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Young children's reasoning about artifact function: an action-protest paradigm

BBCCCD 2012-Budapest
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Vast Array of Artifacts (Csibra & Gergely, 2007)

Intended Design

Intended design function

Alternative function

(note this is also an intended function)

Intended Design: Bloom (1996); Keleman (1999)
Social convention: Callanan & Siegel (2007); German, Truxaw & Defeyter et al. (2007); Childers & Tomasello (2002)

Design Stance

- An object's identity is explained in terms of it having been intentionally designed to serve a particular purpose (Dennett, 1987).

- Adult's reasoning about artifacts appears to reflect the adoption of a '**design stance**' (e.g. Keleman, 1999; German & Johnson, 2002; Matan & Carey, 2001).

- An object's designed function is central to children's artifact representation, (e.g. Kelemen & Carey, 2007; Kemler Nelson et al., 2002; Gelman & Bloom, 2000; Defeyter & German, 2009)

Shared Convention

- In the majority of cases the design function and the conventional use usually match (Callanan et al., 2007).
- The way communities use artifacts is just as important as design intentions in children's artifact conceptualisation (Diesendruck et al., 2010; German, Truxaw & Defeyter, 2007).
- Children learn about artifacts through focussing on how "we" use them (Tomasello et al., 2005).

A bottle – What is it for?

Peroski (2007); Rabardel & Beguin (2005)

Atypical Uses of Artifacts

- An individual level

- An community level (i.e. a shared agreement on use within a community)

Violating conventional function

Do young children view atypical functions of artifacts as plain wrong?

Young children's normative awareness of artifact function (Casler, Terziyan & Greene, 2009)

- Action-protest paradigm (Rakoczy, Warneken & Tomasello, 2008).
- Demonstration phase –Adult demonstrated the conventional function of familiar and novel artifacts.
- Test Phase – Puppet demonstrated an alternate atypical function.

Toddlers view artifact function normatively

- 2- and 3-year-olds demonstrated normative protests towards a puppet using artifacts in ways that violated conventional function.

"No! It's not for that!"

- Toddlers strongly believe that there are 'proper' ways to use objects and any other use is simply 'wrong'.

Study 1: Research question

Do young children believe that artifacts embody their conventional function across different contexts rendering other plausible uses as completely wrong?

Hypothesis

Conventional function = No protest

Violation of conventional function = Protest

Method

Participants = 80 children

Three year olds

N = 39, mean age= 3.7, range 3.1 - 3.9

20 females and 19 males.

Four year olds

N = 41, mean age = 4.8, range 4.3 – 4.10

20 females and 21 males

Children were tested individually.

Sessions were videotaped and lasted 25 minutes.

Conditions

1. Conventional Function - Experimental Function

2. Conventional Function - Control Function

Order Function Counterbalanced→

3. Experimental Function - Conventional Function
4. Control Function - Conventional function

Materials

Three familiar objects were used:

Stirring liquid
Tapping

Rolling Play Doh
Drawing Guide

Brushing doll's hair
Placing in a container

Procedure

- Warm up phase – To make child feel at ease with the experimental setting

- First function - Demonstration phase by ‘Sam’ the bear.
- Second function - Test phase by ‘Sally’ the pig.
- Control question - “What is ‘*X*’ for?”

Condition 3 - Experimental - Conventional

Sequence 01.mpg

Results: Overall

- **Test phase**: No significant main effect of function: $F(3, 72) = 0.178$; $p = .905$
- No significant main effect of age $F(1,72)=0.48$, $p = .540$
- No significant Function x Age interaction ($F(3,72) = 0.80$, $p = .496$

  In all conditions both groups of children protested towards **any** second function demonstrated.

