

UC Merced

Proceedings of the Annual Meeting of the Cognitive Science Society

Title

Preschoolers' Understanding of Freedom of Choice

Permalink

<https://escholarship.org/uc/item/7kp4f5bz>

Journal

Proceedings of the Annual Meeting of the Cognitive Science Society, 31(31)

ISSN

1069-7977

Authors

Chernyak, Nadia

Kushnir, Tamar

Wellman, Henry

Publication Date

2009

Peer reviewed

Preschoolers' Understanding of Freedom of Choice

Tamar Kushnir (tk397@cornell.edu)

Department of Human Development, MVR Hall
Ithaca, NY 14853 USA

Henry M. Wellman (hmw@umich.edu)

Department of Psychology and The Center for Human Growth and Development,
University of Michigan
530 Church Street
Ann Arbor, MI 48109 USA

Nadia Chernyak (nc98@cornell.edu)

Department of Human Development, MVR Hall
Ithaca, NY 14853 USA

Abstract

Our folk psychology includes the ability to reason about freedom of choice. That is, we believe that an agent who has performed an action *could have done otherwise*. This study investigates the development of the concept of freedom of choice in preschool children. Importantly, we contrast choices with desires, outcomes and constraints on action. In Experiment 1, four- and five-year-olds were shown a character that first desired and then achieved a given outcome, and were asked whether the character could have chosen to do otherwise. In Experiment 2, children acted themselves then were asked to reason about whether they could have done otherwise. We found that preschoolers appropriately reasoned about their own and others' freedom of choice. Moreover, they appropriately reasoned about lack of choice when actions were physically impossible (Experiment 1) or externally constrained (Experiment 2). These findings have implications for the development of social cognition and moral reasoning.

Keywords: Free will, theory of mind, social cognition, intentional action, moral reasoning.

Introduction

Our folk psychology includes the ability to reason about freedom of choice. Simply put, freedom of choice is the idea that, all other things being equal, an agent *could have done otherwise* (Nichols, 2004). This commonsense notion plays a central role in adults' explanations of behavior (Nichols, in press; Ross, 1977) and is critical to our ability to reason about moral obligation and social responsibility (Nichols, in press, Wellman & Miller, 2006). Moreover, freedom of choice dominates the experience of our own actions (Wegner, 2002). Though there has been much interest in the psychology of freedom of choice in adults (see Baer, Kaufman, & Baumeister, 2008) very little research has examined the development of the concept of freedom of choice in children.

Research on children's social cognition shows that, by the time children are 4 or 5 years old, they can reason about the psychological causes of human actions, including goals, beliefs, desires, and intentions (Gopnik & Melzoff, 1997; Wellman, 1990). Importantly, preschoolers make

distinctions between actions caused by psychological states (e.g. beliefs, and desires), and those caused by physical forces (e.g. gravity) or biological processes (e.g. reflexes; Schult & Wellman, 1997; Inagaki & Hatano, 1993; Schultz & Wells, 1985). Preschoolers are also able to reason about counterfactuals – that things could have been different (Harris, German & Mills, 1996). Thus, it is certainly plausible that preschoolers may have some concept of freedom of choice.

To date, however, only one study (Nichols, 2004) directly asked 4- and 5-year-olds about whether an agent could have done otherwise. Nichols (2004) showed children a box with a sliding lid. The experimenter opened the box and either stuck his hand inside or dropped a ball inside the box. Children were asked “after the lid was open, did I [the ball] have to touch the bottom, or could I [it] have done something else instead?” Children overwhelmingly said that the experimenter, but not the ball, could have done something else.

This result is promising, but not conclusive. Nichols (2004) showed that children were able to appropriately answer a direct question about a change to a past behavior; that is, children did not attribute the ability to “do something else instead” to an inanimate object (the ball). This is consistent with the fact that even toddlers attribute goals and intentions to agents and not inanimate objects (Melzoff, 1995). However, the critical question still remains: did children respond “yes” to the human action because they understood that the *situation* (reaching into a box) affords the choice? That is, can preschoolers distinguish between actions that can be freely chosen and actions that cannot?

The following studies explore this issue. In Experiment 1, we contrast the *ability* to do otherwise with the *desire* to do otherwise. We do this by asking children if a story character could have done something that is a) possible, but not desired versus b) impossible, but desired. In experiment 2, we ask about the child's own ability to do otherwise when they are free to act versus prevented from acting (by being externally constrained). In both experiments, the contrasts

