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

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Artifacts

Intended Design

Intended design function

Alternative function

A bottle – What is it for?

Design Stance

- An object's identity is explained in terms of its 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)

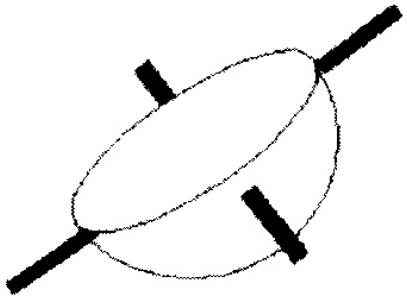
Shared Convention

- 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)

Shared Convention

- A long time ago an **inventor** made the DAX to **collect leaves.**
- Now **MANY** people have them. Every day they use them to **catch fish**.



When a function had changed because many people had adopted a different use from the original function less likely to view the artifact from the design perspective (Siegel & Callanan, 2007).

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/design 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 - Instrumental function

Order Function Counterbalanced→

3. Idiosyncratic function - Conventional function
4. Instrumental function - Conventional function

Materials

Three familiar objects were used:

Procedure

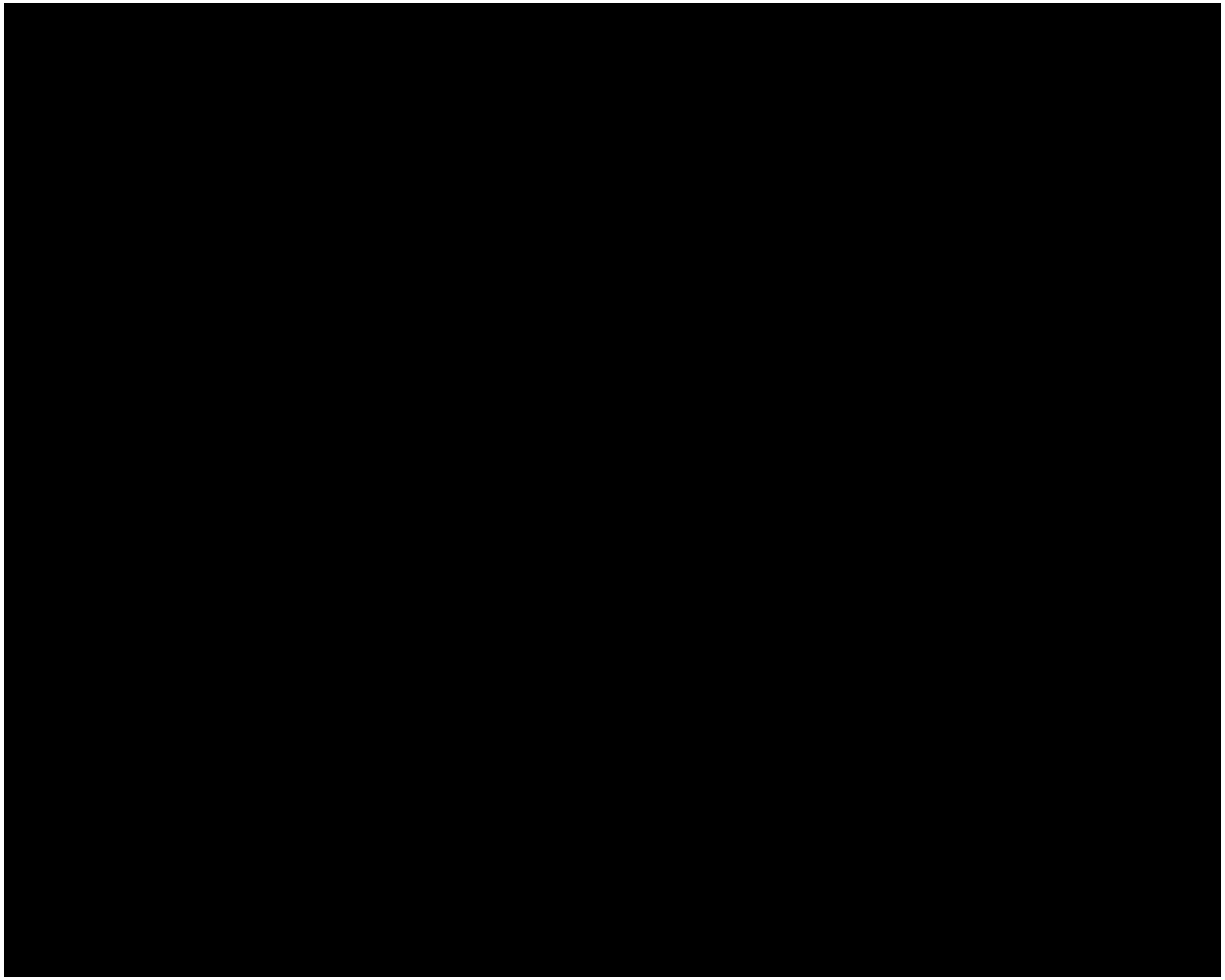
- Warm up phase – To make child feel at ease with the experimental setting

