likely to be an important part of explaining why humans are so exceptionally cooperative.

Methods Summary

Each child played all three games against anonymous partners. In order to avoid satiation effects, a different currency was used in each of the three games (smarties, jellybabies, or fizzers). The currencies were randomized across games. In each game, subjects had two mutually exclusive choices that were represented with two cardboards; we drew two circles with arrows on each (see supplementary Figure S1). One arrow pointed to the decision maker, illustrating that the candy in that circle goes to him or her, while the other arrow pointed to a group photo which had been made earlier. In the ingroup condition, the group photo showed the members of the child's playgroup, kindergarten or school, while it showed the members of a different playgroup, kindergarten or school in the outgroup condition. The photos were used to communicate the partner's ingroup or outgroup status to the children in the game. Depending on whether the ingroup or the outgroup condition applied, the decision-maker was told that the candy(s) in the other circle (if there were any in that circle) would be given to one of the children on the ingroup photo or outgroup photo, respectively. If there was no candy in the circle, it was made clear to the child that the choice of the corresponding cardboard implies that the partner would receive nothing. We also controlled for the spatial assignment of the different alternative. In the prosocial game, for example, displayed in Figure S1, the alternative (1,1) was randomly assigned to be on the left side or on the right side. Thus, preferences for left or right cannot explain any of our findings. We also made it clear to the children that neither other children nor their parents or teachers will be informed about their decisions (see supplementary methods).

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Methods

Subjects. We recruited young children (3-8 years old) from playschools, kindergartens, and first grades for our experiments. We received permission for the experiments from the school president, the school board, the teachers, and the parents. 92% of the parents whom we asked agreed, so that a total of 229 children participated in the study – 62 children from playschools, 75 from kindergartens, and 92 children from grade one. The children live in Rapperswil-Jona, a small city in the canton of St. Gallen, Switzerland. Two women aged between 20 and 25 conducted the experiment. The experimental instructions are reproduced in the supplementary information.

Experimental procedures. Each child played the prosocial game, the envy game, and the sharing game against anonymous partners. The order of the games was counterbalanced across subjects. The partners either came from the ingroup (same playschool, or kindergarten or school) or from an outgroup (a different playschool, kindergarten, or school).

Payoffs. We needed an experimental currency desirable for the younger and older children in our sample. Therefore we decided to use various sweets. In order to avoid satiation effects, a different currency was used in each of the three games (smarties, jellybabies, or fizzers), and the currencies were randomized across games. Before the experiment started, we asked each child whether he or she likes those sweets (all of them did). At the end of all three treatments we asked the child whether it likes all three sweets the same or whether it likes one more than the other. If the child indicated that it liked some of the sweets more than the others we asked which one it liked the most and which the least (see supplementary material). The average "liking rates" of the different currencies were identical. Moreover, we asked the parents to rate on a 7 point scale how much their children value the candies. The parents' answers revealed that our currencies provide equally strong incentives for the children across all ages.

The choice situation. In order to ensure that the children can easily understand the choice problem, we used a set up that made the two available choices transparent. The two mutually exclusive choices were represented with two cardboards; we drew two circles with arrows on each (see supplementary Figure S1). One arrow pointed to the decision maker, illustrating that the candy in that circle goes to him or her, while the other arrow pointed to a group photo which had been made earlier. In the ingroup condition, the group photo showed the members

of the child's playgroup, kindergarten or school, while it showed the members of a different playgroup, kindergarten or school in the outgroup condition. The photos were used to communicate the partner's ingroup or outgroup status to the children in the game. Depending on whether the ingroup or the outgroup condition applied, the decision-maker was told that the candy(s) in the other circle (if there were any in that circle) would be given to one of the children on the ingroup photo or outgroup photo, respectively. If there was no candy in the circle, it was made clear to the child that the choice of the corresponding cardboard implies that the partner would receive nothing. The advantage of this design is that the same procedure can be used for the ingroup and the outgroup condition, and that the children can grasp the partner's ingroup or outgroup status very easily. In fact, many children across all ages immediately expressed their knowledge about the children on the photo, i.e. they spontaneously indicated that they know the children on the photo or they don't know them. Based on this spontaneous insight, it was then easy to explain that the partner will be a member of the child's group or the member of another group.

