***Supplementary Information for “Human Children but not Chimpanzees make Irrational Decisions driven by Social Comparison”***

***Additional information on participants for children***

Each subject was paired with a same-sex, same-age partner. Participants and partners were familiar with each other since they were recruited from the same school and thus frequently interacted with one another. Children who were in the required age range were randomly chosen from the class list and were randomly assigned to the participant or partner role. Children were tested in a quiet room in their local school. Participation was fully voluntary, and children were usually eager to participate.

***Additional information on materials and design for children***

Participants sat opposite each other at a small table (see Figure 1, and SI for details). One half of the table was marked with red tape, and the other half with blue tape and each child was assigned to one of the two colors (red for subjects, blue for their partners). A board containing two trays was used to display the distribution of rewards (for purposes of clarity, only the two trays are depicted in Figure 1). In addition, a small pole for stacking rewards (again marked in either red or blue) was positioned on each side of the table. Participants collected their rewards (chocolate cereal rings) by placing them on their pole. During the test condition, the distribution on one tray was 2-1 (2 for subject, 1 for partner: the ‘I get more’ option) and on the second tray 3-6 (3 for subject, 6 for partner: the ‘You get more’ option). During the control condition, the distribution on one tray was 2-5 and on the second tray 3-6.

In a between-subjects design, children participated in four trials in one condition. The procedure consisted of two consecutive steps: a familiarization phase (see SI) and a test phase (see below). All sessions were videotaped for later coding.

***Familiarization phase for children***

At the beginning of the familiarization phase, the participant and the partner entered the testing room together with the Experimenter (E), who assigned them to their respective chairs (red for subjects, blue for the partners). E then placed a tray between the two children, which again featured a red and a blue side. E explained to the two children (in Swahili) that rewards on the red side belonged to the subject and rewards on the blue side belonged to the partner. In addition, E drew the children’s attention to two small poles (one located on each side of the table and again marked in red and blue) that could be used to stack rewards. E then familiarized children with the procedure in a series of seven steps. In step one, E1 placed one tray between the two children which contained one reward on each side (1-1 distribution) and told children that they could take their rewards and place them on their collection pole. After this, E1 asked the children to count the number of rewards on their poles aloud (this was also done after each of the following steps). In step two, E1 placed one tray (1-1 distribution) on a board and handed it to the subject. The subject was prompted to take the tray from the board and place it in-between herself and the partner (as would be the case during the test phase). This same procedure was repeated during step three (1-0 distribution, i.e. one reward for subject and 0 rewards for partner) and during step four (0-1 distribution). These two steps were included to familiarize children with the fact that it was possible for the subject to receive more rewards than the partner or vice versa. In step five, E1 placed two trays on the board for the first time (as would be the case during the test phase) - one with a 1-1 distribution and one with a 2-2 distribution – and gave subjects the choice of picking either. Finally, in steps six and seven, subjects were faced with a 1-0 and 0-1 (step six) or a 0-1 and 1-0 (step seven) distribution. This represented the end of the familiarization phase. E1 placed the rewards the two children had collected in two envelopes and told the children that they would receive the envelopes after class. The partner child then returned to class.

***Additional control condition for children***

**Participants.** We tested twenty-four 9 to 10-year-old Kikuyu children from three rural schools near Nanyuki in Laikipia county in central Kenya. Two additional children had two be excluded because they grabbed their partner’s rewards and one additional child because of an inability to count.

**Materials and Procedure.** The study-setup and procedure were identical to the other conditions. The only difference was that children decided between a 2-4 and a 3-6 option.

**Results.** Children selected the payoff-maximizing option (3-6) in 74% of trials. A one-sample t-test confirmed that children picked the 3-6 option significantly more often than expected by chance (*p* < 0.001). Using an independent samples t-test, we also investigated whether children were more likely to choose the 3-6 option in this control condition compared to the test condition. This was the case (*p* = 0.005).

