



Brief article

Two-year-olds use artist intention to understand drawings

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Abstract

Adults appreciate that an abstract visual representation can be understood through inferring the artist's intention. Many investigators have argued that this capacity is a late-emerging developmental accomplishment, a claim supported by findings that preschool children ignore explicit statements about intent when naming pictures. Using a simplified method, we explored picture naming in 2-year-olds. Experiment 1 found that when an adult artist drew an object, children later mapped a novel name for the drawing to the object that the adult had been looking at. Experiment 2 suggests that this response was not merely because there was more attention given to that object. These findings are consistent with the view that children are naturally disposed to reason about artifacts, including artwork, in terms of inferred intention.

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1. Introduction

Visual representations are understood in part by inferring the intentions of their creators. Picasso's 1906 painting did not look much like Gertrude Stein; what made it a

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portrait of her was Picasso's mental state as he painted it. Similarly, a circle on a page can be understood as denoting a soccer ball, the planet Mars, or the empty set – depending on the goal of the individual who drew it. Adults are typically aware of the importance of intention; when uncertain about what a painting or drawing is supposed to depict, most people would agree that it makes sense to ask the artist – he or she is in the perfect position to know (for discussion, see, e.g., Danto, 1981; Goodman, 1968).

This focus on creator's intention might be a cultural invention, one acquired by children through experience with art and how people talk about art. In an intriguing set of studies, Richert and Lillard (2002) asked children to name drawings while providing them with explicit information about the knowledge of the artist – for instance, children would be shown a drawing that looks like a fish, but told that the artist comes from a faraway land and has never seen or heard of a fish before. When asked to name the drawing, it was only by the age of eight that children showed some sensitivity to the mental state of the artist, and realized that the drawing could not be of a fish. Richert and Lillard conclude that young children start off as natural *deconstructionists*, giving no special consideration of the intention of the artist.

There is reason to continue to explore this issue, however. For one thing, even 2-year-olds are aware of the symbolic nature of pictures, that is, they understand that a picture can be used to refer to or represent some real world entity (DeLoache, 2004; DeLoache & Burns, 1994; Preissler & Carey, 2004). For another, young children are sensitive to intention in other contexts, including word learning (e.g., Baldwin, 1993; Tomasello, Strosberg, & Akhtar, 1996), imitation (Gergely, Bekkering, & Király, 2002; Meltzoff, 1995) – and when naming pictures that they themselves draw (Bloom, 2000; Bloom & Markson, 1998). This raises the possibility that if one were to use a simpler non-linguistic cue to intention, such as eye gaze, one might find a more precocious understanding. We explore this in the two studies below.

2. Experiment 1

2.1. Method

2.1.1. Participants

Twenty native English-speaking 30-month-old children (range 26–33 months) were included in the study. There were 11 males and 9 females. Two additional children were excluded due to non-compliance, and one further child was excluded due to parental interference.

2.1.2. Materials

There were two stimuli sets, each with two novel objects and one picture that could represent either of these objects (Fig. 1).

2.1.3. Procedure

Participants were seated at a small table across from the experimenter. An empty box was located on a platform to the child's left, and an opaque container with a lid

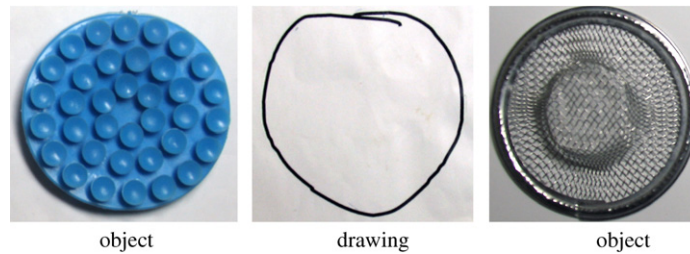


Fig. 1. Example of stimuli used in Experiments 1–2. The picture was either “drawn” (Experiment 1) or discovered (Experiment 2) by the experimenter.

was located to the child’s right. Each child received two trials (“Into” and “Away”), which were counter-balanced for order and stimuli sets. At the beginning of each trial, the child was given two novel objects to explore. Participants were then told they were going to play a game and were encouraged to pay attention to the experimenter and watch what she was going to do. The experimenter showed the child that the open box to her right was empty. She then placed one of the objects in the box and placed the other object in the second container, also shown to be empty, with the lid subsequently closed. Importantly, the child could no longer see either object. Then the experimenter picked up a clipboard with a sheet of paper and pretended to draw for 10 s. During this time the child could not see what the experimenter was drawing.

