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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)
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 & Béguin (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

Age Group

3 year olds

4 year olds

Mean Protest Scores

0

0.5

1

1.5

2

2.5

3

3.5

4

4.5

5

Demo

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

- 3 year olds: Test group has a mean protest score of 3.5
- 4 year olds: Test group has a mean protest score of 4.5
Fig. 3: Mean number of protests in the Experimental-Conventional Function Condition.
Figure 4: Mean number of protests in the Control-Conventional Function Condition

![Bar graph showing the mean number of protests by age group.](image-url)
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.
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.