

# COOPERATION & EMPATHY



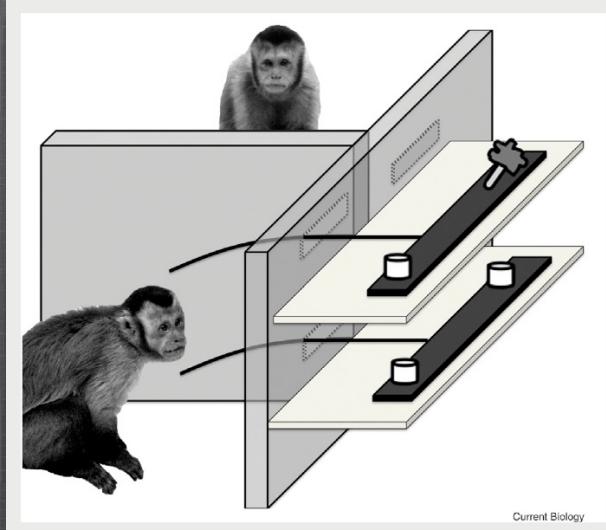
Masterclass 2b

## # 1 - PULL PARADIGM

Silk et al. (2005). Chimpanzees

Burkart et al. (2007). Marmosets

Lakshminarayanan & Santos (2008). Capuchins



Current Biology

### BROWN CAPUCHINS

But chimpanzees failed  
(in study by Silk et al.)

## # 2 - ASSISTANCE PARADIGM

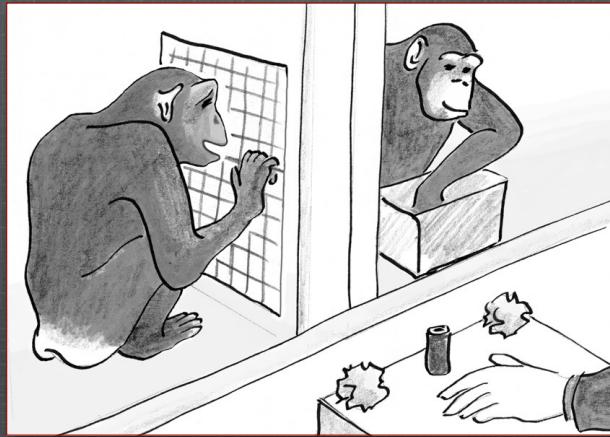
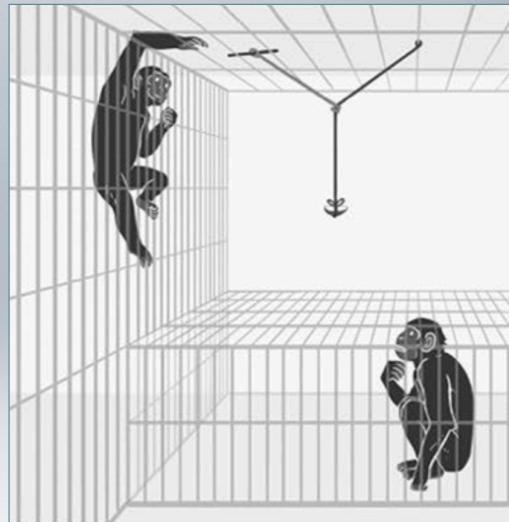
Warneken, F., Hare, B., Melis, A.P., Hanus, D., & Tomasello, M. (2007).  
Spontaneous altruism by chimpanzees and young children. *PLoS Biology* 5: 1414 – 1420.



