

# Delay of Gratification in Capuchin Monkeys

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## Background

- Self-control occurs when waiting leads to better rewards compared to taking immediate rewards.
- Self-control can produce clear advantages from dietary habits to financial well being.
- Capuchin monkeys show cognitive abilities that can rival those seen in great apes, but they struggle with self control, even with task experience.
- Thus, they provide a good model for attempting to facilitate better self control through creation of tasks that might improve delay of gratification.
- We assessed whether capuchin monkeys were better at delaying consumption of food rewards when they could watch the rewards coming towards them using the rotating tray (RT) task than in the accumulation (AC) task that involved rewards continuously being placed into an immediately accessible food tray.
- **Prediction:**
- *Monkeys would perform better at the RT task than the AC task even though reward amount and rate were held constant across tasks.*

## Methods

**Subjects:** Nine adult capuchin monkeys participated in this experiment. All monkeys were experienced in a variety of cognitive tasks. They were tested once per day in one of these tasks. Each session involved two trials that required self-control.

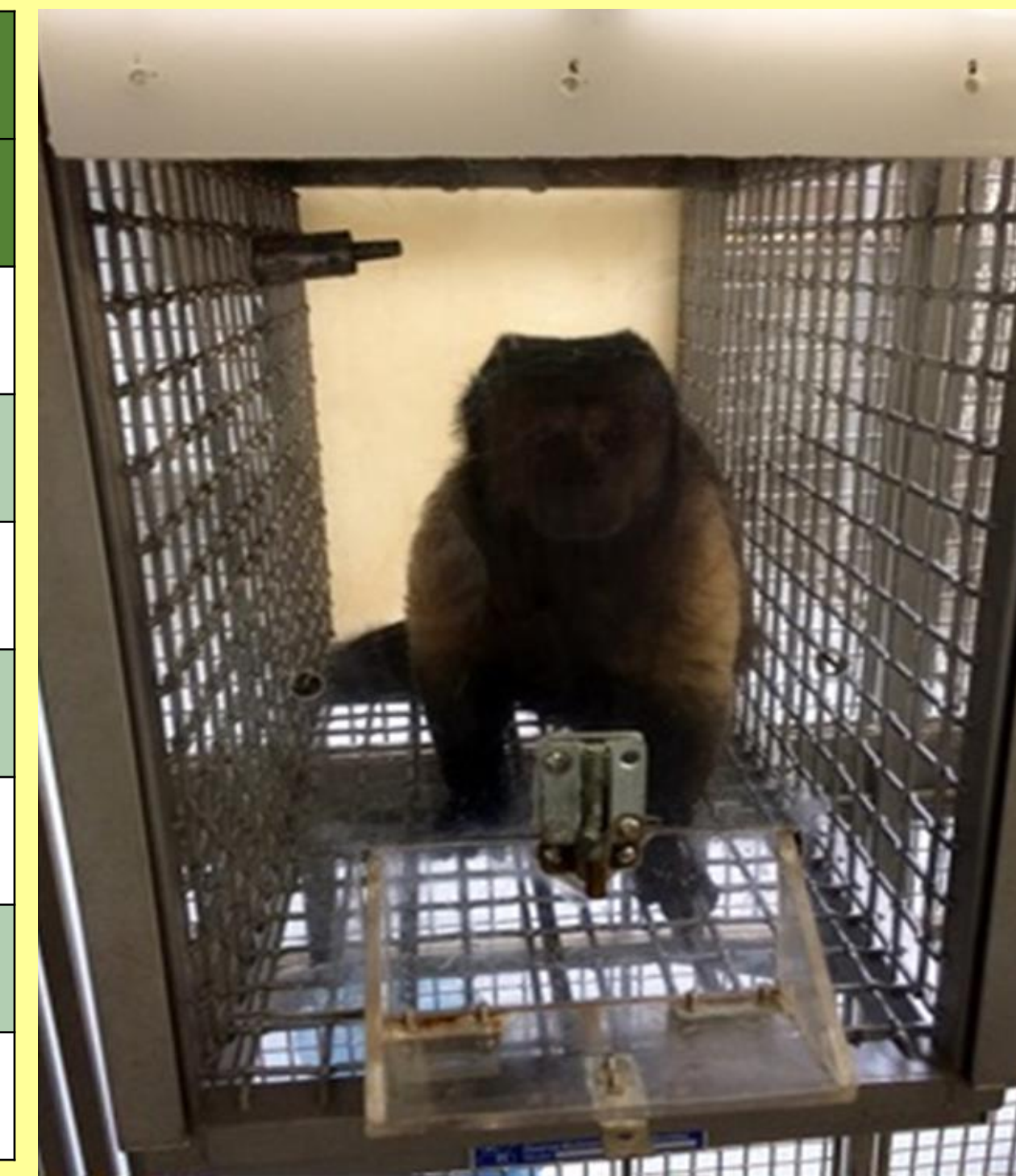
### Rotating Tray task

A rotating disk apparatus affixed to a cart was placed within reach of the monkey. Cups attached to the disk rotated towards the monkey who then could reach through a hole in a faceplate and grab the contents of one cup to end a trial.



### Accumulation task

A reversible tray was affixed to the front of the monkey's box. The experimenter placed food items into the tray as the monkeys watched. When unlocked, the subject could pull the tray into its side of the compartment to consume the contents at any time. However, no more items would be delivered and the trial would end.



Rotating Tray Task				Accumulation Task			
Forced Trial		Test Trial		Forced Trial		Test Trial	
Choice*	Total	Choice	Total	Choice*	Total	Choice	Total
Cup A	1	Cup A	1	Add 1	1	Add 1	1
Cup B	3	Cup B	3	Add 2	3	Add 2	3
Cup A + 5	6	Cup A + 5	6	Add 3	6	Add 3	6
Cup B + 9	12	Cup B + 9	12	Add 6	12	Add 6	12
Cup A + 14	20	Cup A + 14	20	Add 8	20	Add 8	20
		Cup B + 28	40			Add 20	40

## Results

	Rotating Tray Task				Accumulation Task				Comparison	
	Trial 1	Trial 2	t(4)	p	Trial 1	Trial 2	t(4)	p	t(9)	p
Gabe	2.6	2.4	0.30	.78	4.4	3.6	0.75	.50	-1.98	.08
Gambit	1.0	1.0	NA	NA	1.0	1.0	NA	NA	NA	NA
Griffin	3.8	4.0	-0.54	.62	4.0	4.2	-0.34	.08	-0.32	.76
Liam	5.0	4.2	2.14	.10	6.0	5.8	1.00	.37	-3.26	.011
Lily	4.4	4.8	-1.63	.18	5.0	6.0	-1.00	.37	-2.29	.051
Logan	3.8	4.4	-1.50	.21	6.0	6.0	NA	NA	-5.00	.001
Nala	2.8	3.6	-0.87	.43	2.2	2.6	-0.59	.59	1.11	.30
Nkima	1.0	1.0	NA	NA	1.0	1.0	NA	NA	NA	NA
Wren	4.8	5.2	-1.00	.37	3.8	6.0	-2.40	.07	-0.28	.78

## Discussion

- Despite our predictions, no monkeys performed better at the RT task than the AC task.
- There were large performance differences across monkeys.
- Monkeys may have improved in their accumulation abilities as a result of their exposure (and success) with the RT task in a previous experiment.
- One major difference between the present experiment and past tests with these animals was the use of increasingly larger additions of items to the sets within a trial.
- It was possible that the better performance of monkeys in this experiment in the AC task was the result of escalation in the amount of items added throughout each trial.
- We presently are assessing this possibility.

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