

# ToMcat: A videotaped, open-access violation-of-expectation study for measuring early false-belief understanding in infants and toddlers

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## Introduction

Investigators have long sought to determine at what age children first show **false-belief understanding (FBU)**, which is widely perceived to be an important facet of representational ToM. Initial studies using explicit tasks suggested that children are not capable of FBU until about 4 years of age. Subsequent investigations using implicit tasks suggested that some capacity for FBU is already present in infancy.

However, non- or partial- replications of implicit FBU findings have led a number of researchers to question the reliability and validity of implicit measures of FBU

### Goals of ToMcat project:

1. Develop a videotaped violation-of-expectation task that measures implicit FBU in infants and toddlers (Exp. 1)
2. Assess the reliability and validity of our task by running a preregistered replication of our false-belief condition as well as a preregistered true-belief condition (Exp. 2)
3. Conduct a multi-lab replication.

**Here we describe this new task and report the results of Exp. 1 and preliminary results of Exp. 2.**

## Method

### Participants

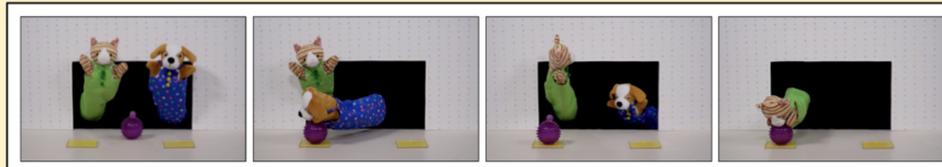
- Exp. 1: 24 children 18-28 months old ( $M = 22.07$ )
- Exp. 2: 14 children (9 FB, 5 TB) 18-28 months old ( $M = 21.34$ )

### Design

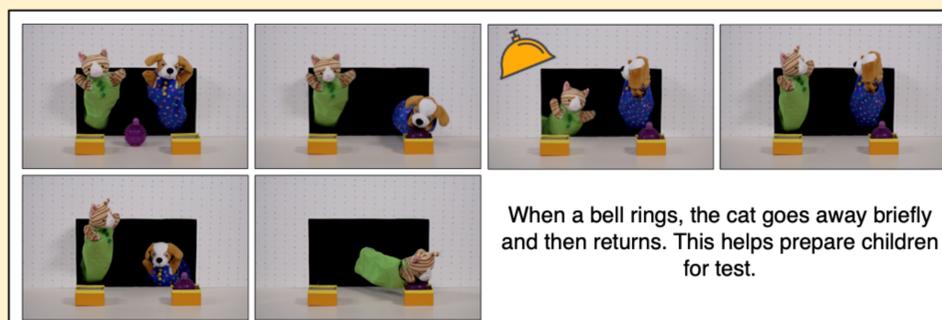
- 4 Familiarization Trials & 2 Test Trials, all with 2 phases:
  - *Pre-trial*: videotaped event
  - *Main-trial*: final frame of each videotaped event
- Each main-trial ends when children (a) look away for 2 consecutive seconds after having looked for at least 2 cumulative seconds or (b) look for 30 seconds (as in Onishi & Baillargeon, 2005)
- Looking time is measured using an EyeLink 1000 eye-tracker in a remote arm configuration, with 5-point calibration and validation.