Yamamoto et al., 2009

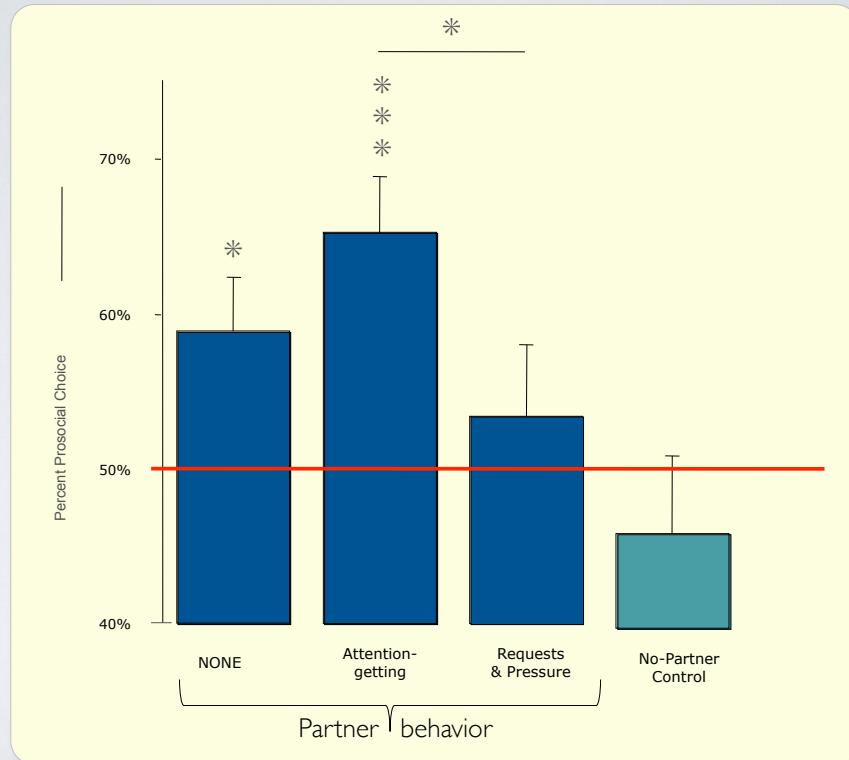


Jingzhi Tan *et al.*  
(2017). Bonobos  
respond prosocially  
toward members of  
other groups. *Scientific  
Reports*.



### # 3 - TOKEN PARADIGM

# Prosocial Choice by Chimpanzees



Horner, Carter, Suchak & de Waal (2011). PNAS.