We also controlled for the spatial assignment of the different alternative. In the prosocial game, for example, which is displayed in Figure S1 (supplementary methods), the alternative (1,1) was randomly assigned to be on the left side or on the right side. Thus, preferences for left or right cannot explain any of our findings. We also made it clear to the children that neither other children nor their parents or teachers will be informed about their decisions.

Before a child played a game we ensured that he or she fully understood the game situation (i.e., the available choices, the implications of different choices for the allocation of currencies for "self" and "partner", the partner's ingroup-outgroup status, etc.). The subjects had to answer several questions for this purpose (supplementary methods). Only three children had problems in answering these questions, which shows that we successfully implemented the three games even for the youngest participants in the sample. The three children who could not answer correctly were excluded from the data analyses (229 is the number of children who correctly answered the questions). Once the children had answered the questions correctly, they were asked to make a decision in the first game before the second game was presented and explained. Because we ensured that the children understood the payoff implications of the two available choices very well and because it was clear that the choices were mutually exclusive (i.e. only one cardboard could be chosen), the children did not make mistakes while choosing, e.g., by indicating that they wanted to choose both cardboards. Nor did any children reverse their opinion during the choice process, i.e., children who first chose one cardboard but later switched to the other.

Questionnaire. After all children had participated in the experiment we sent the parents a questionnaire in which we asked them about characteristics of their child, such as whether he or she can easily imagine how other children feel (“empathy”), whether there are siblings, birth order, who primarily cares for the child during the day, the number of regular playmates, etc. We sent 198 questionnaires to the parents and 161 questionnaires were sent back. The questionnaire is reprinted in the supplementary material.

Figure 1 **The relative frequency of egalitarian choices across all ingroup treatments.** In these treatments, the decision-maker's choice determines the resources of an ingroup partner. The frequency of egalitarian choices strongly increases with age across all three ingroup treatments, and the vast majority of children prefers equality at age 7-8 in the prosocial and the envy game. However, if equality is costly for the children, they choose the egalitarian allocation less frequently – as indicated by the behaviour in the sharing game – and at age 3-4, self-interested choices dominate almost completely.

Figure 2 **Behavioural types in the ingroup condition.** The figure classifies subjects according to their behaviour in all three games, i.e., in the prosocial game (1,1 versus 1,0), the sharing game (1,1 versus 2,0), and the envy game (1,1 versus 1,2). Strongly egalitarian subjects choose the egalitarian allocation in all three games. Weakly egalitarian subjects choose the egalitarian allocation only in the prosocial and the envy game, but not in the sharing game where egalitarian behaviour is costly. Strongly generous subjects choose the allocation that maximizes the partner's payoff in all three games. Weakly generous subjects maximize the partner's payoff only in the prosocial and the envy game, but not in the sharing game where generous behaviour is costly. Spiteful subjects choose the allocation that minimizes the partner's payoff in all three games. The percentage of egalitarian subjects increases steeply with age, while the share of generous subjects declines. Moreover, most subjects who are willing to share at age 7-8 belong to the egalitarian and not to the generous type of subjects.

Figure 3 **Egalitarian Choices across ingroup and outgroup conditions. a.** In the prosocial game, the children remove inequality that favours themselves more often if the partner is an ingroup member. **b.** Egalitarian choices even slightly decrease over time in the sharing game – with very little sharing at age 7-8 – if the partner is an outgroup member, while sharing with ingroup members strongly increases with age, providing strong evidence for parochial altruism in children. **c.** In the envy game, children develop a preference for equality much earlier if the partner is an outgroup member but eventually the aversion against disadvantageous inequality with regard to ingroup members becomes so strong that ingroup-outgroup differences are small.