Figure 1: Mean number of protests in the Conventional-Experimental Function Condition

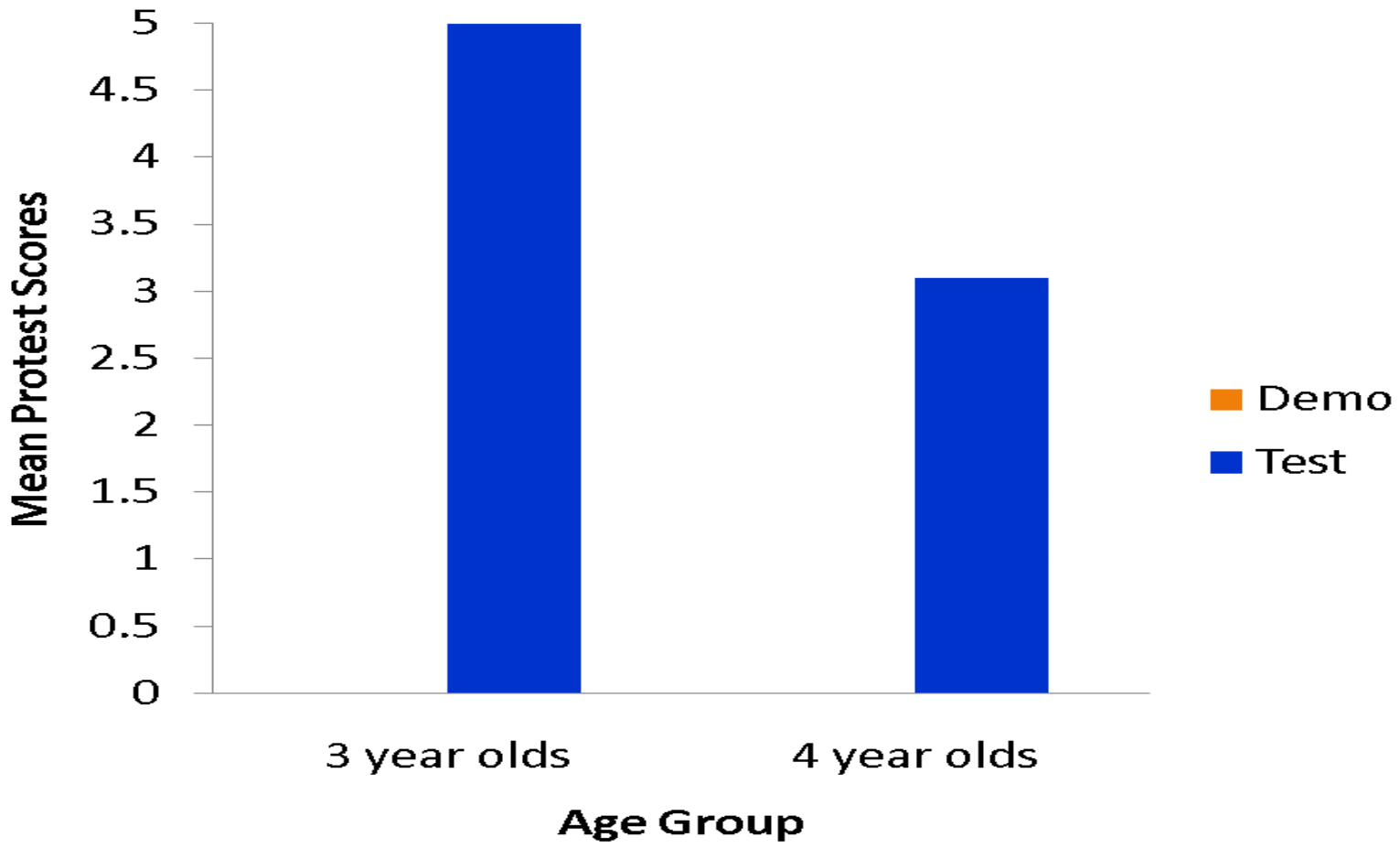


Figure 2: Mean number of protests in the Conventional- Control Function condition