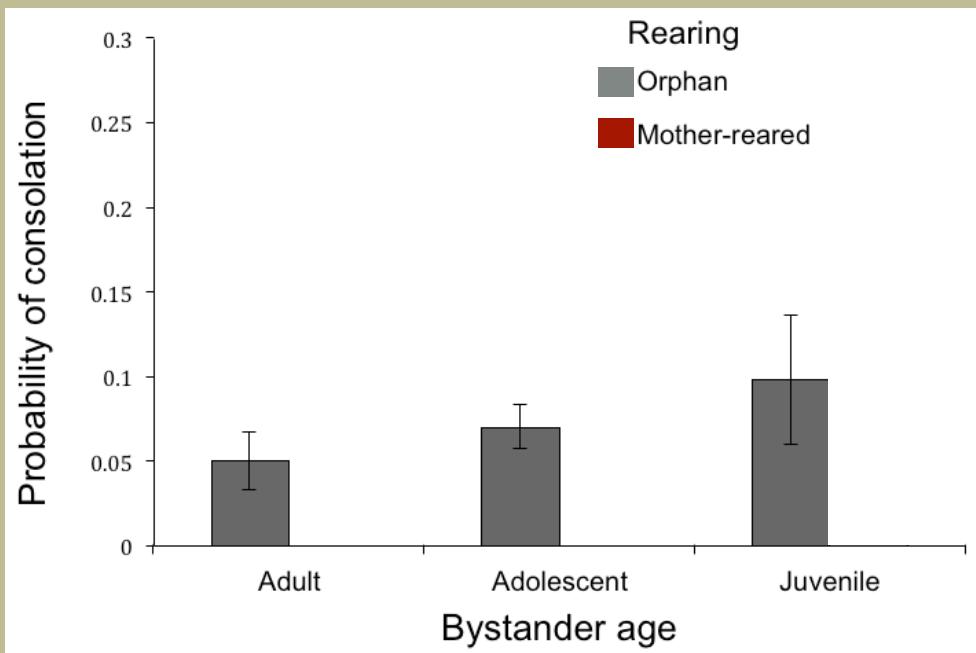


Bonobo  
consolation



Lola ya Bonobo  
Dr. Zanna Clay

# Bonobo Consolation



Clay & de Waal, 2013, PNAS

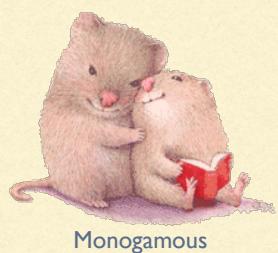


James Burkett

## Prairie Vole

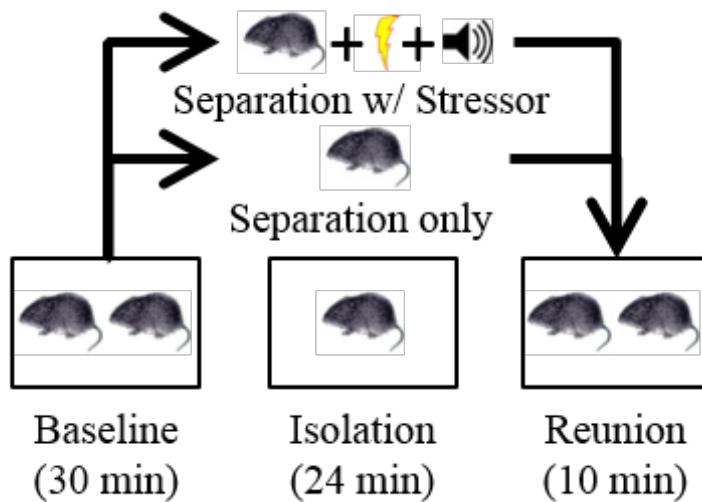


Burkett, Andari, Curry, de Waal & Young (2016). *Science*.

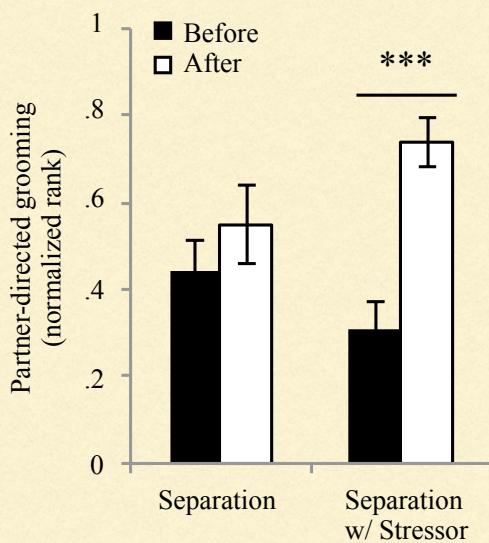


Monogamous

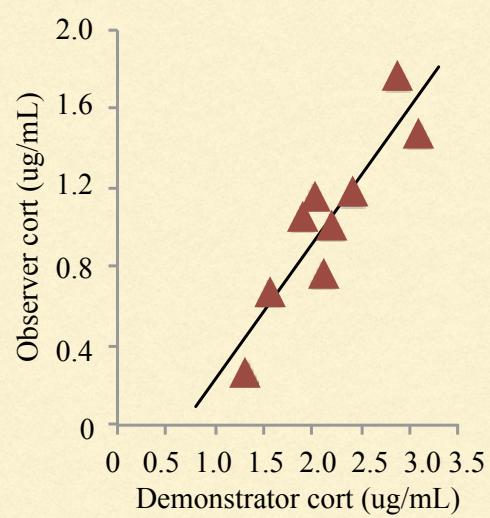
# CONSOLATION EXPERIMENT



Consolation Response  
(groom partner)



Emotional Contagion  
(matching corticosterone)



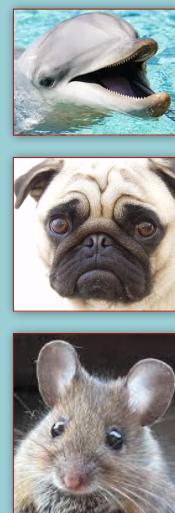
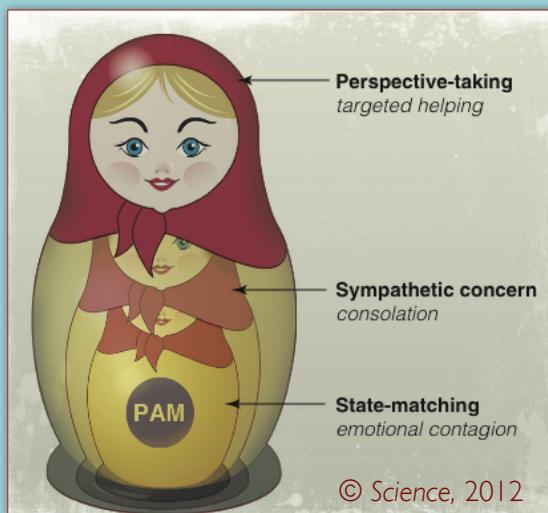
## SUPPORT FOR EMPATHY HYPOTHESIS



1. **Social bias:** Prairie voles only console mates & siblings
2. **Emotional contagion:** Stress (corticosterone) level of consoler perfectly matches partner's
3. **Oxytocin:** Response is blocked by OT receptor antagonist in anterior cingulate cortex

### Russian Doll Model of Empathy

Self-Other Distinction



Preston & de Waal (2002). Behavioral & Brain Sciences 25: 1-72.