Figure 4 **Gender differences in parochial egalitarianism in the envy game where the child could choose between (1,1) and (1,2). a.** Boys' propensity for egalitarian choices in the ingroup and the outgroup condition. **b.** Girls' propensity for egalitarian choices across the ingroup and outgroup condition. The difference between ingroup and outgroup condition is large for boys but virtually absent for girls.

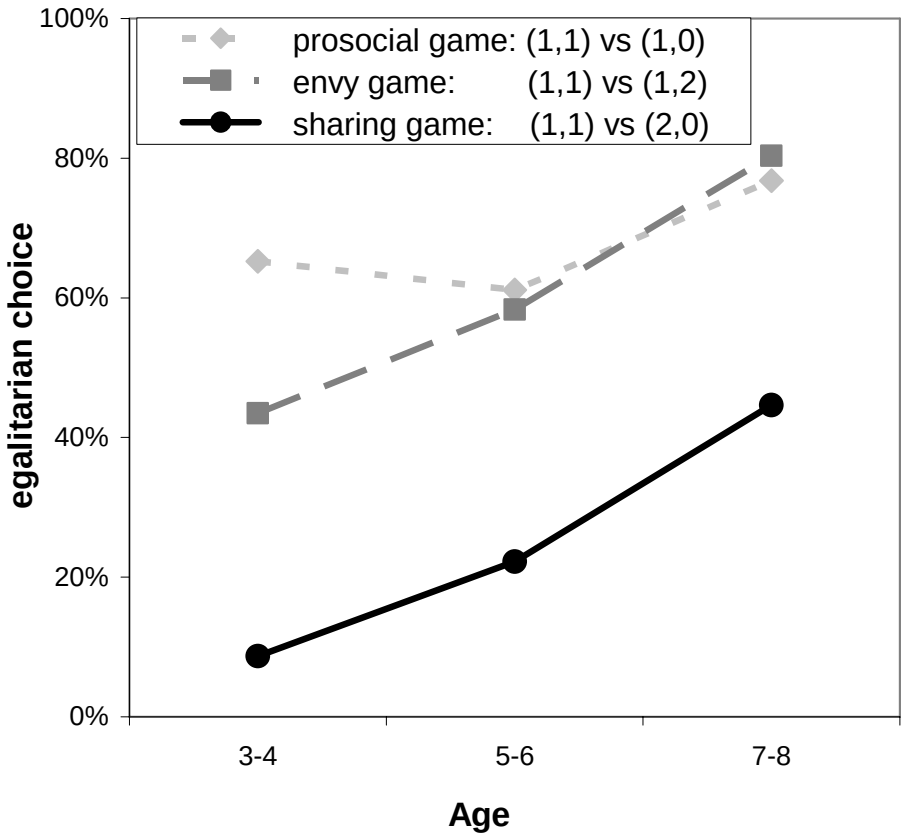
prosocial game: (1,1) vs (1,0)
envy game: (1,1) vs (1,2)
sharing game: (1,1) vs (2,0)
100%
80%
60%
40%
20%
0%
egalitarian choice
3-4
5-6
7-8
Age

