Reward downshifts show that behavior remains dependent on reward expectancies even after extended training

Angela Adame, Jessica Suárez, Adrienne Drickamer, and Mauricio R. Papini
Texas Christian University

COLLEGE OF SCIENCE & ENGINEERING
DEPARTMENT OF PSYCHOLOGY

Introduction

•**Frustration:** Emotional reaction induced by an unexpected loss in the quantity or quality of a reward (Amsel, 1992).

•**cSNC:** Consummatory successive negative contrast unexpected reduction in sucrose from 32% or 16% to 4% to study frustrative nonreward (FNR)

•**Effects:**

- •Rejection of the downshifted solution, stress response (Flaherty, 1996).
- •Less extreme situations that produce no behavioral evidence of enhanced suppression (Arjol et al., under review).

•**Interpretation:** Behavioral suppression reflects frustration (Amsel, 1992).

Expectation: Habitual behavior is elicited by antecedent stimuli, rather than by an expectation of an outcome: Learning "what" to do, or S → R learning (Thorndike, 1911).

Expectancies of current outcome value guide actions: Learning what to get for doing something, or S→S learning. Limited training leads to actions (Amsel, 1992).

Methods

•**Subjects:** 47 female Wistar rats around 90 days old at the beginning of the experiments were used.
•**cSNC:** Ten (RT) or thirty (OT) 5-minute sessions of access to 32% or 16% sucrose followed by 4 downshift sessions of access to 4% sucrose. Control groups were always exposed to 4%.

Condition	Training	Post-shift	N=60
OT = 30	32%	4%	n=12
	16%		n=12
	4%		n=12
RT =10	32%		n=12
	16%		n=12

•**Instrument:** Subjects received training in consummatory behavior boxes, each enclosed in a sound-attenuating cubicle. A circuit connecting the metal bars on the floor of the box with the zipper tube allowed licks to be counted.

Results

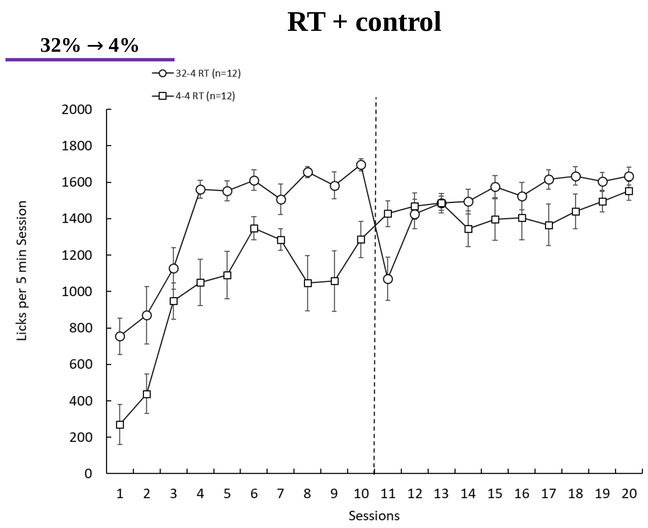

Figure 1:

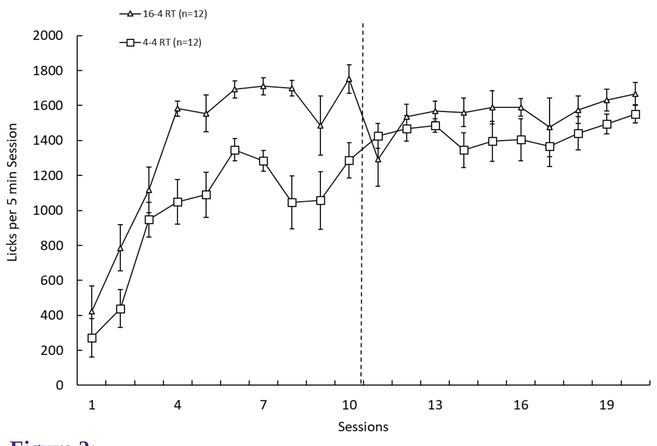

Figure 2:

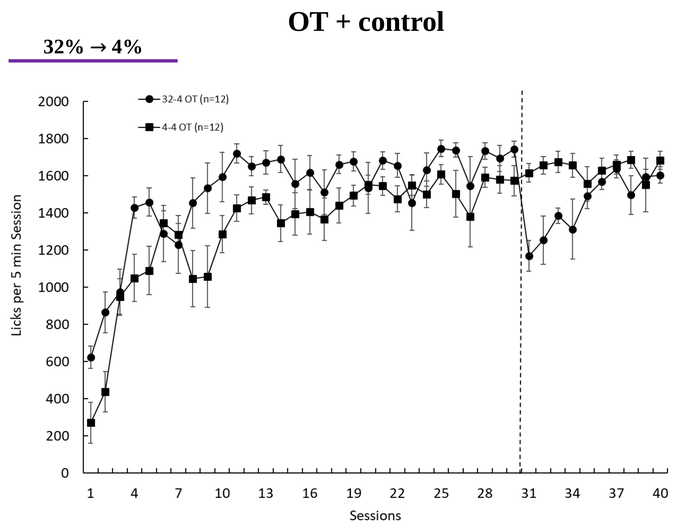

Figure 3:

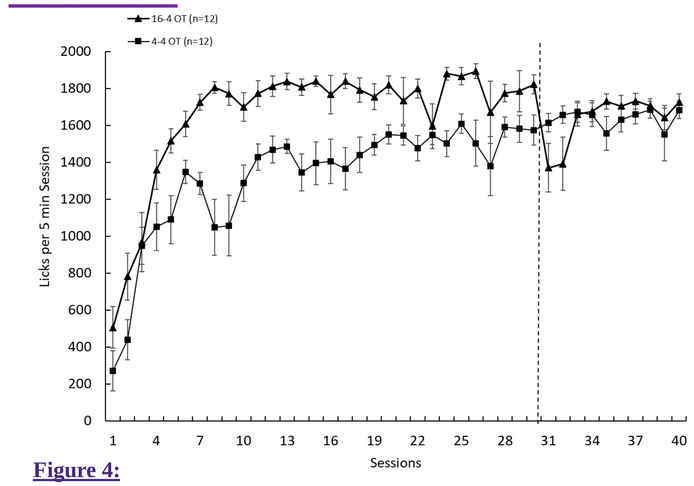

Figure 4:

Discussion

• **Consummatory suppression:** Enhanced behavioral suppression after OT even in the less extreme downshift condition.
•**Recovery:** There could be a trend towards greater resistance in behavioral recovery.
•**Conclusion:** Expectations can be strengthened and this could facilitate the detection of frustration. FNR induced by reward downshifts overcomes the development of a habit even after prolonged training. The action is guided by the expectation of the reward.
•**Future studies:** Differences in recovery and suppression between extreme and non-extreme downshift.

References

Amsel, A. (1992). *Frustration theory.* Cambridge University Press.
Arjol, D., Aguera, A., Hagen, C., & Papini, M. R. (under review). Frustrative nonreward: Detailed c-Fos expresión patterns in the amygdala after consummatory successive negative contrast. Neurobiology of Learning and Memory.
Flaherty, C. F. (1996). *Incentive relativity*. Cambridge University Press.
Thorndike, E. L. (1911). *Animal intelligence*. Macmillan Press.

Funding

reSEaRCh
Science and Engineering Research Center