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Introduction

Faithful imitation: Young children will copy both the goal and the means of a novel action (e.g., Meltzoff, 1988)

Over-imitation: Older children and adults tend to copy all actions demonstrated by a teacher, even when these actions are not necessary to accomplish the goal (e.g., Horner & Whiten, 2005).

In short, children copy actions demonstrated by others with high fidelity.

Natural pedagogy: Ostensive cues signal to the learner that the teacher is showing generalisable, culturally relevant information, increasing imitation behaviour (Csibra & Gergely 2006).

Tools: Tools are cultural artifacts. The uniquely human approach towards tools may be the evolutionary root of imitation (Csibra & Gergely 2006).

Our main research question:

Are tool actions imitated more faithfully than non-tool actions?

Details of Study 1: Faithful imitation

Participants: 35 18-month-olds (17-19 mos, M=18)

Design: 4 demonstrations: 2 Tool trials, 2 Body trials (within participants), with or without ostensive cues (between participants)

Procedure:

Demonstrate novel action with object set A (x3)

Demonstrate novel action with object set B (x3)

4 minute delay

60 seconds of free play with object set A

60 seconds of free play with object set B

repeat for trials C and D

Coding: All behaviours recorded and coded offline

Imitation: faithful reproduction of means

Emulation: reproduction of goal with alternative means

Study 1: Faithful Imitation

Research Questions:

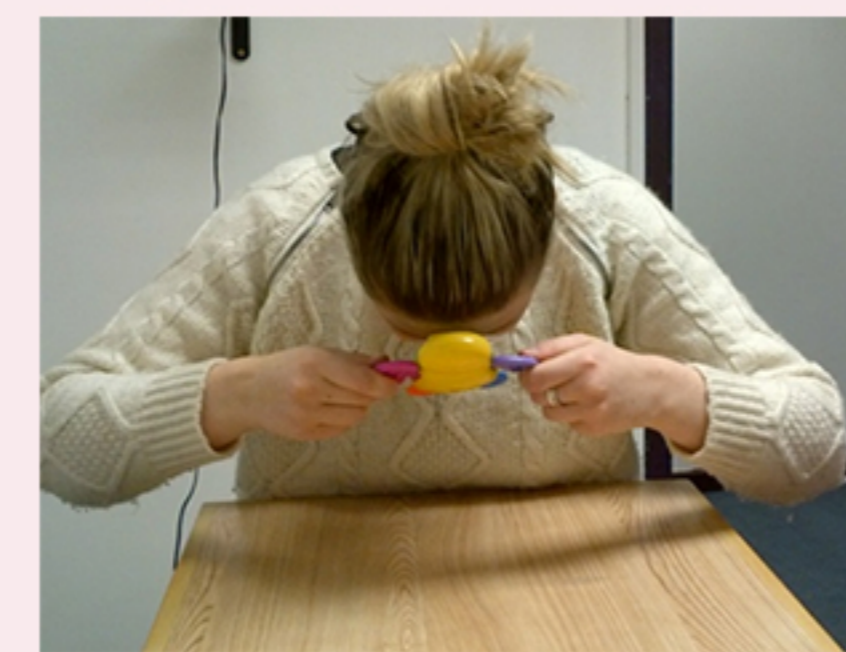
Are novel tool actions imitated more often than novel body actions?

Is this faithful imitation affected by ostensive communicative cues?