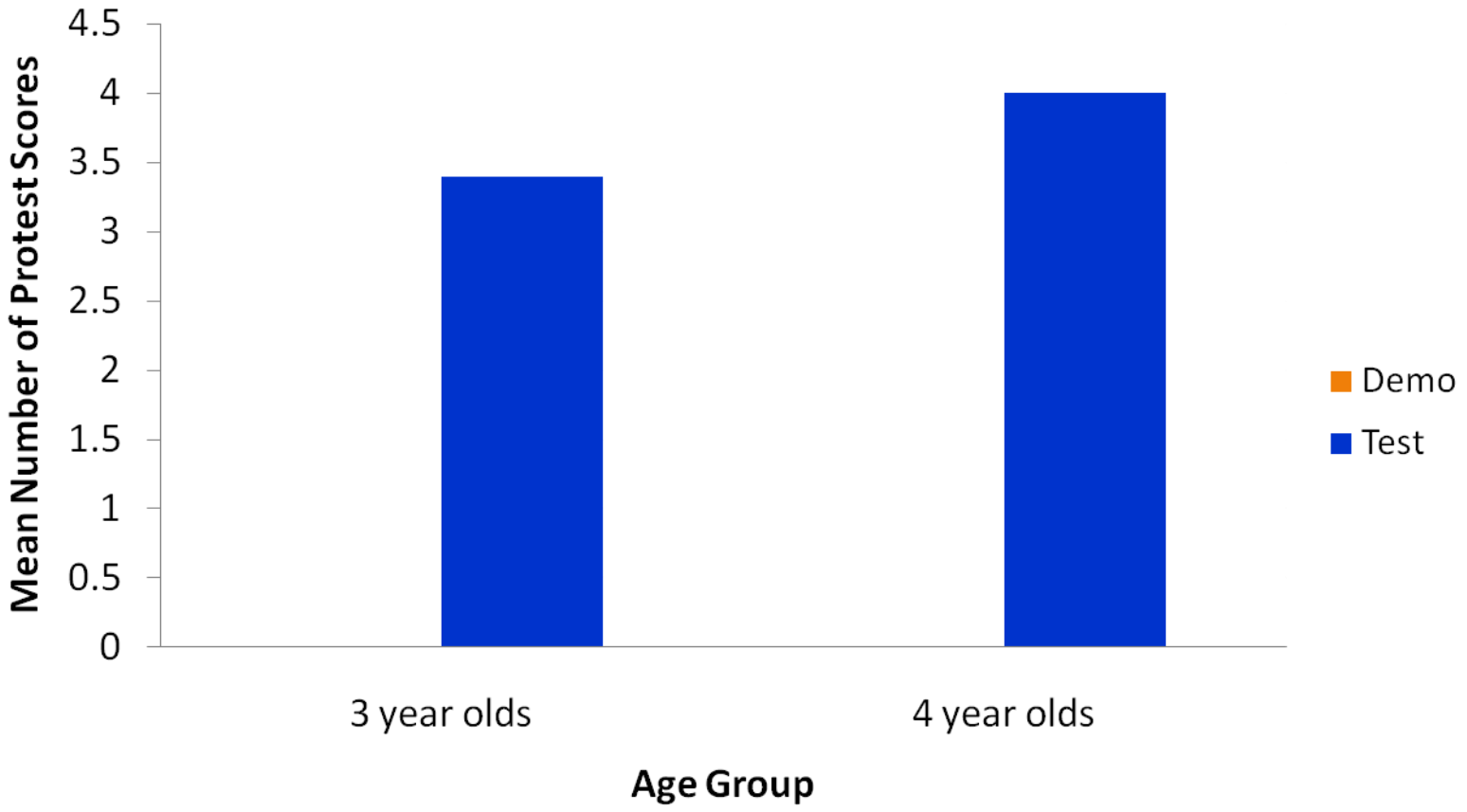


Fig. 3: Mean number of protests in the Experimental-Conventional Function Condition.