In the “Away” trial, the experimenter stared at the wall behind the closed container while drawing. In the “Into” trial, the experimenter stared into the open box (See Fig. 2).

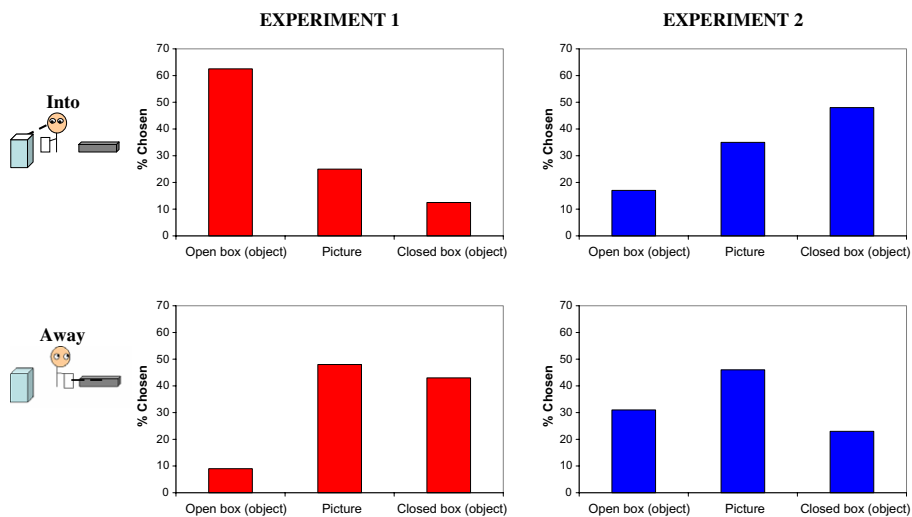


Fig. 2. Percentage of each stimuli type (object in open box, object in closed box, or picture) selected by 2-year-old children after asked to indicate the referent of a new word (‘spoodle’).

The drawing was then labeled for the child using a novel word (e.g., “Look! A *spoodle!*! I drew a *spoodle*. See the *spoodle!*”), and then placed on the table facing the child. The two objects were then removed from the boxes and placed in front of the child, one on each side of the picture, and the child was asked to show the experimenter a “spoodle”. Thus there were three candidate answers: children could point to either object, or to the picture.

2.2. Results and discussion

If children are sensitive to experimenter’s gaze, then in the “Into” trial, they should choose the object that was in the open container during the ‘drawing’ phase as the referent of the new word, and not the other object. They might instead choose the picture, which is a correct, though uninformative response. This should be different from what they do in the “Away” condition, where there is no clear intention on the part of the speaker – here children should prefer either the object that was in the closed box, or the picture itself. Responses were coded as the item(s) children pointed to or gave to the experimenter. If more than one item was chosen, we coded responses as a single instance of each choice (e.g., choice of picture and object in open box would be reflected as two separate data points). Preliminary analysis revealed no effects of order of condition, so the data were combined.

As predicted, where the experimenter was looking had a significant effect on how children generalized the picture name. In the “Away” trial, over 90% of the children chose either the object which was previously in the closed container or the picture. In the “Into” trial, most children (62.5%) pointed to the object that was in the box that the experimenter was looking at. ($\chi^2 = 2.5$, $p < .001$, $df = 1$, McNemar’s test) (see Fig. 2). If children selected an object, they were significantly more likely to choose the object in the open box as compared with chance in the “Into” condition (odds ratio 5.0 (95% confidence interval 3.1–161.6)), but not in the “Away” condition (odds ratio .28 (.05–1.7)).

This suggests that 2-year-olds are sensitive to artist’s intent (as reflected in direction of gaze) when understanding what a drawing depicts, and extending a name for that drawing. The high number of “closed container” responses in the “Away” condition could also reflect intentional understanding; even though the container is closed, looking in its general direction might still be a clue to intent. These results also support previous findings by Preissler and Carey (2004) which indicate that when a picture is named, children infer that the name refers, not to the picture itself, but to the object depicted by the picture.