***Script for children’s study***

|  |
| --- |
| **Training** |
| Today you can collect some rewards. |
| Let's see how many you can get. |
| Look. |
| You play on the red side, and you play on the blue side. |
| The rewards on the red side are yours, and the rewards on the blue side are yours. |
| This is your reward. |
| And this is your reward. |
| Now take it and put it here. |
| This way. |
| Very good. |
| Again? |
| *Turn around.* |
| Take this and put it on the table. |
| *This one.* |
| Take it. |
| Put it here. |
| Like this. |
| Now take your reward and put it here. |
| Again? |
| Now count your rewards. |
| How many have you got? |
| And you? |
| OK. |
| *repeat as before* |
| Look, now there are two trays. |
| Which one do you want? |
| This one or that one? |
| Only one. |
| *repeat as before* |
| Now you have finished. |
| This is your bag. |
| I will put your rewards in your bag and you will get them after class. |

**Table 1. Age and Sex of each chimpanzee subject and their respective partners.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Subject | Age | Sex | Partner | Age | Sex | Location |
| Jane | 14 | Female | Dufa | 36 | Female | Sweetwaters |
| Roy | 11 | Male | Romeo | 13 | Male | Sweetwaters |
| William | 18 | Male | Uruhara | 38 | Male | Sweetwaters |
| Joy | 14 | Female | Amizero | 38 | Female | Sweetwaters |
| Akela | 30 | Female | Tess | 35 | Female | Sweetwaters |
| Dufa | 27 | Female | Bahati | 34 | Female | Sweetwaters |
| Kofi | 12 | Male | Lobo | 13 | Male | Leipzig |
| Bangolo | 8 | Male | Lome | 16 | Male | Leipzig |
| Tai | 15 | Female | Dorien | 37 | Female | Leipzig |
| Natascha | 37 | Female | Riet | 40 | Female | Leipzig |
| Frodo | 24 | Male | Robert | 42 | Male | Leipzig |
| Lobo | 13 | Male | Robert | 42 | Male | Leipzig |
| Lome | 16 | Male | Frodo | 24 | Male | Leipzig |
| Sandra | 24 | Female | Corrie | 41 | Female | Leipzig |
| Dorien | 37 | Female | Natascha | 37 | Female | Leipzig |

***Additional information on participants for chimpanzees***

Fifteen chimpanzees (8 females) ranging in age from 8 to 37 years (M = 20 years) participated in this study. Six chimpanzees were tested at Sweetwaters Chimpanzee Sanctuary, Kenya, and nine chimpanzees were tested at Wolfgang Köhler Primate Research Center in Leipzig Zoo, Germany, using identical procedures at the two sites. Each subject was paired with a same-sex partner (see SI). An additional eight chimpanzees (5 females) ranging in age from 13 to 42 years (M = 31.7 years) acted solely as partners (chimpanzees that did not pass apparatus understanding criteria were selected as partners). Finally, six subjects also acted as partners once they had participated in the study as subjects. Subjects and partners were randomly paired. Chimpanzees at both testing sites had previously participated in several cognitive and behavioral studies. For more information on subjects and their partners, please refer to table S1 (SI).

***Additional information on materials and design for chimpanzees***

Testing took place in two opposing rooms. The rooms were connected by an overhead raceway (Kenya) or an interconnecting door (Germany), which could be opened or closed. Two boards were positioned in-between the rooms (see Figure 1, lower part). Each board contained two small, moveable platforms. If the subject pulled the rope attached to a certain board, the platform closest to the subject moved towards the subject and the platform closest to the partner moved towards the partner. The number of rewards (pieces of apple) on each platform varied according to condition. The distribution was identical to the children’s experiment: during the test condition, the distribution on one platform was 2-1 (2 for subject, 1 for partner) and on the second platform 3-6 (3 for subject, 6 for partner). During the control condition, the distribution on one platform was 2-5 and on the second platform 3-6.

