Choice Behavior in Children and Nonhuman Primates

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Primates

Background:

- Computerized "door game" (Shin & Ariely, 2004)
- Could click on a door to change rooms (costly) or stay in room to earn money
- First, subjects established preference pattern when all rooms were constantly available
- Then doors began to shrink (to the point of disappearing) if not clicked on
- Would have been rational to maintain initial room preference and let other doors disappear (earning the most money), but people chose to click doors more in second condition to "keep options open"

Question:

- Do nonhuman primates share with humans this irrational preference, suggesting a biological and evolved origin to such irrationality?

Participants:

- 7 capuchin monkey and 8 rhesus macaques housed at the Language Research Center of Georgia State University in Atlanta, GA

Method:

- Primates selected between a "high risk" (1 or 4 pellets) or "low risk" icon (2 or 3 pellets) in a simplified "door game"
- Averaged scores in last 10 trials of last 5 sessions to establish overall risk preference score
- Compared risk preference scores in **Constant Options** condition (squares remained the full size for 100 trials, see Figure 1A) and the **Diminishing Options** condition (squares diminished in availability (6 blocks of 40 trials—last 240 trials of each session, see Figure 1B)
- Change score higher than zero indicated shift towards choosing both options more evenly

Do monkeys, like humans, show an irrational preference to keep options open even when they weren't initially preferred?

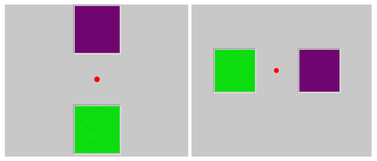


Figure 1A. Constant Options.

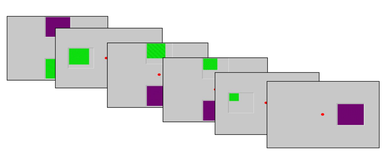


Figure 1B. Diminishing Options.

Abstract

Choice enables more freedom and control over one's life, but research suggests the provision of a large range of choices causes more dissatisfaction and demotivation than the provision of a small range of choices. This phenomenon of wanting more choice, but it actually being detrimental, is known as choice overload. Our studies investigated choice behavior in primates and children in order to disentangle cultural and biological factors. Young children have not yet been exposed to the same cultural influences as adults, and primates have the same underlying biology but lack human culture. Thus, finding evidence of similar patterns to adult humans in children and primates would suggest that these behavioral patterns are more innate. The study on the primates investigated if monkeys preferred to have more choice like adult humans, and the study on children investigated whether they were susceptible to choice overload.

Adult humans show a desire or preference for choice even when it is irrational. Specifically, there is a tendency to choose a certain response more often if that option appears to be disappearing or diminishing in availability (in other words, they may not choose an option often, but if that option begins to go away, they will select it more; Shin & Ariely, 2004). Monkeys were tested in a similar manner using a computerized task in which subjects selected between two squares, one high risk (gives 1 or 4 pellets) or one low risk (gives 2 or 3 pellets). Both choices, however, yielded the same average number of pellets per session, making each a logical choice from the perspective of reward maximization. In one condition both icons were constant (both squares remained the same size throughout the session), and in the other condition the icons had the potential to diminish in size (one square shrunk—and could disappear—whenever the other was chosen, and could only be restored by clicking on it). Results indicated that, despite what their initial risk preference was in the Constant Phase, the monkeys shifted this preference in the Diminishing Phase by choosing to click on both squares more equally in order to keep both options available. This demonstrates that some monkeys will irrationally change their initial preference, choosing an option that was initially undesirable and yields no extra benefit, in order to keep their options open. These results support the idea that desire for more choice has evolved and learning is not necessary for these patterns to emerge.

We were also interested in whether having too much choice impedes children in a similar manner to adults (Iyengar & Lepper, 2000). Half of the children chose one toy from a large range of options (24-choice condition) and the other half chose from a small range of options (6-choice condition). After completing an unrelated task, they were offered the chance to trade in their toy for a different one at the end of that unrelated task. The trade-in behavior served as our measure for choice overload because it would indicate whether a child was dissatisfied with their choice (because traditional measures of satisfaction may be too cognitively complex for young children). In our first experiment, we found that more children from the 6-choice condition decided to keep their toy than trade it in, whereas more children in the 24-choice condition decided to trade in their toy than keep it. This demonstrates that children experience dissatisfaction with their choice when choosing from a larger number of options. Subsequent experiments revealed that experience with the task may change this pattern.

Overall, these two studies indicate that biological and evolutionary factors may play a large role in choice behavior, and particularly in irrational choice behavior.

Children

Background:

- People desire choice even when more options are detrimental (Iyengar & Lepper, 2000)
- Participants either given 6 or 24 options of jam
- 24 choices attracted more people, but 6 choices resulted in more sales
- Demonstrates ***choice overload***: Although humans desire more choice, too many choices may hinder decision making and cause dissatisfaction

Question:

- Do children, who have not been fully exposed to cultural influences, also exhibit choice overload, suggesting that it is more biologically influenced than learned?

