

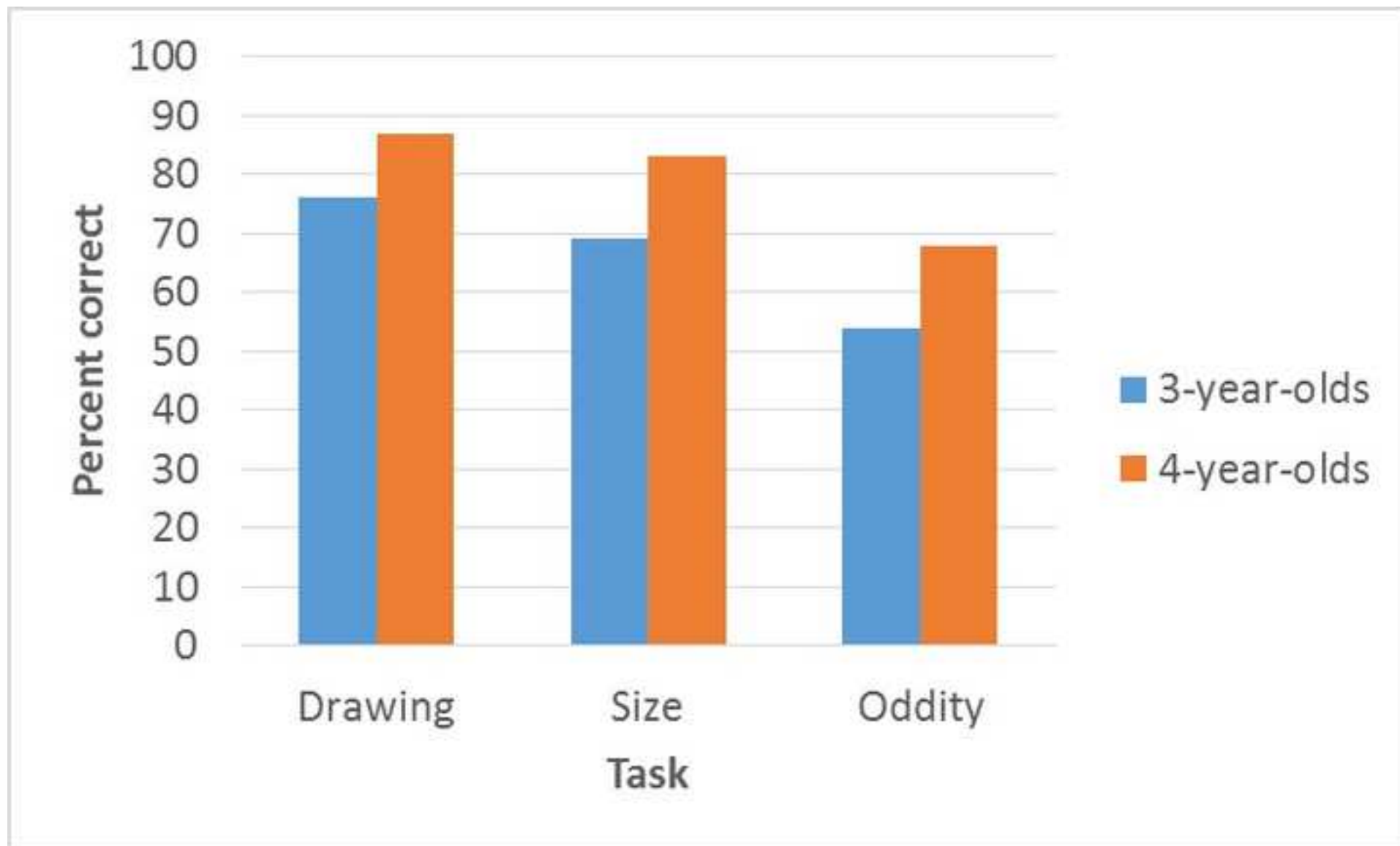
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Children's Reliance on Artist Intentions When Identifying Pictures

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Corresponding Author:	Judith Danovitch UNITED STATES
Corresponding Author Secondary Information:	
Corresponding Author's Institution:	
Corresponding Author's Secondary Institution:	
First Author:	Judith Danovitch
First Author Secondary Information:	
Order of Authors:	Judith Danovitch
	Nicholaus Noles
Order of Authors Secondary Information:	





PIs: Judith Danovitch and Nicholas Noles

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Overview:

Children are not the best artists. Sometimes it's easy to pick out the characteristic triangular head, whiskers, and tail of a cat, but children often describe elaborate scenarios that they depict as a beautifully unrecognizable mess. Thus, given children's questionable artistic talent, how do they know what their drawings, and the drawings of others, represent? One way children identify pictures is by relying on resemblance. If it looks like a cat, then it's a cat. However, some pictures do not clearly resemble any real object. In this situation, children must use other means to figure out what the picture represents, including their understanding of what the person who created the picture intended it to represent.

By their first birthday, children are sensitive to the intentions of other people. They know that people's actions are driven by their goals, and they can infer a person's intentions even if the goal-directed action is not successful (e.g. they understand a person struggling to turn a lid intends to open a jar, even if they never see them succeed in opening it). By about age 3, children can use this understanding of intention to guide their interpretation of drawings and other pictorial representations. They apply this understanding both to identifying their own drawings and to interpreting drawings created by another person.

This experiment demonstrates how to measure children's use of intention to interpret otherwise ambiguous pictures based on the methods developed by Bloom and Markson (1998).

Procedure:

1. Recruit 3- and 4-year old children. For the purposes of this demonstration, only one child is tested. Larger sample sizes (as in the Bloom and Markson study) are recommended when conducting any experiments.
 - 1.1. Participants should have no history of developmental disorders and have normal hearing and vision.
2. Data collection.
 - 2.1. Drawing task.
 - 2.1.1. Prepare a crayon and four sheets of blank paper. Invite the child into the room and have them sit at a table.