In a within-subjects design, chimpanzees participated in two sessions of six trials in each condition. Whether individuals started with the test condition or the control condition was counterbalanced across subjects. The procedure consisted of two consecutive steps: a familiarization phase and a test phase.

***Familiarization phase for chimpanzees***

During the familiarization phase, subjects were introduced to the apparatus and the contingencies of the task in a series of four steps. Subjects were tested individually and in one session per day. Pieces of apple – the same food that would be used during the test phase – were also used in the familiarization phase.

In step one, chimpanzees chose between a 1-0 and a 0-0 option. This was included so that subjects would understand that they could pick only one option. Once they had picked one option (by pulling the rope attached to the respective board), an experimenter removed the rope attached to the second board. Successful sessions were those in which subjects chose the correct option (1-0) on five out of six trials.

In step two, chimpanzees chose between a 2-0 and a 3-0 option. This step was included in order to test whether subjects would track the food quantities on each board. Subjects had to select the 3-0 option in five out of six trials in two consecutive sessions, in order to advance to step three.

During step three, subjects chose between a 1-1 and a 1-4 option. In contrast to step one and two, the raceway/door between the two rooms was open during this stage. This step was included in order to test whether subjects pay attentions to both platforms on the board (and not just to the platforms closer to their side). To pass the criterion, subjects had to choose the 1-4 option in five out of six trials in two consecutive sessions. This required pulling the correct rope, eating the one piece of apple on their side, then moving to the opposite room and eating the four pieces of apple.

Finally, in step four, subjects were confronted with a 5-0 and a 3-5 option. Importantly, the raceway/door between the two rooms was closed during this stage. Thus, to maximize their rewards, subjects had to pick the 5-0 option. This step was included in order to test whether chimpanzees would simply pick the option that contains more food overall (3-5) or whether they would maximize their reward. To pass criterion in step four, subjects had to pick the 5-0 option on five out of six trials in two consecutive sessions.

***Ethics statement for chimpanzees***

Research at Leipzig Zoo was performed in accordance with the recommendations of the Weatherall report “The use of non-human primates in research”. Groups of apes were housed in semi-natural indoor and outdoor enclosures with regular feedings, daily enrichment and water ad lib. Subjects voluntarily participated in the study and were never food or water deprived. Research was conducted in the sleeping and/or observation rooms. No medical, toxicological or neurobiological research of any kind is conducted at the Leipzig Zoo. Research was non-invasive and strictly adhered to the legal requirements of Germany. The full procedure of the study was approved by the Max Planck Institute for Evolutionary Anthropology Ethics Committee. Animal husbandry and research comply with the “EAZA Minimum Standards for the Accommodation and Care of Animals in Zoos and Aquaria”, the “WAZA Ethical Guidelines for the Conduct of Research on Animals by Zoos and Aquariums” and the “Guidelines for the Treatment of Animals in Behavioral Research and Teaching” of the Association for the Study of Animal Behavior (ASAB). IRB approval was not necessary because no special permission for the use of animals in purely behavioral or observational studies is required in Germany. Further information on this legislature can be found in paragraphs 7.1, 7.2 and 8.1 of the German Protection of Animals Act (“Tierschutzgesetz”).

Research at the Sweetwaters Chimpanzee Sanctuary was performed in accordance with the recommendations of the Weatherall report “The use of non-human primates in research”. Groups of apes were housed in semi-natural indoor and outdoor enclosures with regular feedings, daily enrichment and water ad lib. Subjects voluntarily participated in the study and were never food or water deprived. Research was conducted in the sleeping and/or observation rooms. No medical, toxicological or neurobiological research of any kind is conducted at Sweetwaters Chimpanzee Sanctuary. Research was non-invasive and strictly adhered to the legal requirements of Kenya. The full procedure of the study was approved by the local ethics committee at the Sanctuary (the board members and the veterinarian).