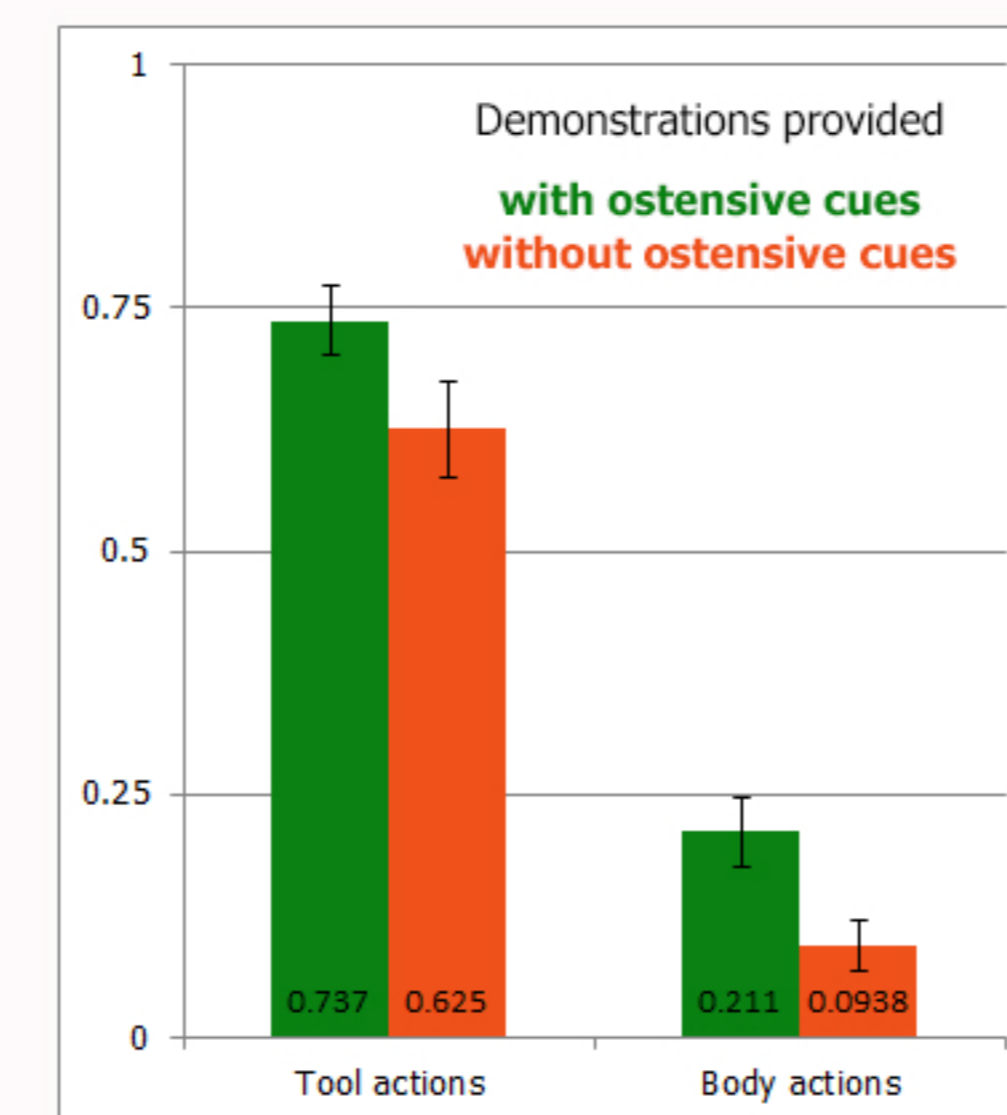
Tool demonstration



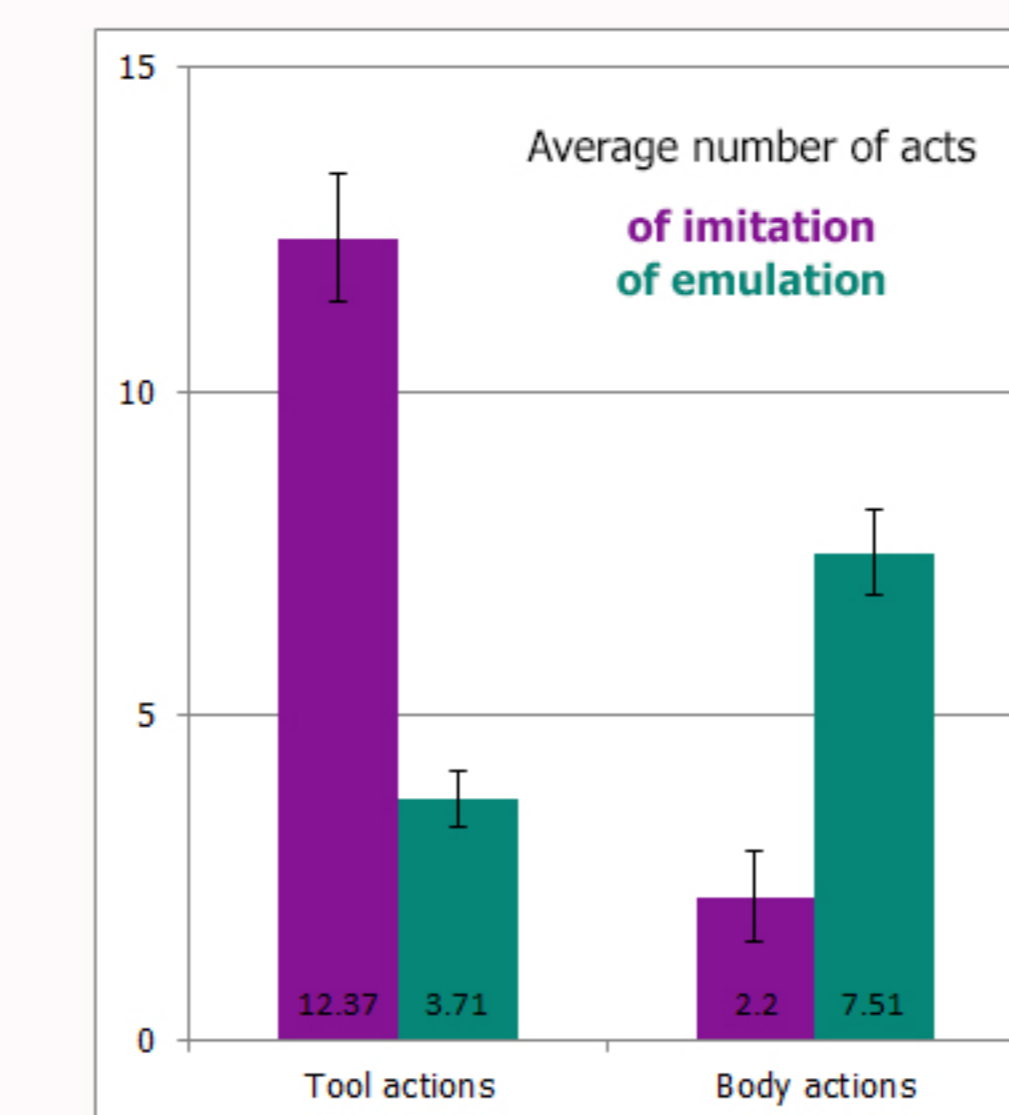
Body demonstration



Proportion of trials on which children imitated
scored whether children imitated on a given trial (0 or 1) averaged over two trials of each type



Number of behaviours: imitation vs emulation
scored the total number of behaviours summed across two trials of each type



Results:

More likely to faithfully imitate tool than body actions

More often imitated tool actions and emulated body actions

Cues increased imitation of body actions but not tool actions

Number of behaviours across both trials of each type

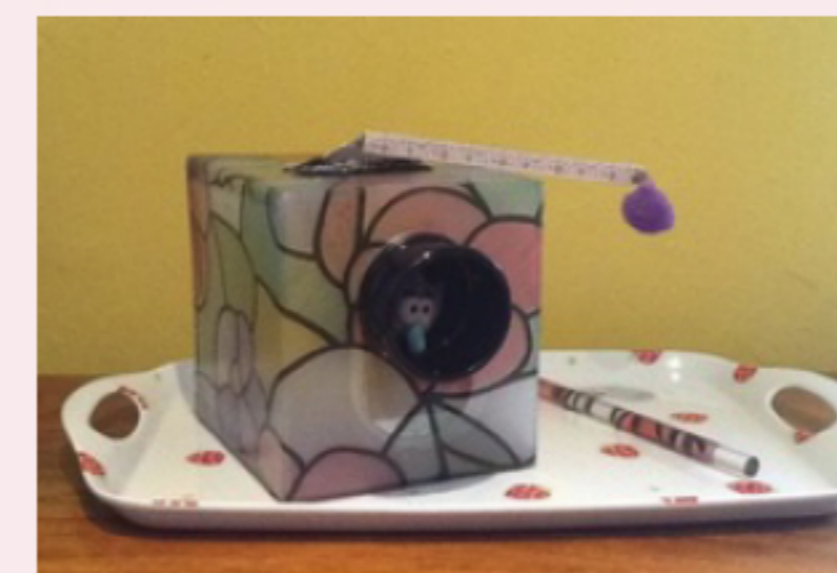
		Imitation	Emulation
With cues	Tool	13.16	3.37
	Body	3.84	7.79
Without cues	Tool	11.44	4.13
	Body	0.25	7.19

Study 2: Over-Imitation

Research Question:

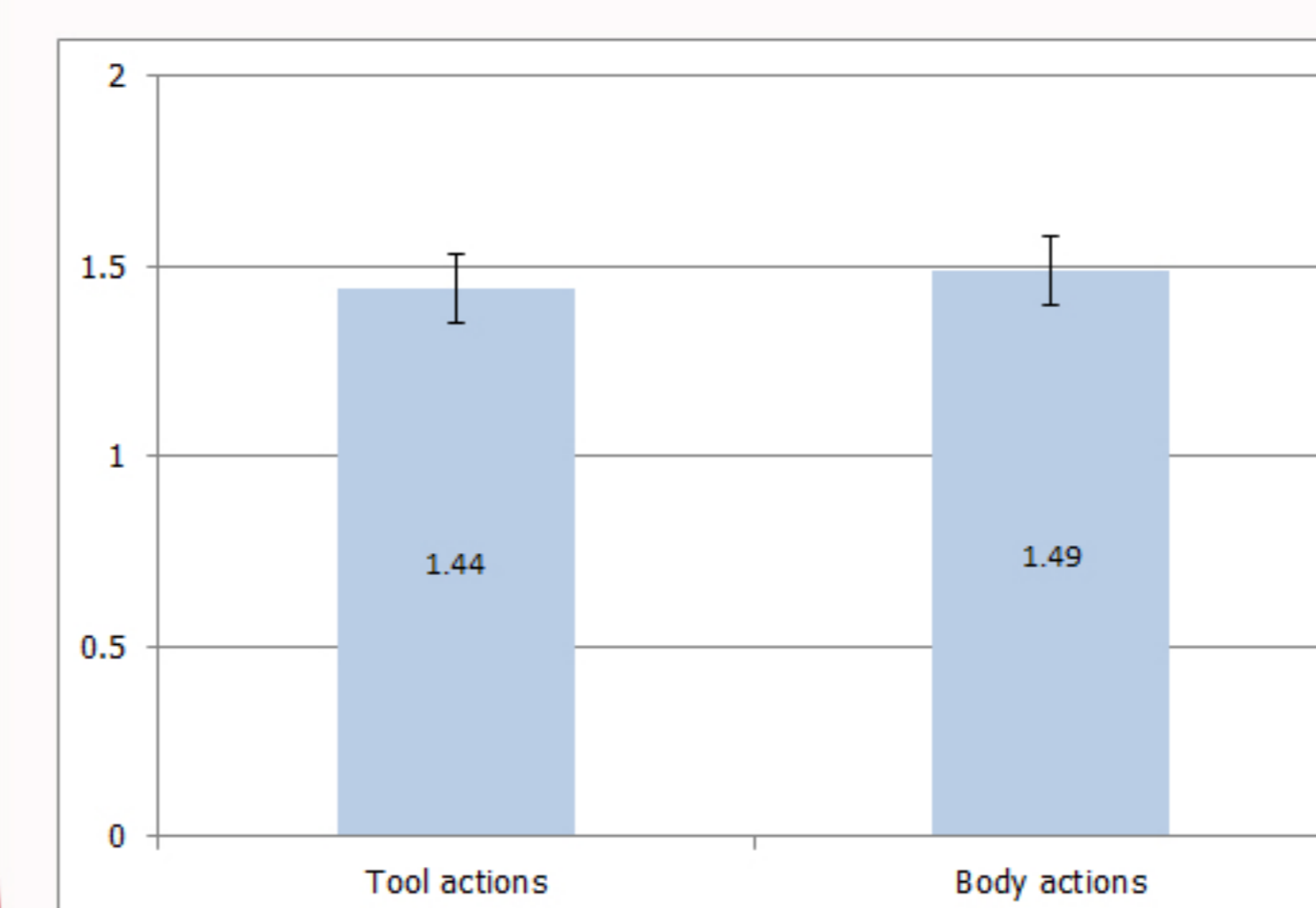
Are actions performed **with a tool** over-imitated more than actions performed **with the hand**?

Over-imitation materials



Rate of overimitation

scored total number of unnecessary actions performed out of 2 on each trial type



Results:

Very high rates of over-imitation

Equivalent over-imitation for tool vs body demonstrations

Results

Faithful imitation: 18-month-old infants were more likely to faithfully imitate tool actions than the equivalent non-tool actions.

Only body actions showed increased imitation after demonstrations with ostensive cues.

Over-imitation: 3- and 5-year-old children over-imitated all types of action equally, showing no predisposition to over-imitate tool actions more than non-tool actions

Conclusions

There may be an early predisposition towards faithful imitation of tool use.

This predisposition did not appear for over-imitation with older children, but over-imitation rates were very high, suggesting a possible ceiling effect.

The choice of actions used in imitation studies should be carefully considered.

Details of Study 2: Over-imitation

Participants: 68 3- to 5-year-olds (37-63 mos, M=50)

Design: 2 boxes: one using tool for all actions, one using hand for all actions (within participants, counterbalanced).

Procedure:

Demonstrate Box A (x2): two unnecessary actions (e.g., tapping the top, moving a lever) and one necessary (opening the box) to retrieve goal (removing a toy)

Child is told, "now it's your turn"

Repeat for Box B

Coding: All behaviours were recorded and coded offline

Over-imitation: number of unnecessary actions performed

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