Substrate choice in nut-cracking behavior of semiwild tufted capuchin monkeys (Cebus apella)

Kazuo Fujita, Sayaka Tsutsumi, Yo Morimoto (Kyoto University)
Camila G. Coelho, Tiago Falótico, Eduardo B. Ottoni (University of São Paulo)

Tufted capuchin monkeys at the Tietê Ecological Park, São Paulo, Brazil, are known to crack open Syagrus palm nuts placed on the hard substrate with hammer stones (Ottoni & Mannu, 2001).

**Question**
Do capuchin monkeys know substrate conditions necessary for successful nut-cracking with hammers?

**Background**
The monkeys at this park are selective of the hammers (Falótico & Ottoni, 2005).

Captive tufted capuchins at the Monkey Valley Zoo, France, prefer to use hard substrate when they crack nuts on the surface by directly pounding them (Pouydebat, et al, 2006).

This species show understanding of causality in the tool-choice task (Fujita, et al., 2003), even with obstacles and traps (Sato et al, submitted).

**Method**

**Experimental Site**
Tietê Ecological Park, São Paulo, Brasil

**Subjects**
Opportunistically selected crackers.

**Procedure**
We placed 2 types of artificial anvils (25x62.5 cm) and a familiar hammer stone (14x13 cm, 1.42 kg) and dozens of nuts between the anvils, and ......... waited.

Hard anvil: connected 5 cement blocks
Soft anvil: wooden board covered with sponge and rubber

Position of the anvils counterbalanced across subjects.
Recorded which anvil the monkeys used in their first cracking attempt.

**Results**

11 monkeys worked on the experimental site (Table).

All Monkeys chose the hard anvil in their 1st attempt (p<0.001). (Figure)

7 monkeys who worked in the original setting (w hammer placed middle) used the hard one (p<0.02).

4 monkeys worked after another, when the hammer was on the hard anvil.

They immediately recognized the appropriate anvil by mostly visual inspection before trial-and-error.

**Discussion**
The monkeys seem to understand that the anvil surface must be hard for the success of this tool using behavior.

Capuchins not only understand spatial relationships among elements required for successful tool use (Fujita, et al, 2003; Sato, et al., submitted) but also quality (i.e., hardness of the surface) of the elements involved in it.

However, starting cracking immediately after visual inspection may mean that the monkeys simply used the surface that was similar to the one they often use (cement floor). Thus stronger neophobia against the soft anvil may partly account for the results.

**Future Directions**
Need replication with anvils of the same appearance.

**References**