

Monkey business

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Introduction

Endowed effect was thought that is showed only by human beings. Although base on researches and experiments that have been done, scientists found out that human economic biases like loss aversion and reference dependence are shared with an ancestrally related New World primate, the capuchin monkey (*Cebus apella*). With the following experiments we understood that those behavioral effects are not based on timing or dealing issues, but are based on cognitive systems, which are phylogenically older than previously thought. At the beginning they had to exchange fruits discs with cereals (which the equally liked) and then the other way round. The monkeys showed that they prefer to eat the goods they own instead of trade them with equally valued goods. Then in another experiment they could exchange the fruit discs with higher value goods and there was an increase in the trade. That shows that they overestimate the price of the things they own.

But there are also other behaviors that they share with human beings. In other researches the capuchin monkeys showed an early evolutionary origin of inequity aversion. For example they reject the unequal pay or they react negative if they see that another monkey receives award without any effort. Another common in their behavior with humans, is the self-rewarding mechanism. In that research the monkeys could select to reward only themselves (selfish) or choose to reward also another monkey (prosocial). The selfish choice was highest towards strangers and lower toward kin.

Methods

Baseline session:

For this experiments we needed two humans who were the experimenters (experimenter 1 and 2) and five adult capuchins (the subjects), from which two were males and 3 were females. At this stage the experimenters had to teach the subjects how the game works. Each subject had twelve metal tokens. They could use these tokens to buy food. One monkey at a time was entering a cage (supermarket) with two openings. The one was opposite to the other. Each experimenter was standing in front of those openings and showing different foods (cereal or fruits) to the monkey. The monkey was allowed to get the food, after they pay the experimenters with token. By doing this we were trying to find 1 cereal and 1 fruit that

the most of the monkeys equally like so we can have more accurate results in the next experiments. We had 1 session of each fruit and cereal in order to find equally trade foods. Each session was made of twelve trials.

Experiment 1:

It was similar with baseline session. The difference was that in experiment 1 there was only one experimenter with who the subjects could trade and the subjects instead of metal tokens had fruit discs or cereal. Therefore there were only two sessions. In the first session the monkeys owned fruit discs which they could trade them for cereals. And in the second session the monkeys owned cereal which they could trade them with an experimenter who was offering fruit discs. Each session was made of 12 trials. In this experiment they had the opportunity of either eat the endowed good or exchange it with an equivalent good. Therefore it will tell us if the subjects overestimate their own goods compare to the goods that the experimenter offers them (even though they are equivalent).



Figure 1: subjects exchange tokens with experimenters for food reward.

Experiment 2:

The trading game is still the same as experiment 1. But this time instead of equal value goods, they could trade the endowed goods with a higher value good (Fluff filled fruit rolled-up, FFRU). Again there were 2 sessions (one with cereals and one with fruit discs). Each session had 12 trials. During this experiment we could check if the subjects were willing to exchange the endowed cereal or fruit with a higher value good.

Experiment 3:

In this experiment the monkeys had the opportunity to either eat the endowed food or exchange it with an equivalent food plus a small compensation for the transaction cost of the trade. By this experiment we could test the subjects, if they were still showing the endowed effect after they were paid for the cost of transacting the trade. Before the subjects participate in the third experiment, they were introduced to a transaction cost assessment session to determine, the smallest compensation that the monkeys would deal to exchange it with a token. To determine that, each subject owned twelve tokens. For the first round of this transaction cost assessment, the experimenter offered only one piece of uncooked oatmeal ('1 oat') in exchange for each of the monkey's tokens. If the monkeys refuse to give any of its tokens to buy it then the session was rerun. But this time with 2 piece of uncooked oat meal and so on. Using this method the experimenter could find out the transaction cost of each monkey. After that the third experiment took

place. This time each monkey had 1 session with 12 fruit discs which they could exchange them for cereal plus the oat transaction cost. And another session with 12 cereals which they could trade with fruit discs plus the oat transaction cost.

Experiment 4:

We wanted to find out if the capuchin monkeys really had the endowed effect in their behavior or they would refuse trade because it was faster to eat the already owned food. For this test the subjects were supplied with 12 almonds inside their shell (slow eat food) and they could trade them with one experimenter who was selling almonds without shell (fast eat food). Therefore the monkeys could either eat the slow eat food or exchange it with fast eat food. The subjects run 1 session of 12 trials.