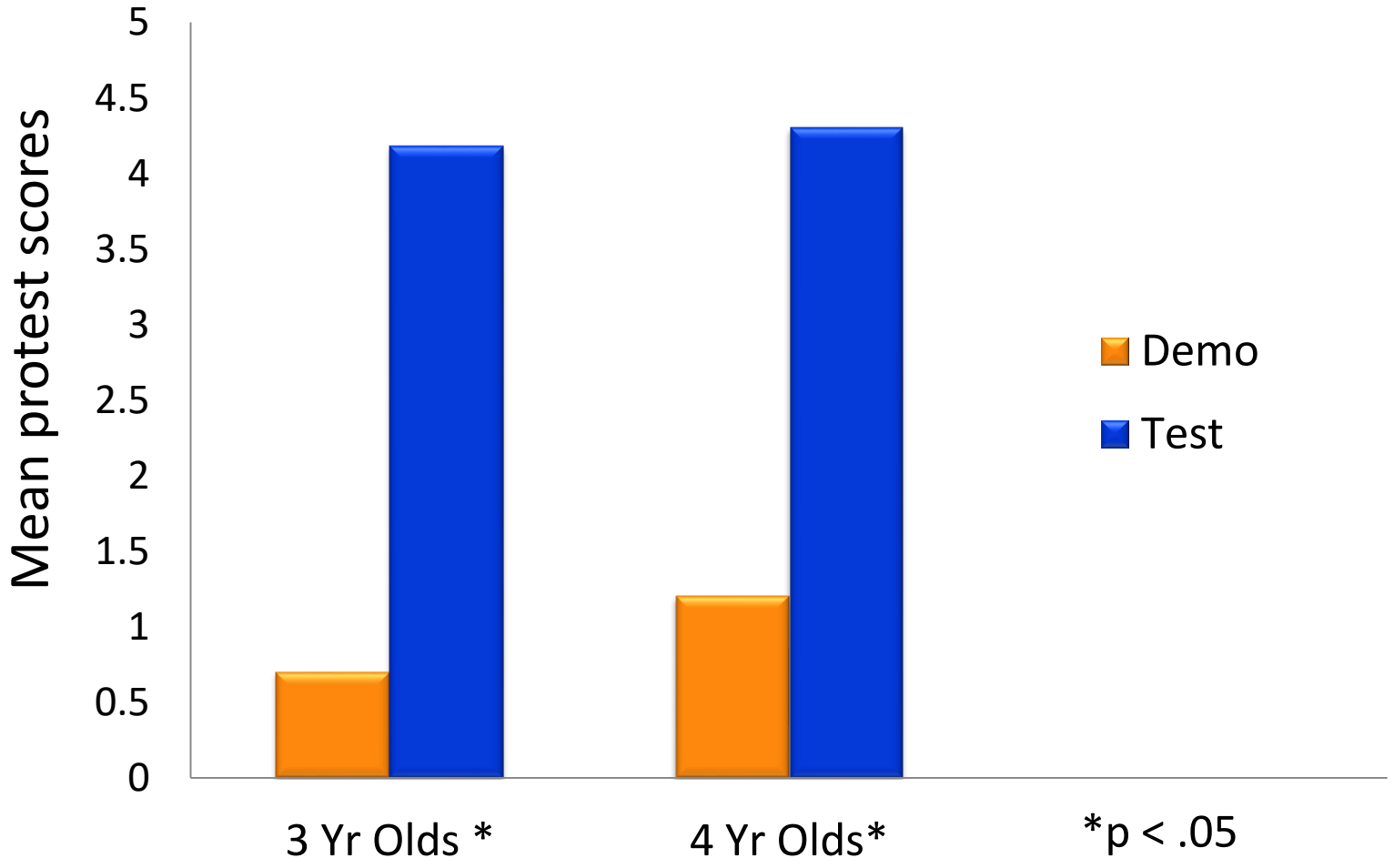
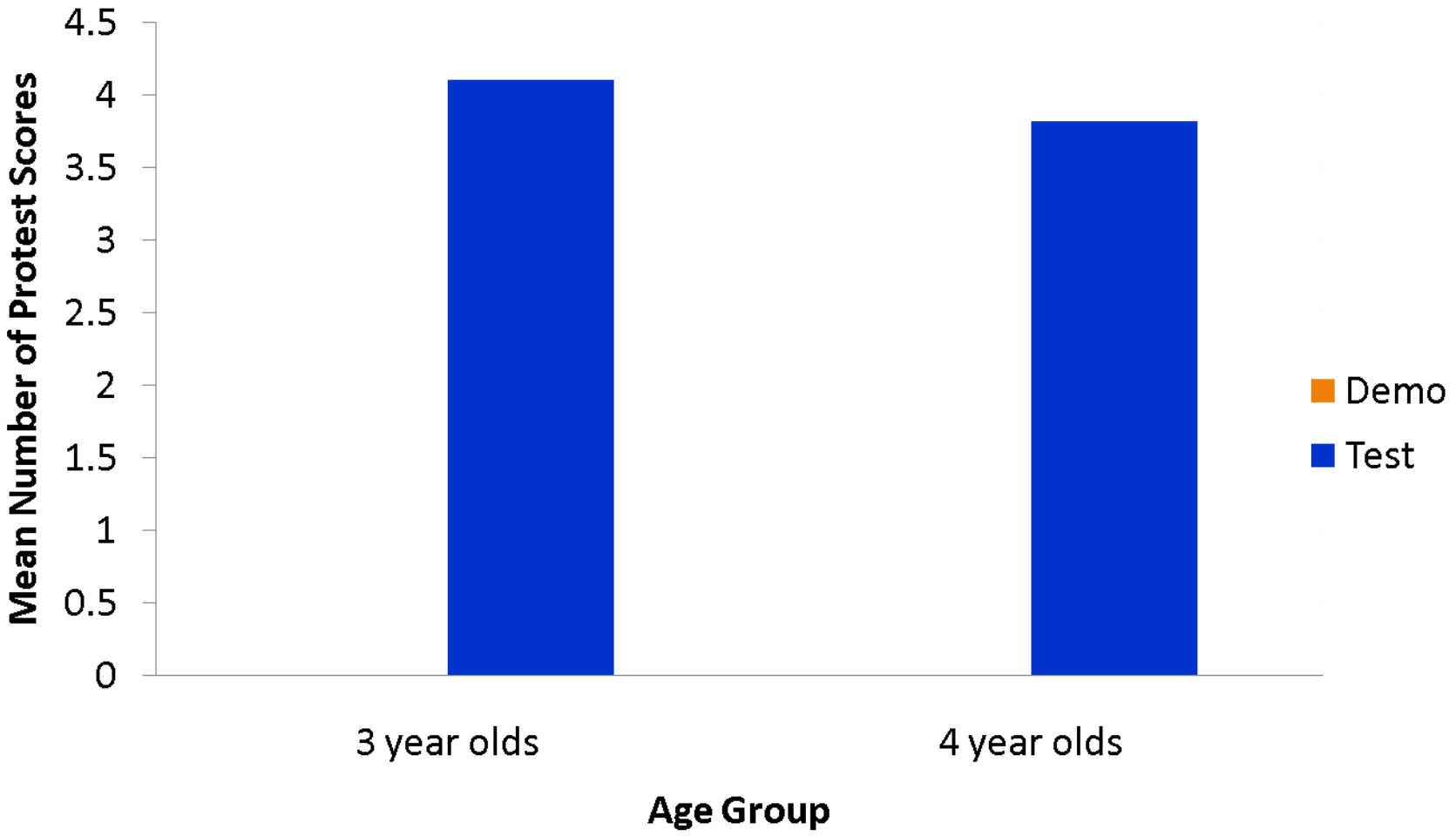


