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

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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 & Begaun (2005)
Atypical Uses of Artifacts

• An individual level

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

3. Experimental Function - Conventional Function

Order Function Counterbalanced

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 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.

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**Mean protest scores**

<table>
<thead>
<tr>
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<th>3 Yr Olds</th>
<th>4 Yr Olds</th>
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<tbody>
<tr>
<td><strong>Demo</strong></td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>Test</strong></td>
<td>4</td>
<td>4.5</td>
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* *p < .05*
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.