Participants:

- 40 participants (ages 37-76 months) were tested repeatedly (one trial per session, sessions approximately once a week) at local nursery school.

Method:

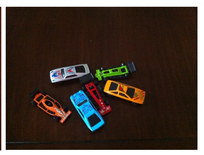
- During an unrelated task, children were given an opportunity to choose a toy (see below for details of each trial). After a delay and subsequent completion of the unrelated task, children were asked if they wanted to keep their initial choice or exchange it for another toy. We used exchange as a measure of dissatisfaction in young children.

Trial 1—Stuffed Animals: Random assignment to one of two conditions: 6 or 24 stuffed animal options.

Trial 2—Toy Cars: Children received the opposite number of choices from their first trial. Procedure the same as Trial 1 except for using cars instead of stuffed animals.

Trial 3—Stuffed Animals: All children were switched to their original choice number (6 or 24 options) and the stuffed animals were presented by spreading them out on a table.

Trial 4—Stuffed Animals with Added Cost for Trade In: For the final trial, children were told that if they wanted to trade their first toy, they could not change their mind, adding a tangible cost to trading it.



Results

Capuchins:

- Overall change scores (M = 0.167, SD = 0.126) differed significantly from zero, $t(6) = 3.497$, $p = .013$, see Figure 2A
- In diminishing options phase, monkeys began to choose both options more equally in order to keep them from disappearing

Rhesus Macaques:

- Overall change scores (M = 0.060, SD = 0.112) did not differ significantly from zero, $t(7) = 1.507$, $p = .176$, see Figure 2B
- Pattern remained consistent from Constant Options phase and Diminishing Options phase (i.e., behaved rationally by not changing preference when options began to diminish)

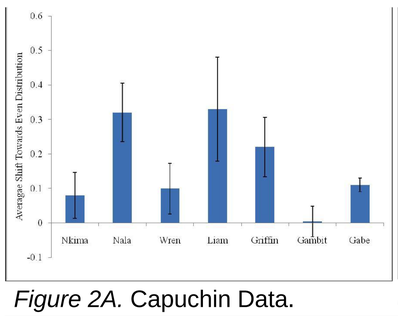


Figure 2A. Capuchin Data.

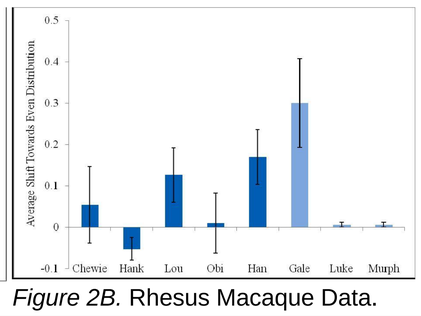
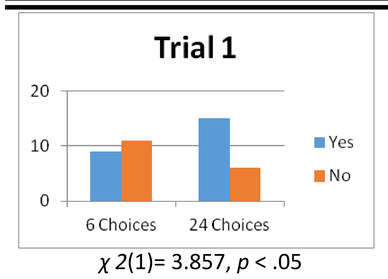


Figure 2B. Rhesus Macaque Data.

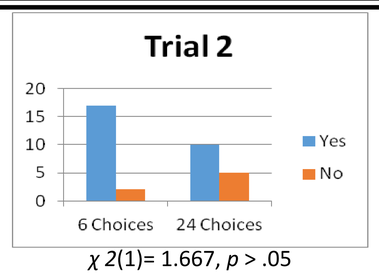
Conclusions

- Capuchin monkeys, like humans, tend to irrationally prefer to "keep options open" even when that is not beneficial.
- Rhesus macaques did not show this irrational behavior.
- Human children appeared to experience less choice overload than reported for adults. This remains an open question that may be influenced substantially by methodology.
- These studies demonstrate that biological factors may play a part in the decision-making behavior of human children, adults, and non-human primates.
- Future research is needed to better understand the underlying mechanism(s) at work in these decision-making scenarios.

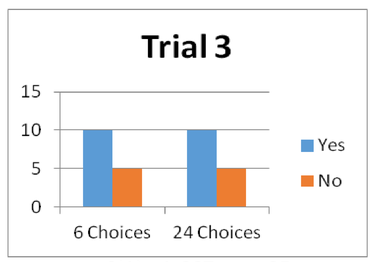
Results



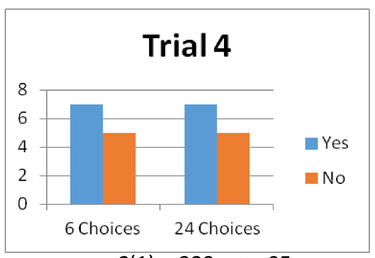
$\chi^2(1) = 3.857$, $p < .05$



$\chi^2(1) = 1.667$, $p > .05$



$\chi^2(1) = 1.667$, $p > .05$



$\chi^2(1) = .333$, $p > .05$

In general, the choice overload effect was found on the first trial, but was not observed on subsequent trials.

Support

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References

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