



The evolutionary origins of patience

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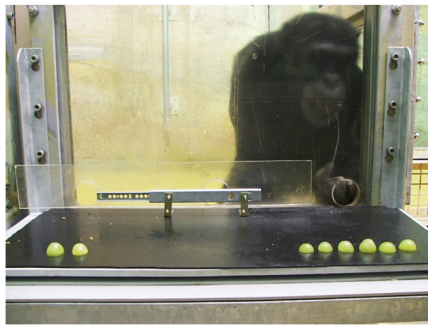
Introduction

- Economists have demonstrated that humans can wait years for future rewards. Yet, other animals typically wait only a few seconds. *Are humans uniquely patient?*
- We tested two problems with this assertion:
 1. *Evolutionary problem*—our closest, living phylogenetic relatives have not been tested.
 2. *Methodological problem*—experiments on humans and other animals use different reward types.
- Can ecological rationality account for species differences?

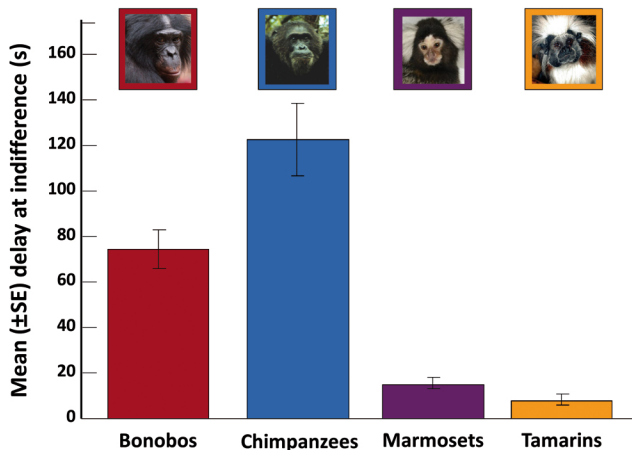
Experiment 1: How patient are apes?

Methods

- Five chimpanzees and five bonobos chose between two grapes immediately and six grapes after a time delay.
- We adjusted the delay to large reward until subjects were indifferent between the two options.



Results



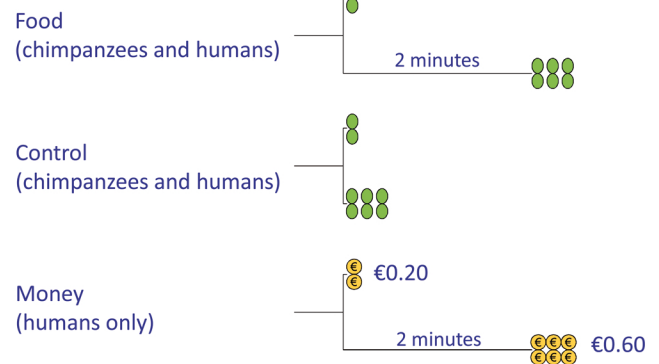
- Chimpanzees and bonobos are much more patient than other animals tested so far, including other primates such as marmosets and tamarins.
 - Chimpanzees are more patient than bonobos, following predictions of the ecological rationality hypothesis.
- But this is still on the order of seconds to minutes. Are humans more patient in the same situation?

Experiment 2: Are humans more patient than apes?

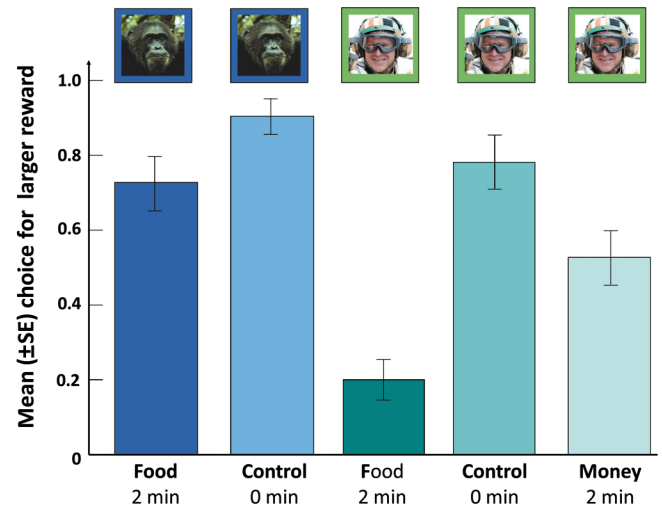
Methods

- 19 chimpanzees and 40 human subjects repeatedly chose between two and six food items.
- Neither humans nor chimpanzees knew the time delays before experiencing them.

Treatment conditions



Results



- Humans were less patient than chimpanzees when tested in a similar situation.
- Control and money conditions suggest that hunger and aversion to waiting cannot account for the effect.

Discussion

- For food, human temporal preferences are similar to apes, indicating that patience may have evolved with a common ancestor of apes and humans.
- Ecological rationality of patience
 - Chimpanzee/bonobo difference: *wild chimpanzees face more temporal delays when foraging.*
 - Human money/food difference: *patience depends on the reward type and opportunity costs.*