Figure 1

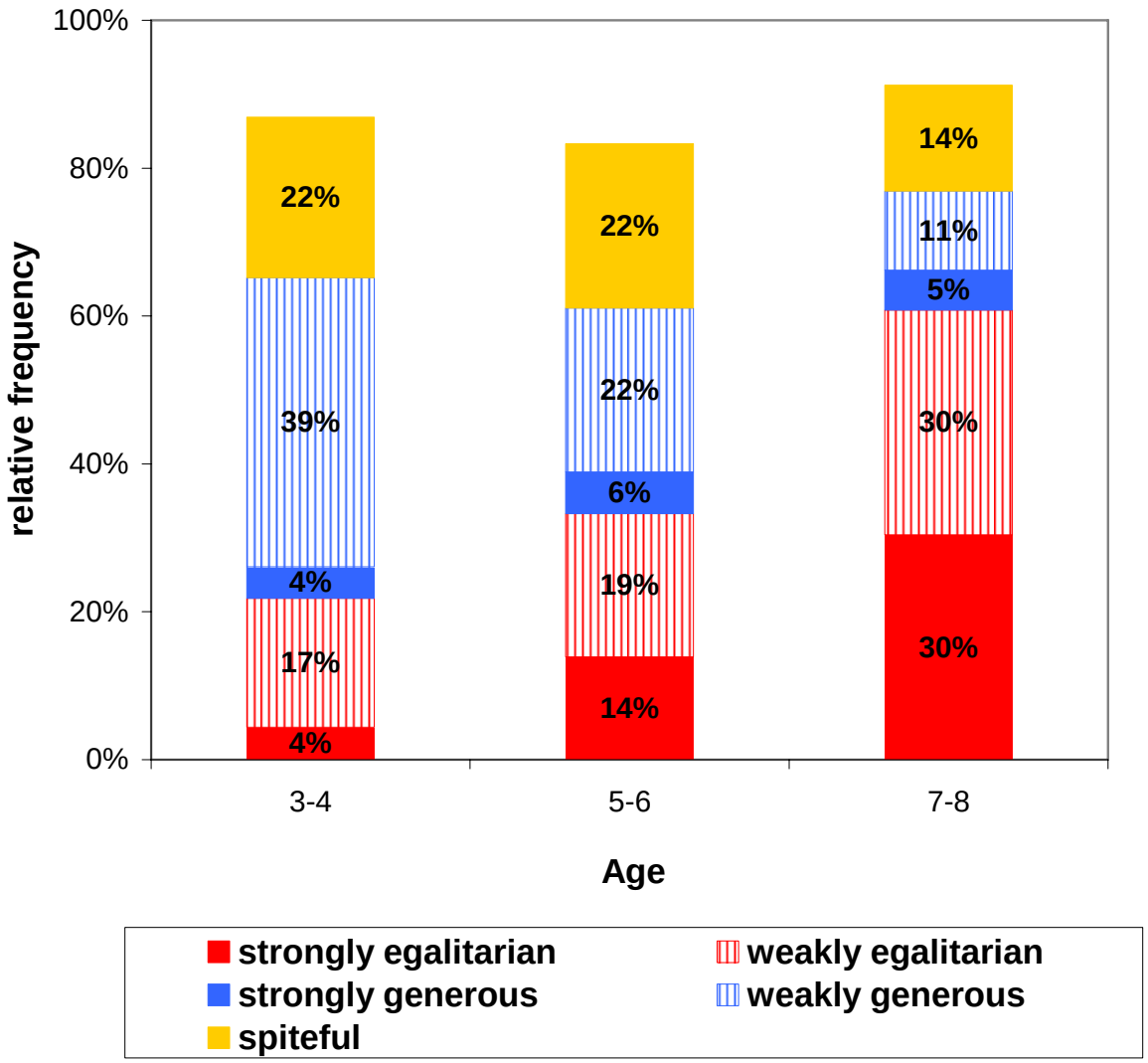
100%
80%
60%
40%
20%
0%
relative frequency
22%
39%
4%
17%
4%
22%
22%
6%
19%
14%
14%
11%
5%
30%
30%
3-4
5-6
7-8
Age
strongly egalitarian
weakly egalitarian
strongly generous
weakly generous
spiteful