## Procedure

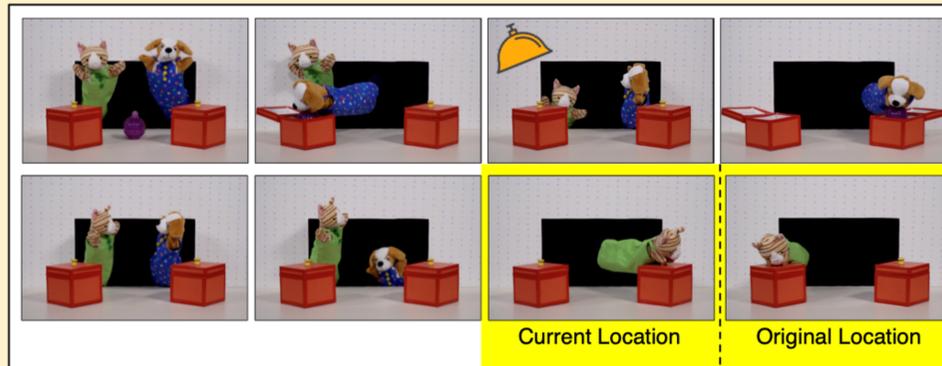
### Familiarization trials 1 & 2



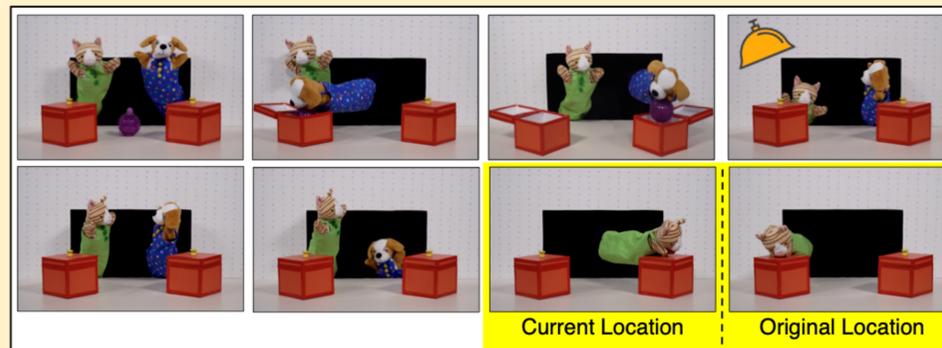
### Familiarization trials 3 & 4



### False-belief test trials



### True-belief test trials



Counterbalanced: side of cat, side of hiding location in familiarization and test trials, & test order

## Results

### Experiment 1 (False-belief condition only)

#### Both Test Trials

- Current Location ( $M = 14.29$ ,  $SD = 8.72$ ) > Original Location ( $M = 8.01$ ,  $SD = 4.97$ ),  $t(23) = 3.11$ ,  $p = .002$

#### Test Trial 1 Only

- Current Location ( $M = 17.45$ ,  $SD = 8.58$ ) > Original Location ( $M = 7.99$ ,  $SD = 4.25$ ),  $t(22) = 2.84$ ,  $p = .005$

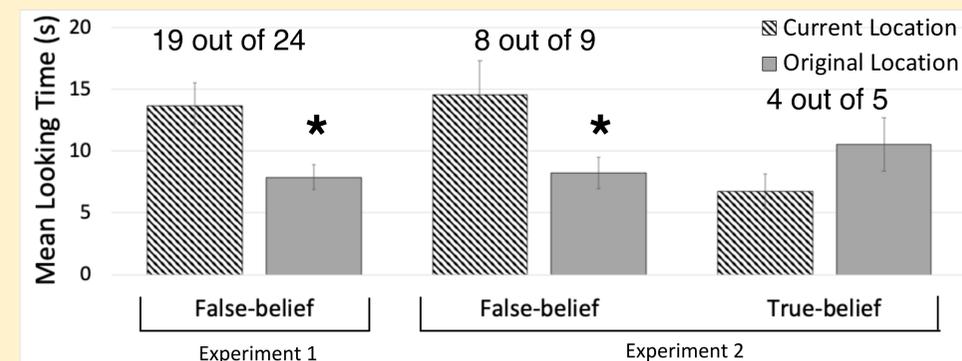
### Experiment 2

#### False-belief Both Test Trials

- Current Location ( $M = 14.6$ ,  $SD = 7.38$ ) > Original Location ( $M = 8.27$ ,  $SD = 3.59$ ),  $t(8) = 2.55$ ,  $p = .034$

#### True-belief Both Test Trials

- Original Location ( $M = 10.54$ ,  $SD = 6.14$ ) > Current Location ( $M = 6.76$ ,  $SD = 3.39$ )



## Discussion

Children attributed a false-belief about the toy's location to the cat and found it unexpected when the cat failed to act in accordance with its belief.

We hope these efforts will be useful in the following ways:

1. By contributing evidence to the ongoing debate about implicit tests of FBU
2. By providing researchers with a reliable resource for assessing early FBU in their own labs

### Acknowledgements

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