Figure 4: Mean number of protests in the Control-Conventional Function Condition



Results: Control question
What's *X* for?

92% of children generated the conventional function of the three test objects.

To draw

To feed

To brush teeth

One week later

- The same children were tested again one week later under the same conditions.
- 86% children spontaneously generated the first function demonstrated.
- No effect of condition.

Discussion

- Young children did not view violations of conventional function as wrong *per se*.
- 3- and 4-year-olds understood the first function of each artifact to be the 'correct' one in this context.
- Study 2: Replicated findings using adults (no puppets) but levels of overall protest lower.

Discussion

- Young children understand that objects have a stable conventional function.

- Non-conventional functions are not necessarily viewed as mistakes but perfectly feasible alternatives within specific contexts (Callanan et al., 2007; Rakoczy et al., 2009; Searle, 1995).

- Within this context young children understand that everyday artifacts can serve different functions which may deviate considerably from their conventional use.

Current work: How do children distinguish between conventional and atypical functions?

- Physical affordances of artifacts.
- Designers intentions vs. other users intentions.
- Frequency of conventional function.

The Role of parents:

- Adults convey normative cultural expectations to children (Csibra & Gergely, 2006).
- Linguistic marking to distinguish conventional and unconventional information in word learning (Henderson & Sabbagh,2010) [see also Siegel et al. (SRCD, 2011)]

Thank you for listening.