An alternative explanation, however, is that the children, who were required to choose an item, might favor the item corresponding to the direction that the experimenter was looking, either because this is where their own attention was drawn, or because they infer that this is the item that the experimenter wants them to choose. Under this alternative, their responses would have nothing to do with an interpretation of the adult’s intent while she was drawing. Experiment 2 was designed to address this alternative.

3. Experiment 2

3.1. Method

3.1.1. Participants

Twenty 30-month-old children (mean age 30, range 27–33 months) were included in the study. There were 10 males and 10 females. Two additional children were excluded due to non-compliance.

3.1.2. Materials

Same as in Experiment 1.

3.1.3. Procedure

The procedure was the same as Experiment 1, except that instead of drawing the picture, the experimenter *discovered* it – she brought out a clipboard that was hidden behind her. After staring into/away from the box for the same duration as Experiment 1 (10 s), the experimenter reached behind her chair, ‘found’ the clipboard, and said to the child, “Look what I have!” The clipboard contained the same pre-drawn stimulus as in first study, and the experimenter described it in a similar way (“Look I found a *spoodle!* That’s right, it’s a *spoodle!* See the *spoodle!*”).

3.2. Results and discussion

If children are simply focusing on direction of gaze, they should show the same bias to choose the item which was within the box the experimenter was looking at as found in the “Into” condition of Experiment 1. In the “Into” condition, children selected the object that was in the open box 17% of the time, the object previously in the closed container 48%, and the picture 35%. These responses did not differ significantly from performance in the “Away” trial, where children indicated the object that was in the box 31% of the time, the object which was in the closed container 23%, and the picture 46% ($\chi^2 = 2.1, p > .05, df = 1$, McNemar’s test) (see Fig. 2).

Comparing across experiments, children selected the item that was in the box the experimenter was looking into only when the experimenter was drawing (in Experiment 1, 62.5%), and not when the experimenter simply looked into the box without creating a picture (in Experiment 2, 17%) ($\chi^2 = 11.2, p < .01, df = 2$). Direction of gaze matters for picture naming, then, when it serves as a cue to the artist’s intention.

3.3. General discussion

When 2-year-olds are asked to interpret the name of a drawing, they choose the object that the speaker was looking at when the drawing was created (Experiment 1), and they do this to a greater extent than when the speaker is looking at the object but not creating a drawing (Experiment 2). This suggests that they attend to intention when interpreting the name of a picture.

Why do we get such different results from Richert and Lillard (2002)? One consideration is that their drawings resembled real-world objects, such as a fish, a lollipop, or a snake. Resemblance is a cue to intention; if something looks like a fish, it is a good bet that it was made with the intention to look like a fish (see Bloom & Markson, 1998). Hence showing a child a picture that looks like X and saying that the artist does not know what an X is provides two competing cues to artist intention, and reconciling such cues is difficult for both children and adults (Browne & Woolley, 2001). In contrast, the drawing in our study did not resemble any object in particular and thus appearance would not serve as a competing cue.

In Experiments 2 and 3 by Richert and Lillard (2002), children were offered an alternative intention that was consistent with the drawing's appearance. For instance, the child might be told of a troll named Luna who comes from a land with no lollipops. Luna would be manipulated so as to draw a circle with a line on the bottom and to color in the circle, and children would be told that Luna was "wants to make a red balloon, so she is coloring it red". When later asked "Is Luna drawing a lollipop?" children often said yes, ignoring the stated intention. Even here, though, children were repeatedly reminded that the picture resembled a lollipop, and so there might still exist the problem of competing cues. Consistent with this, children do better when the procedure is simplified so as to minimize conflict (Nurmsoo, 2005), and when children are offered specific alternatives in a pretense scenario (see German & Leslie, 2001).

Another consideration is that previous studies have placed linguistically heavy demands on the young participants; our paradigm relies upon social cues and simple labeling, both of which highlight the role of pictures as representational (Preissler & Bloom, 2007). Indeed, when symbols are emphasized to be communicative tools, children are better able to produce and respond to an adult's drawings (see Callaghan, 1999).