Table 1: The sequence of events in each of the four stories in Experiment 1

Mary Stories	
<p>Story 1: Possible</p> <p>“This is Mary. Mary is standing on a small stool”</p> <p>“I’ll tell you what Mary wants to do. Mary wants to step off the stool and go right down to the ground.”</p> <p>Desired Action: “<i>Can Mary do that? Can she step off the stool and go right down to the ground?</i>” (explanation probe)</p> <p>“Let’s see what happens. Mary steps off the stool and goes right down to the ground.”</p> <p>Alternate Choice: “<i>Did she have to do that, or could she have just stayed on the stool?</i>” (explanation probe)</p>	<p>Story 2: Impossible</p> <p>“I’ll tell you what Mary wants to do. Mary wants to step off the stool and float in the air and never come down.”</p> <p>Desired Action: “<i>Can Mary do that? Can she step off the stool and float in the air and never come down?</i>” (explanation probe)</p> <p>“Let’s see what happens. Mary steps off the stool and goes right down to the ground.”</p> <p>Alternate Choice: “<i>Did she have to do that, or could she have just floated in the air and never come down?</i>” (explanation probe)</p>
John Stories	
<p>Story 3: Possible</p> <p>“This is John. John’s hand is near this brick.”</p> <p>“I’ll tell you what John wants to do. John wants to push with his hand so that the brick moves over there (point to other side of table).”</p> <p>Desired Action: “<i>Can John do that? Can he push with his hand so that the brick moves over there?</i>” (explanation probe)</p> <p>“Let’s see what happens. John pushes with his hand and the brick moves over there.”</p> <p>Alternate Choice: “<i>Did he have to do that, or could he have just left the brick right here (point)?</i>” (explanation probe)</p>	<p>Story 4: Impossible</p> <p>“I’ll tell you what John wants to do. John wants to push his hand right through the brick. The brick would still be there, but his hand would just ooze right through it.”</p> <p>Desired Action: “<i>Can John do that? Can he push his hand right through the brick – so it would ooze through?</i>” (explanation probe)</p> <p>“Let’s see what happens. John pushes with his hand and the brick moves over there.”</p> <p>Alternate Choice: “<i>Did he have to do that, or could he have just pushed his hand right through the brick – so it would ooze through?</i>” (explanation probe)</p>

are all made between human actions, rather than between human actions and the actions of inanimate objects.

Experiment 1

In Experiment 1, 4-year-olds heard two stories – one about a character who desired to perform a possible action (e.g. stepping off of a stool) and one about a character who desired to perform an impossible action (e.g. floating in the air). The stories were adapted from Schult & Wellman’s (1997) study of children’s psychological, biological, and physical explanations for human actions. In both stories, the outcome was the same (stepping off of the stool and ending up on the ground). Children were asked if the character could have done something different (Alternate Choice Question).

We predicted that children’s responses would depend on the nature of the action (possible or impossible), and not on the outcome of the action. Critically, in the possible story, even though the outcome was desired, possible, and ultimately attained, children should say that the character could have chosen a different course of action.

Methods

Participants Participants were 20 four- and five-year-olds (M=4 years, 7 months; SD=5.5 months) attending preschool in a university town. The sample was predominantly middle- and upper-middle class and reflected the diversity of the local population. Five additional participants were excluded from the analysis – two due to non-compliance and three due to experimenter error.

Materials and procedure Materials consisted of four stories and six colored drawings mounted on 8x11 cards. Each story was illustrated using three of the picture cards. The first card was a picture of the main character (Either Mary or John) standing alone. The second card was a picture of the same character getting ready to perform an action. The third card was a picture showing the outcome of the action. In the outcome card the character’s face was turned away so no emotional expression was depicted.

Children were interviewed individually in a quiet room at their preschool. Children heard two stories – a possible story and an impossible story. If a child heard a possible story about Mary, then they heard an impossible story about

John, and visa versa. The order of stories (possible/impossible, Mary/John) was counterbalanced.

Table 1 shows the exact sequence of events in the four stories. First the character was introduced, (for example "This is Mary. Mary is standing on a small stool." Next the character's desired action was revealed (for example "I'll tell you what Mary wants to do. Mary wants to step off the stool and go right down to the ground."). After that children were asked to restate the desired action (to make sure they were on task). Then the experimenter asked the *Desired Action* question (e.g. "Can Mary do that? Can she...?") and probed for an explanation ("How can she do that?/Why can't she do that?"). Finally, the outcome was revealed, children was asked the *Alternate Choice* question (e.g. "Did she have to do that, or could she have just...?") and probed for an explanation ("How could she have done that?/Why couldn't she do that?"). If a child did not answer one of the yes/no questions or said "I don't know" the question was repeated exactly as before. Silent responses (nods/shakes of the head) were accepted. If a child did not initially provide an explanation, or simply restated the facts, the experimenter followed up with a second request for an explanation ("Can you tell me more about that?"). The child's complete response was recorded.

Coding Children's responses were coded independently by the first author and a researcher blind to the hypothesis of the study. Responses to the Desired Action Question and the Alternate Choice Question were coded yes or no. Agreement was 95%.

Explanations were coded as 1) physical, 2) psychological, or 3) other/don't know by the criteria used in Schult & Wellman, (1997). This was straightforward for the impossible stories. However, children's explanations for possible stories were predominantly restatements of the characters actions (or the alternate choices), followed by the child acting out the desire/choice themselves (by getting up and jumping, for example). Thus, we included a fourth category of restatements/reenactments.

