

Three- and Four-Year-Olds Judge Animacy Using Non-Motion Cues

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Introduction

From a very early age, children assign animate and inanimate objects to separate categories. On our account, learning about this distinction benefits from yoked, skeletal principles that guide attention to objects' motion sources, composition, and ways of interacting with the environment. Because these characteristics are linked, individual information sources may be ambiguous. This ambiguity has been demonstrated for motion paths (R. Gelman et al., 1995; Williams, 2000). We are, therefore, motivated to ask about other cues used by young learners to sort animates from inanimates.

Research Questions

1. Can 3- and 4-year-olds use non-motion cues to determine the animacy status of photographed real and fake animals?

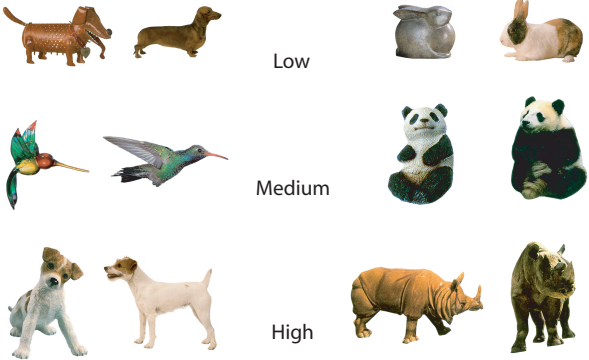
2. If so, what kind of category-relevant information do they access?

- substance and texture?
- substance related category labels?
- potential for self-generated motion or not?
- capacity to vocalize or not?

Method

Participants. Twelve 3-year-olds (mean age = 42.5 mos.) and 12 4-year-olds (mean age = 52 mos.) were included in final analyses.

Stimuli. 21 paired photographs of real and fake animals of the same type. The pairs were pretested with adults who judged animacy and rated the difficulty of the decision on a 3-point scale. These data were used to assign an equal number of pairs to three difficulty levels.



Examples of Stimulus Pairs at Each Difficulty Level

Procedure. During the task introduction, the experimenter told children that she had pictures of "real animals" from the zoo and "not real--fake--animals" from the store. Examples and descriptions were given. The experimenter explained that the pictures had been accidentally mixed up and children asked to help by sorting them into a "zoo book" and a "store book."

We introduced pairs with the phrase, "I have two, eg, butterflies. Give me the real butterfly for my zoo book." After completing all 21 pairs, children justified their answers for a subset of them (3 low, 3 medium, and 3 high difficulty pairs). Children were asked, "How did you do that? Tell me how you knew which one was real and which one was fake." We added probes as necessary to clarify answers.

Two experimenters coded verbal justifications using a scheme similar to those employed by Kremer (1989) and Subrahmanyam et al. (2002). Discussion of results will focus on substance-related and motion-related responses.

Answers to Research Questions

1. Preschoolers use non-motion cues to judge animacy. The binomial probability of a score at or above 15/21 correct is .026. All 4-year-olds and eight 3-year-olds exceeded this criterion. Mean scores were: 15.25 (all 3s), 17.75 (3s who "passed" the task), and 19.83 (4s).

Table 1 shows that the items adults rated as most difficult were the hardest for all children to judge. Among 3-year-olds especially, medium difficulty items were judged more accurately than low items.*

* We suspect that this result is due to the way items were assigned to groups. Our goal was to use the adult data to assign an equal number of stimuli to 2 difficulty groups; however, the data broke more naturally into 2 uneven or 3 even groups. It is likely that the low and medium levels together are a truer "low difficulty" group.

2. Children provided justifications for 182 pairs assigned correctly in the animacy judgment task. Tautological ("because it's really, really the real one") and irrelevant ("because I get my smarts from Mommy") answers occurred, but importantly many were informative (Table 2).

Comment Type (freq)	Examples
Substance (17)	...that, um, was <i>glass</i> , and this wasn't. It was all <i>furry</i> (4;6). ...this one <i>made out of fur</i> , and this one <i>made out of wood</i> (3;5). ...this is the <i>rock one</i> and this is the real one (4;2).
Texture-related Properties (3)	...this one (real frog) looks <i>slimy</i> , and this one doesn't (4;9).
Category Membership -- Statues (11)	They're only <i>different like a statue or like a real one</i> (4;7). The cat, that cat is a <i>statue</i> (4;9).
Potential for Motion (41)	That one (real labrador) <i>licks</i> me (3;3). This <i>couldn't fly</i> , but this <i>could fly</i> (4;3). That's the <i>hoppy one</i> ...That's the fake one (3;9).
Capacity for Sounds (10)	This <i>could go meow</i> , but <i>this don't</i> (4;3). ...he <i>says cock-a-doodle-do</i> , and this one's a fake one (3;9).

Table 2: Comment Types Related to Substance and Capacity for Movement

Children attended to, and talked about, a number of cues for animacy. Among these were the substance and/or texture of the items. Interestingly potential for motion and vocalizations were cited as reasons for making an animacy decision even when these cues were unavailable from the stimulus display.

Conclusion

We contend that no one source of information--motion, composition, or environmental interaction--allows the learner to accurately sort animates from inanimates. This is because concerns with substance and motion sources are linked. The current study extends earlier work showing that motion trajectory alone is insufficient to make animacy decisions by showing that it is not necessary either. Our results suggest that preschoolers are able to use non-motion cues, such as substance, to make animacy judgments, in a high number of cases. However, it is clear from the high frequency of justifications that refer to potential for motion, that these two sources of information are yoked, and serve **together** to facilitate learning about the categories *animate* and *inanimate* (see also S. Gelman & Opfer, 2002).

Item Difficulty	All 3s N=12	Passing 3s n=8	All 4s N=12
LOW	.70	.86	.96
MEDIUM	.83	.95	.99
HIGH	.64	.73	.88

Table 1: Percent Correct by Age and Item Difficulty

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