- 2.1.2. Ask the child to draw a lollipop and a balloon on two separate sheets of paper.
- 2.1.3. Ask the child to draw a picture of themselves and a picture of the experimenter on the remaining two sheets of paper.
- 2.1.4. Alternate the order in which the drawings are created between subjects, so half the children draw the lollipop and balloon first, and half draw themselves and the experimenter first.
- 2.1.5. Collect all of the child's drawings and put them aside for approximately 15 min while the child completes the size task and the oddity task.

2.2. Size task.

- 2.2.1. For this task, create four sets of hand-drawn pictures on separate sheets of paper in advance. Each picture should contain two of the same shapes of unequal sizes (e.g. a large circle and a small circle).
- 2.2.2. At the start of the task, tell the child, "I am going to show you some pictures drawn by a boy or girl (gender should match the child's gender) your age who has a broken arm. This child tried really hard to draw good pictures but because of the broken arm, the pictures did not always come out looking the way they wanted."
- 2.2.3. After placing the first picture in the child's view, say, "They drew a picture of a spider and a tree. Would you like to see their picture of a tree and a spider?"
- 2.2.4. Point to each object in the picture and ask, "What is this?"
- 2.2.5. If the child is reluctant to respond, repeat the introduction and follow up by asking, "Can you point to a spider? Can you point to a tree?"
- 2.2.6. Repeat the procedure for three additional item pairs: mouse and elephant, dog and house, and flower and bicycle.
- 2.2.7. Counterbalance the order of the items in each pair across children and drawings.
- 2.2.8. Record the child's responses using audio or video.

2.3. Oddity task.

- 2.3.1. Immediately follow the size task with the oddity task.

- 2.3.2. For this task, create four sets of hand-drawn ovals on separate sheets of paper where one oval has a different orientation than the rest. Place the dissimilar oval in either the second or third position in the series of four.
- 2.3.3. Tell the child, "I am going to show you some more pictures drawn by the child your age who has a broken arm. They drew a picture of three shoes and one sock. Would you like to see their picture of three shoes and one sock?"
- 2.3.4. Point to the dissimilar oval and ask, "What is this?"
- 2.3.5. If the child is reluctant to respond, repeat the introduction and follow up by asking, "Can you point to a sock?"
- 2.3.6. Repeat this procedure for three additional item pairs: cows and horses, pigs and chickens, and cookies and apples.
- 2.3.7. Counterbalance the order of the items across children and drawings.
- 2.3.8. Record the child's responses using audio or video.

2.4. Drawing task.

- 2.4.1. Following the size and oddity tasks, retrieve the drawings and say, "I found the drawings you made earlier. I really enjoyed looking at them. What is this one?" Then present the drawings one by one in random order and record the child's responses.

3. Analysis.

- 3.1. Two independent raters code the child's responses to each question to determine if they were accurate or not. Resolve disagreements through discussion.
- 3.2. The dependent variable is the total number of trials (0-4) for each task in which the child described the entire drawing correctly.
- 3.3. Analyze whether the child used the artist's intention to correctly identify the objects in the drawing for each task. To do this, conduct t-tests against chance performance (a score of 2) for each task. Comparisons can also be made across age groups and tasks.

Representative Results:

Researchers tested 24 4-year-olds and found that 4-year-old children correctly identified 87% of the pictures in the drawing task (**Figure 1**). They also identified 83% of the pictures correctly in the oddity task and 68% of the pictures in the size task. All of these results were significantly better than chance at the $p < .05$ level. The researchers also tested 24 3-year-olds and found that they identified 76% of the pictures in the drawing task and 69% of the pictures in the size task correctly, which also reflects better than chance performance. However, the 3-year-olds only identified 54% of the pictures correctly in the oddity task, which is no different from chance performance. This suggests that children as young as age 3 can name a representation of an object based on the creator's intention, even when it does not have a strong resemblance to the object's actual shape, although their ability to do so is more fragile at age 3 than at age 4.

Applications:

Pictures and drawings are symbols, and the ability to identify what a symbol represents is important for the development of a wide range of skills. As early as age 3, children realize that understanding the intentions of a drawing's creator can allow them to identify a drawing that might otherwise be unidentifiable. Moreover, children as young as age 3 can do this even if the drawing bears no resemblance to the intended object. Although appearance and shape are certainly still valuable for identifying pictorial representations, this demonstration shows that children can use social-cognitive processes to infer what a drawing represents.

Understanding that an artifact's identity is a function of its creators' intent is also important for categorizing objects and knowing how to use them. For example, an object might look like a tall drinking glass, but if the person who created it intended it to be a vase, then people call it a vase and put flowers in it instead. This principle also applies to understanding language, including written words, and other types of symbolic representations, such as maps (**Figure 2**). What matters in these cases is not the appearance or shape of the symbol, but shared knowledge about what a symbol is intended to represent.

Children's early understanding that what a picture represents is determined by the artist's intentions may also be the basis for appreciating abstract art. Adults can look at a painting that appears to be only blobs of paint and understand that it represents the night sky or a group of people. Not only can children do the same thing, but they can also appreciate that even when their own drawings do not turn out looking exactly like a cat or a birthday party, they still represent the objects they set out to draw.

Legend:

Figure 1: Percentage of trials in which children from each age group identified drawings correctly in the drawing, size, and oddity tasks.

Figure 2: The representative symbols of a map and the cartographer's intent are shared knowledge, which makes a map functional.

References:

Bloom, P., & Markson, L. (1998). Intention and analogy in children's naming of pictorial representations. *Psychological Science*, 9(3), 200-204.