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Do young rhesus monkeys know what others see?: A comparative developmental perspective

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Introduction

- Human children undergo robust ontogenetic shifts in theory of mind capabilities. [1]

Are humans alone in these developmental shifts in theory of mind, or do other primates show similar changes across infancy?

- Adult rhesus macaques can represent what others see and know despite failures on false belief tasks. [2,3,4]

Do rhesus monkeys undergo developmental shifts in their understanding of seeing throughout infancy and juvenile years?

Age Cohorts

Infant

Juvenile



0 – 12 months
Birth to weaning [5]
n = 75

12 – 60 months
Weaning to sexual maturity [5]
n = 161

Methods

- Subjects: n=236 (0 – 60 months old)
- Used method already validated in this specific population [2]

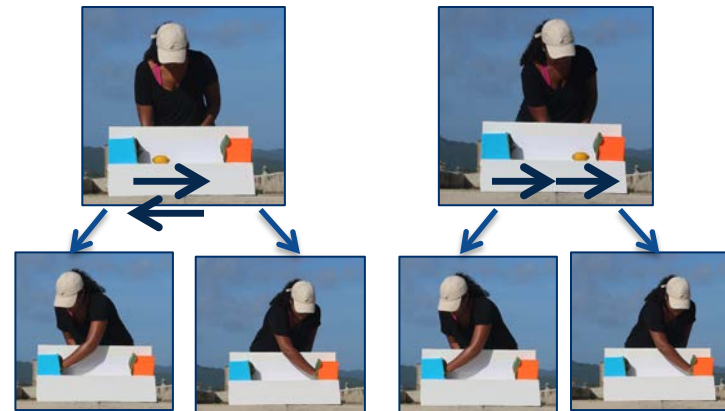
1: Familiarization to reach 2: Familiarization to lemon



3: Test trial, two conditions

Same

Different

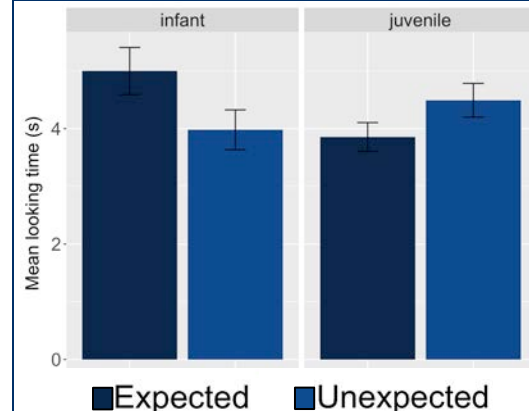


Expected Unexpected Unexpected Expected

References

[1] Wellman, H.M., Xu, F., & Peterson, C.C. (2011). Sequential Progressions in a Theory of Mind Scale: Longitudinal Perspectives. *Child Development* 82(3). [2] Martirena, D., Ruiz, A. M., Mukerji, C., Goddu, A., & Santos, L. R. (2011). Monkeys represent others' knowledge but not their beliefs. *Developmental Science* 14(6). [3] Drayton, L. & Santos, L. R. (2014). A decade of theory of mind research on Cayo Santiago: Insights into rhesus macaque social cognition. *American Journal of Primatology: Special Issue*. [4] Rosati, A. G., Wobber, V., Hughes, K., & Santos, L. R. (2014). Comparative developmental psychology: How is human cognitive development unique? *Evolutionary Psychology*. [5] Rosati, A. G., Arre, A. M., Platt, M. L., & Santos, L. R. (2016). Rhesus monkeys show human-like changes in gaze following across the lifespan. *Proceedings of the Royal Society B*.

Results



Two sampled t-test within cohort and between condition:

Infant: $t(73) = 1.90, p = 0.06$

Juvenile: $t(159) = -1.657, p = 0.09$

Two-way ANOVA (Cohort * Condition):

$F(1, 236) = 6.082, p = 0.0144$

Conclusions

- While infants appear to show a different pattern than juvenile rhesus monkeys, observed group and within-cohort differences are non-significant.
- We provide the first test of infant rhesus monkeys in an expectancy violation experiment.
- Future research should explore whether similar changes occur in human infant understanding of visual perspective.