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

Table 1:
List of Conditions, Artifacts and Functions in the Demo and Test Phases

Condition	Object	Demo Phase	Test Phase
Conventional - Idiosyncratic	Baby Bottle Toothbrush Crayon	Feeding baby Cleaning teeth Drawing	Rolling play dough Brushing doll's hair Stirring liquid
Conventional - Instrumental	Baby Bottle Toothbrush Crayon	Feeding baby Cleaning teeth Drawing	Drawing circles Jabbing play dough Tapping
Idiosyncratic - Conventional	Baby Bottle Toothbrush Crayon	Rolling play dough Brushing doll's hair Stirring liquid	Feeding baby Cleaning teeth Drawing
Instrumental – Conventional	Baby Bottle Toothbrush Crayon	Drawing circles Jabbing play dough Tapping	Feeding baby Cleaning teeth Drawing

Condition 3 - Idiosyncratic - Conventional



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 showed similar levels of protest towards **any** second function demonstrated.

Figure 1: Mean number of protests in the Conventional-idiosyncratic condition

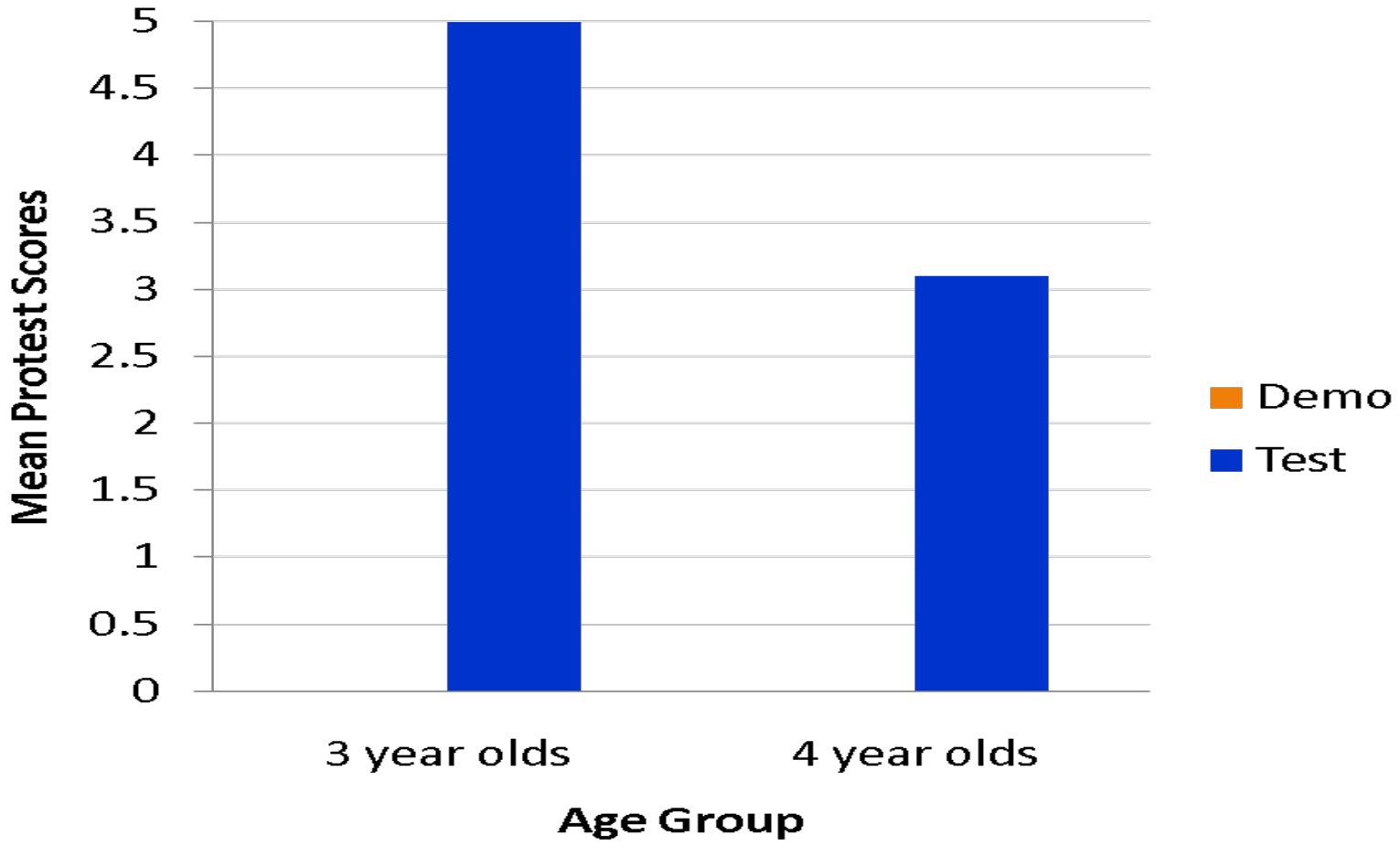


Figure 2: Mean number of protests in the Conventional- Instrumental condition

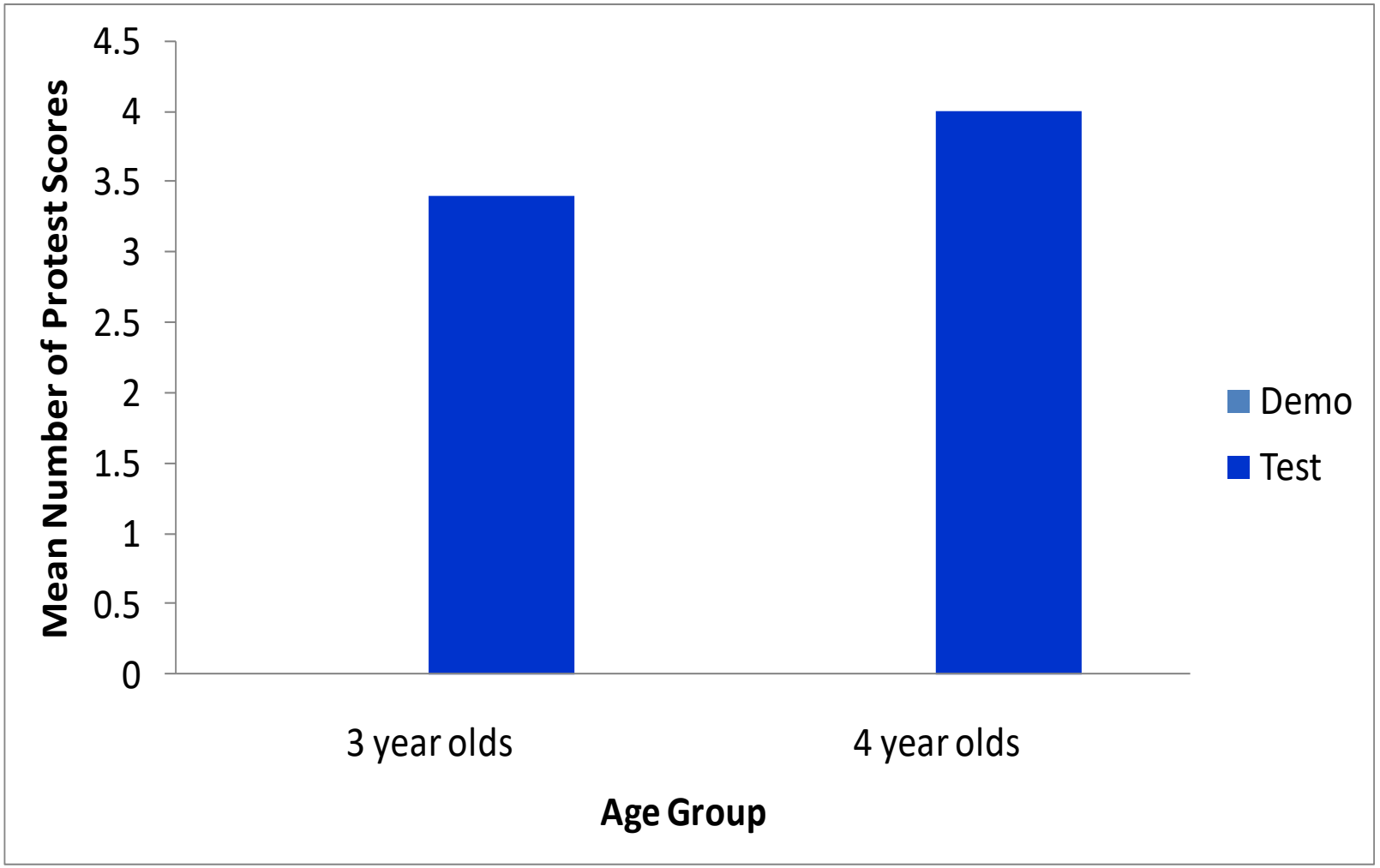


Fig. 3: Mean number of protests in the 'idiosyncratic-conventional' condition.