Figure 2

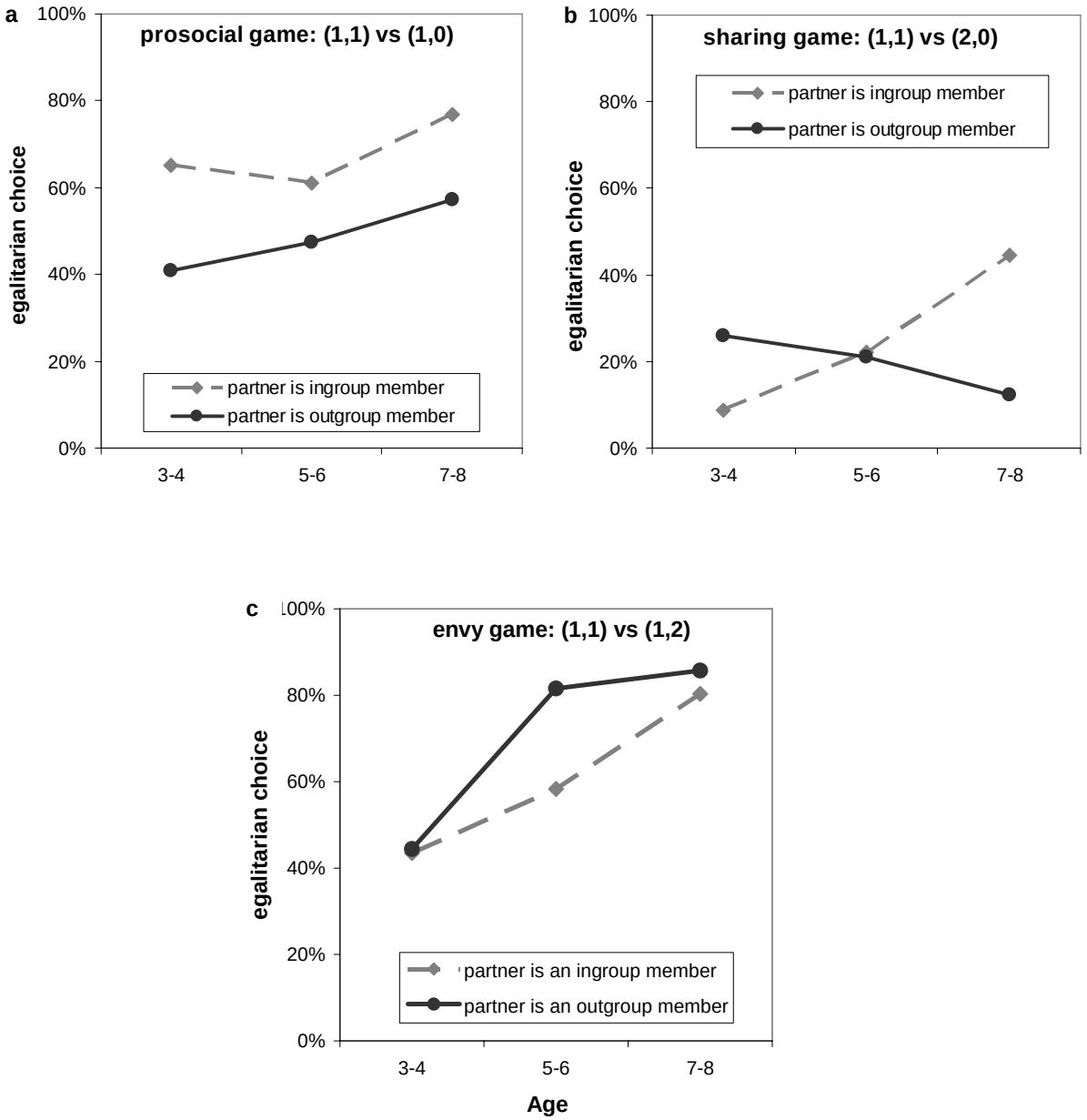

Figure 3a, 3b, 3c

