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

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Artifacts
Intended Design

Intended design function        Alternative function

Bloom (1996); Keleman (1999)
Callanan & Siegel (2007); German, Truxaw & Defeyter et al., (2007)
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, (see Kelemen & Carey, 2007; Kemler Nelson et al., 2002; Gelman & Bloom, 2000)
Participants told a story about a person who made an object to water flowers (the original intended function) and about another person who was using the object for making tea (the current function).

Adults: Design Stance ✓

6 year-olds: Design Stance ✓

4 Year-olds: Design Stance ×
Design Function

Current Function: Accidental or Deliberate

Adults: Design Stance √
5 Year-olds: Design Stance √
4 Year-olds: Design Stance √
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 observations of how “we” use them (Tomasello et al., 2005).
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’.
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 - Idiosyncratic function

2. Conventional function - Non-violation function

Order Function Counterbalanced

3. Idiosyncratic function - Conventional function

4. Non-violation function - Conventional function
Materials

Three familiar objects were used:

- Stirring liquid
- Tapping
- Rolling Play Doh
- Drawing circles
- Brushing doll’s hair
- Turning 180 degrees
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 - Idiosyncratic - 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-idiosyncratic condition
Figure 2: Mean number of protests in the Conventional-Non-violation condition
Fig. 3: Mean number of protests in the ‘idiosyncratic-conventional’ condition.

![Bar chart showing mean protest scores for 3 Yr Olds and 4 Yr Olds in Demo and Test conditions.](chart)

- 3 Yr Olds (Test: 4, Demo: 0.5)
- 4 Yr Olds (Test: 5, Demo: 1)

*p < .05*
Figure 4: Mean number of protests in the Non-violation-Conventional condition

Age Group

3 year olds

4 year olds

Mean Number of Protest Scores

Test

Demo
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.

• The action-protest paradigm measured protest against the first function or rule provided (Rakoczy et al., 2008).
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 (Rakoczy et al., 2009; Callanan et al., 2007).

• Within rule-governed contexts young children understand that everyday artifacts can serve different functions which may deviate considerably from their conventional use.