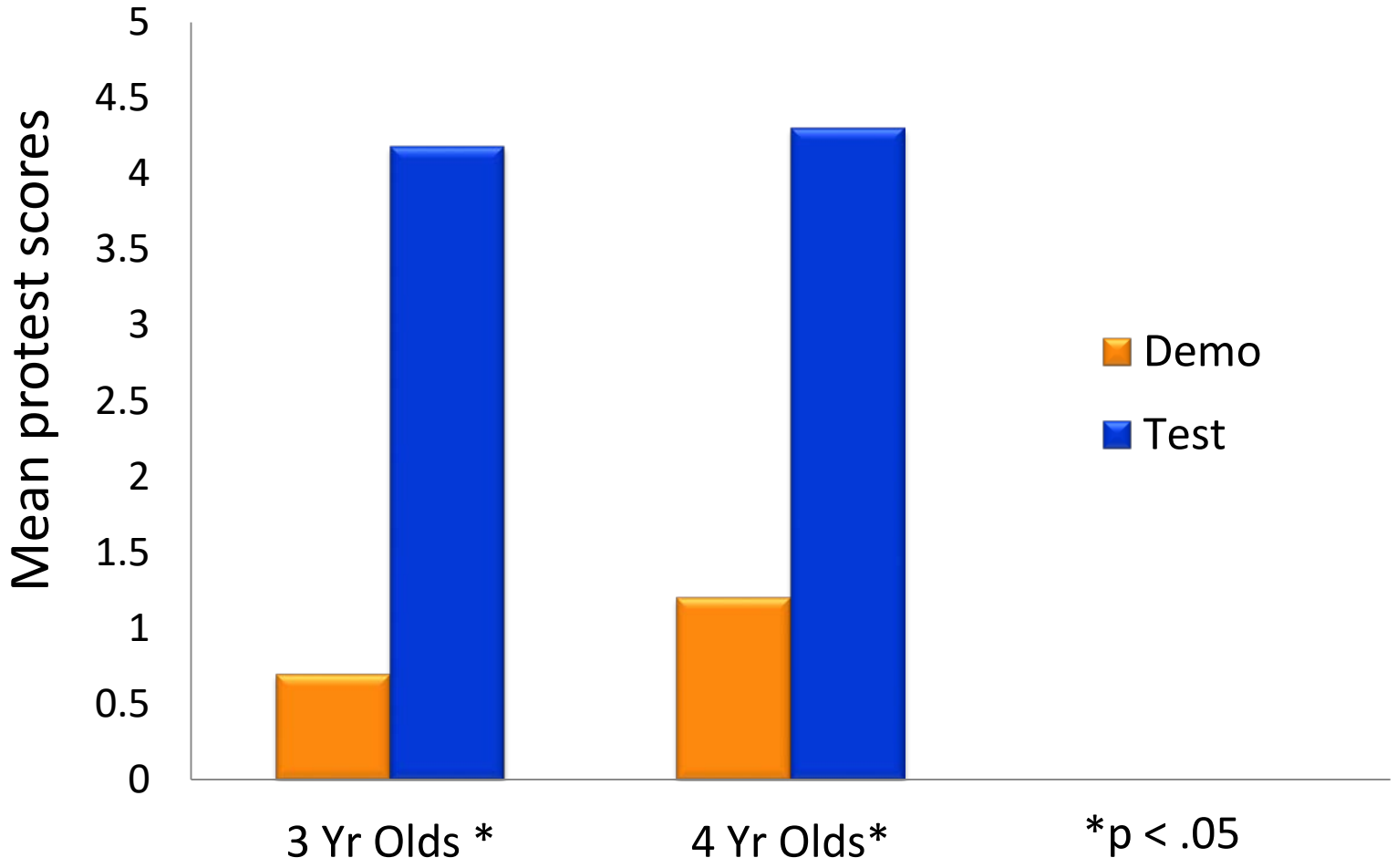
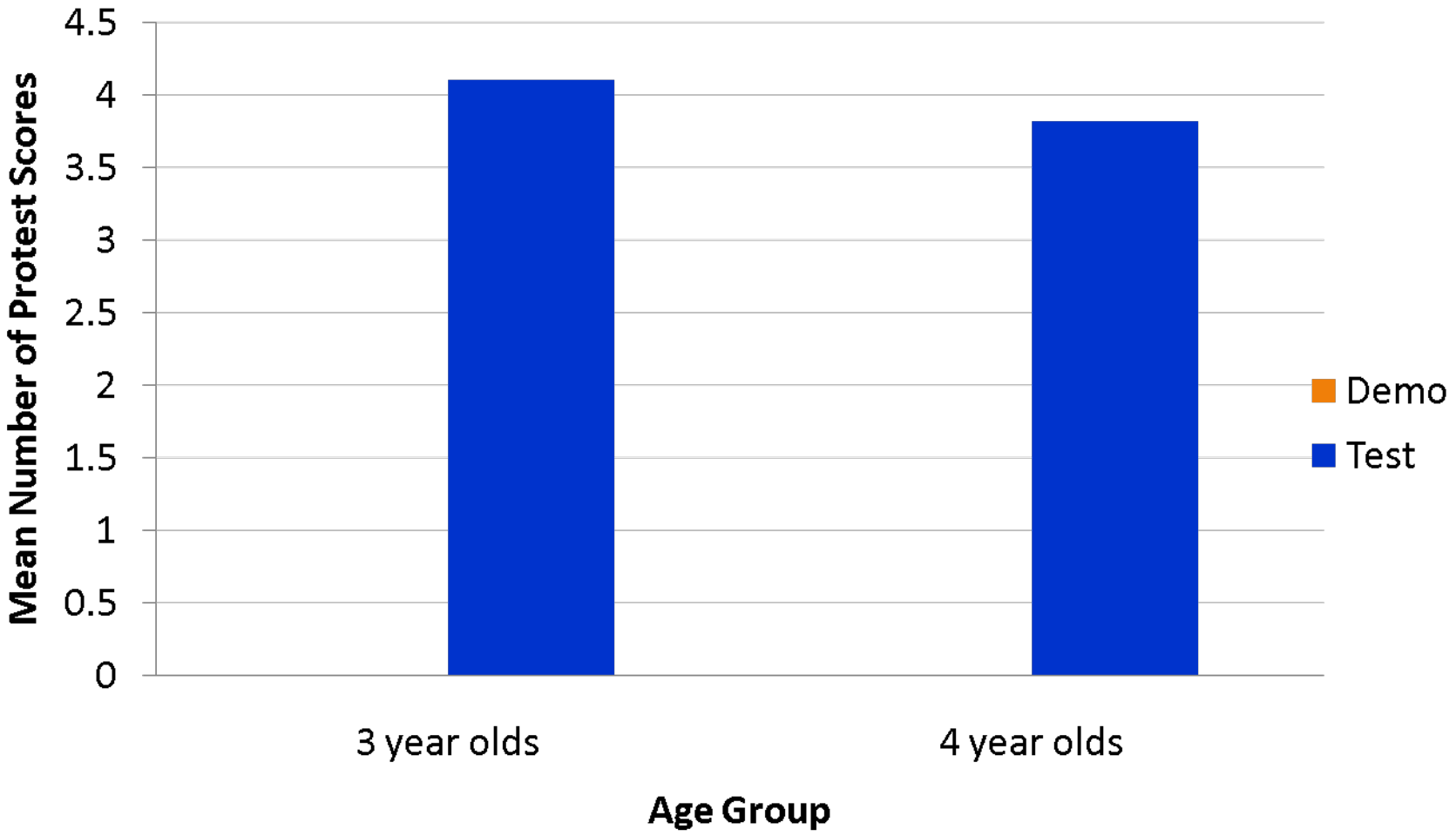


Figure 4: Mean number of protests in the Instrumental-Conventional condition



Results: Control question
What's it for?

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

To draw

To feed

To brush teeth

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.

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