Results

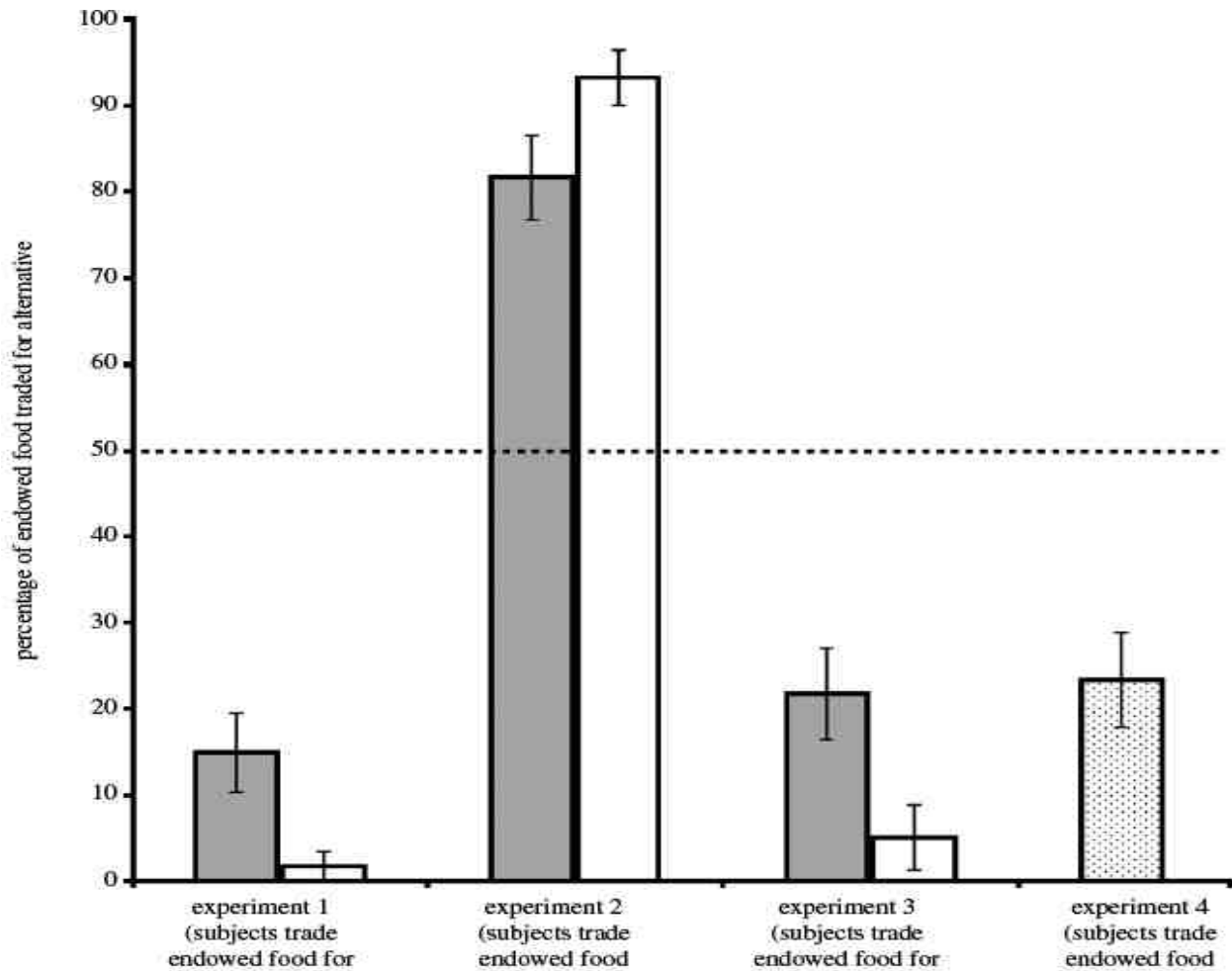


Figure 2.

In experiment 1, when subjects could exchange an endowed good for its equivalent, subjects preferred the endowed good instead the good offered by the experimenter. This preference to consume endowed food, rather than exchange it for an equivalent. Even though there is an increase in the size of the offer to account for the cost of the transaction (experiment 3) and the time of the trade (experiment 4). However, subjects were willing to trade food in exchange for a highly valued alternative (experiment 2). Grey bars, cereal; white bars, fruit; dotted bar, in-shell nut.

Baseline session: the results for the baseline session were roughly equal choice between fruit discs and cereal.

Experiment 1:

The endowed effect on capuchin monkeys was obvious. Because instead of considering that cereal and fruit discs have the same value as in base line session, they preferred to eat the endowed food instead of trading it. When they owned fruit discs, they traded only 1.7 % on cereal. Also when they owned cereals, they traded only 15 % for fruit discs. In both cases they traded under 50 %. For all 5 monkeys, we should reject the null hypothesis that they prefer fruit and cereal equally regardless of endowment.

Experiment 2:

We observe a really high percentage of trading in this experiment. The subjects prefer to trade their endowed goods for a higher value food. Therefore they prefer to eat less of the endowed food and more of the FFRU. They trade 93.3 % cereal and 83.67 % fruit discs for FFRU. In both cases of trading, there were more than 50 %.

Experiment 3:

The trading made by subjects was still low. Even if they could trade their endowed food with an equivalent one plus the oat transaction cost. When they owned fruit discs the trade only 5 % and when they owned cereal they trade only 21.7 %. Again both trade percentages were low (under 50 %).

Experiment 4:

Even in experiment 4 the endowed effect is strongly seen. The subjects preferred to keep the almonds with shell (that was slower to eat) than to exchange them with almonds without shell (which it was faster eat). They subjects exchange only 23.3 %, which it is still under 50 %.



Discussion

Based on experiment 1 we see that the subjects would rather to eat the owing food instead of trade it with equal value food. The reason for this could be that eating what they already owned was faster than trade it with something else. Or another reason is that the food they already own was more valuable based on them. In experiment 2 we see an increase on trading. This is because the subjects prefer to eat more FFRU than the endowed food. They choose to trade because based on them the FFRU had enough value as their endowed food. So it was a good deal for them. Again we see a decrease in trading during experiment 3. The subjects refuse to trade as much as in experiment 2, even though they were compensated for the time and the cost of transfer. Maybe this is because their endowed food was still higher price than that they were offered by the experimenter. The experiment 4 comes to reject the hypothesis of Experiment 1. Even though they were offered almonds without the shell, which is faster to eat they prefer the ones they already owned with the shell (need more time to eat it). And this can be seen statistically because the percentage of trade is lower than 50%. Therefore the endowed effect is very clear especially in experiment 4. This drive us to the conclusion that the behavior to overestimate subjects we owned is not only seen in humans, but is also seen in species who share the same ancestors with humans (more than 30 million years ago) even those that are distantly related in evolutionary time. But there 1 question that remains without answer: How and in what circumstance, this endowment effect can be evolutionary useful?

References

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