A related issue, which applies to all work in this area, including our own, has to do with subtleties of language. At least for adults, names for representations are typically grounded in intuitions about artistic intent – but perhaps not always. If Picasso's portrait looks exactly like your Aunt May, you might point to it and say, "That's my Aunt May!", knowing full well that this was not who Picasso intended to draw. Even if Luna does not know what a lollipop is, then, it is not obviously mistaken (at least by some intuitions) to say that she could be, unintentionally, drawing a lollipop.

Why would 2-year-olds attend to intention when naming representations? While it is conceivable that humans have a special adaptation dedicated to the appreciation of art (Dissayake, 1992), there is a simpler explanation (Bloom, 2004). Two- and 3-year-olds naming and reasoning about artifacts, such as chairs and clocks, is partially determined by the inferred intention underlying the artifacts' creation (e.g., Diesendruck, Markson, & Bloom, 2003; Gelman & Bloom, 2000; Gelman & Ebeling, 1998; Kelemen, 1999). This is because children are intensely interested in human intention, and are aware that artifacts are the product of such intention. Two-year-olds might interpret names for paintings and drawings in the same way, then, simply because they are yet another type of artifact.

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References

- Baldwin, D. A. (1993). Infants' ability to consult the speaker for clues to word reference. *Journal of Child Language, 20*, 395–418.
- Bloom, P. (2000). *How children learn the meanings of words*. Cambridge, MA: MIT Press.
- Bloom, P. (2004). *Descartes' baby*. New York: Basic Books.
- Bloom, P., & Markson, L. (1998). Intention and analogy in children's naming of pictorial representations. *Psychological Science, 9*, 200–204.
- Browne, C. A., & Woolley, J. D. (2001). Theory of mind in children's naming of drawings. *Journal of Cognition and Development, 4*, 389–412.
- Callaghan, T. C. (1999). Early understanding and production of graphic symbols. *Child Development, 70*, 1314–1324.
- Danto, A. (1981). *The transfiguration of the commonplace*. Cambridge, MA: Harvard University Press.
- Dissayake, E. (1992). *Homo Aestheticus: Where art comes from and why*. New York: Free Press.
- Diesendruck, G., Markson, L., & Bloom, P. (2003). Children's reliance on creator's intent in extending names for artifacts. *Psychological Science, 14*, 164–168.
- DeLoache, J. S. (2004). Becoming symbol-minded. *Trends in Cognitive Sciences, 8*, 66–70J.
- DeLoache, J. S., & Burns, N. M. (1994). Early understanding of the representational function of pictures. *Cognition, 52*, 83–110.
- Gelman, S. A., & Bloom, P. (2000). Young children are sensitive to how an object was created when deciding what to name it. *Cognition, 76*, 91–103.
- Gelman, S. A., & Ebeling, K. S. (1998). Shape and representational status in children's early naming. *Cognition, 66*, 835–847.
- Gergely, G., Bekkering, H., & Király, I. (2002). Rational imitation in preverbal infants. *Nature, 415*, 755.
- German, T. P., & Leslie, A. M. (2001). Children's inferences from knowing to pretending and believing. *British Journal of Developmental Psychology, 19*, 59–83.
- Goodman, N. (1968). *Languages of art: An approach to the theory of symbols*. Indianapolis: Hockett.
- Kelemen, D. (1999). Function, goals and intention: children's teleological reasoning about objects. *Trends in Cognitive Science, 3*, 461–468.
- Meltzoff, A. N. (1995). Understanding the intentions of others: re-enactment of intended acts by 18-month-old children. *Developmental Psychology, 31*, 838–850.
- Nurmsoo, E. (2005). Preschoolers reason about the artist's mental representations when naming a drawing. Poster presented at the Annual Meeting of the Jean Piaget Society, Vancouver, Canada.
- Preissler, M. A., & Bloom, P. (2007). Two-year olds appreciate the dual nature of pictures. *Psychological Science, 18*, 1–2.
- Preissler, M. A., & Carey, S. (2004). Do pictures and words function as symbols for 18- and 24-month-old children? *Journal of Cognitive Development, 5*, 185–212.
- Richert, R. A., & Lillard, A. S. (2002). Children's understanding of the knowledge prerequisites of drawing and pretending. *Developmental Psychology, 38*, 1004–1015.
- Tomasello, M., Strosberg, R., & Akhtar, N. (1996). Eighteen-month-old children learn words in non-ostensive contexts. *Journal of Child Language, 23*, 157–176.