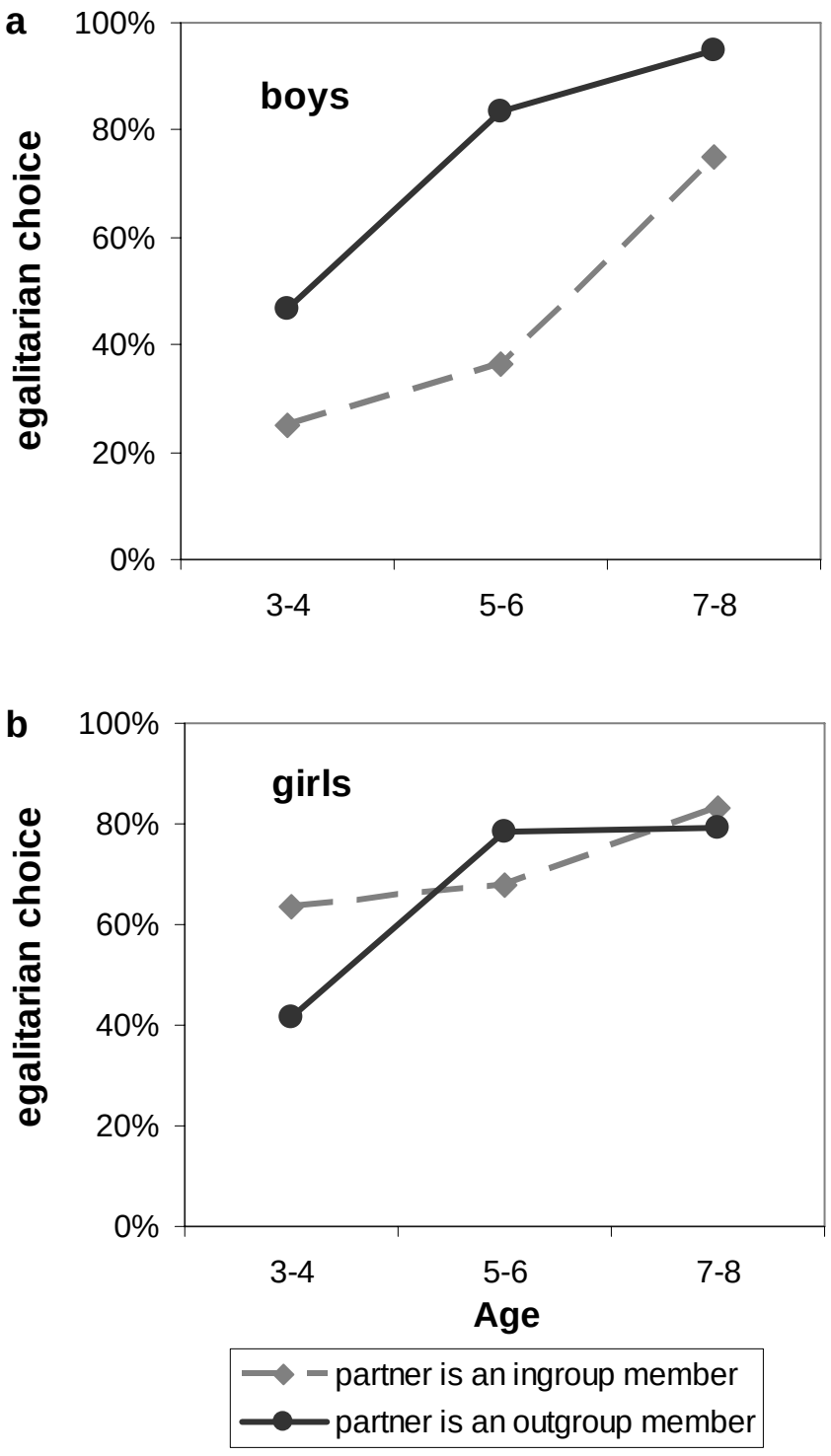

Figure 4a and 4b