Results and Discussion

The results are depicted in figure 1. Results did not differ between the Mary and John possible stories (1 and 3) or the Mary and John impossible stories (2 and 4) and thus were collapsed for further analysis. Children's responses to the desired action questions replicate the findings of Schult & Wellman (1997). Almost all (16/20, 80%) of the children said that the character could perform the possible desired action (binomial test, $p < .01$).¹ In contrast, only 1/20 (5%) of the children said that the character could perform the impossible desired action (binomial test, $p < .0001$).² Fifteen

¹ These results represent the first answer to the yes/no question only. However, the explanations of the 4 children who responded "no" to the possible action involved physical limitations such as "it is too far away," "he can only slide it, not push it" or "she will fall down." Thus, these explanations reveal an understanding of physical possibility.

² This child explained by saying "mom say you can."

children answered both Desired Action questions correctly, and no child answered both incorrectly (McNemar's, $p < .0001$).

Critically, children's responses to the Possible Alternate Choice question ("Did she have to do X, or could she have just done Y?") demonstrate an understanding of freedom of choice. Only 5/20 (25%) children said that the character had to perform his/her desired action. Instead, a significant majority (15/20; 75%) correctly stated that the character could have done otherwise, going against both the outcome and the character's initial desire (binomial test, $p < .05$). In contrast, in the impossible condition, 17/20 (85%) of the children correctly stated that the character could not have done otherwise (that is, could not act in accordance with an impossible desire, binomial test, $p < .01$). The difference between conditions was significant - 13 children answered both Alternate Choice questions correctly, and only 1 child answered both incorrectly (McNemar's, $p < .01$).

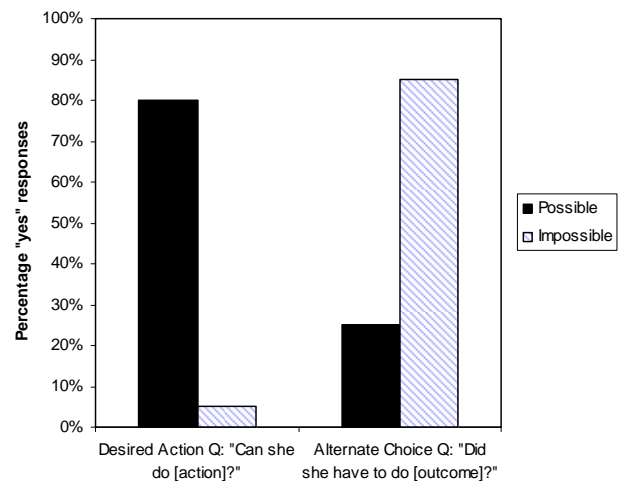


Figure 1: The percentage of children responding "Yes" to the Desired Action questions and "Had to do that" to the Alternate Choice questions in each condition.

A qualitative analysis of children's explanations for their Alternate Choice responses reveals several interesting patterns. The first is that children provided more explanations (and fewer restatements/reenactments) when asked about impossible rather than possible alternate choices. Moreover, the content of their explanations replicates Schult & Wellman's (1997) finding that children explain physically impossible events by appealing to physical causes. For the Mary stories, examples range from "Because you don't have any wings" to "'No... because gravity pushed you down." For the John stories, examples include "Because it doesn't have a hole in it" and "Because [his hand] is not oozy."

The second pattern that emerges is that relatively few children appealed to psychological causes in their explanations for alternate choices. This despite the fact that our intuitions (as adults) are that freedom of choice is a

psychological phenomenon. For the possible actions, the only psychological explanations were “she did what she was expecting [but] she could have just stayed” and “she didn’t want to” (to explain a “no” response). For the impossible actions, there was one child who said ““She had to do that...it will be too hard.” Perhaps children’s understanding of the fact that the character is free to choose (as evidenced by their yes/no responses) precedes their ability to reason about how choices are made (as evidenced by their explanations). This speculation warrants further empirical examination.

Experiment 2

In Experiment 1, preschoolers’ responses demonstrated an understanding that a person could have chosen to act against an expressed (and fulfilled) desire. Moreover, those same children correctly stated that a person cannot choose to act in accordance with a physically impossible desire. In Experiment 2, we asked whether young children could reason about their own actions in a similar way. To investigate this, each child drew two pictures. In the Free Drawing trial, children were asked to draw a dot (and they did). In the Constrained Drawing trial, we asked children to draw a line, but prevented them from doing so by holding their hand in one place. The resulting drawings were identical – each looked like a dot on the page. We then asked children if they could have drawn something different (a line). We expected that children would correctly respond “yes” in the Free Drawing trial and “no” in the Constrained Drawing trial.

Methods

Participants Participants were 20 four- and five-year-olds ($M=4$ years, 9 months; $SD=6$ months) attending preschool in a university town. The sample was predominantly middle- and upper-middle class and reflected the diversity of the local population.

Materials and procedure Materials consisted of five colored placemats (blue, red, green, yellow, and brown), blank white paper, and markers. In addition, there were two drawings prepared by the experimenter: a dot and a horizontal line.

Children were interviewed individually in a quiet room at their preschool. Each child began with a warm up (coloring a triangle) on the first placemat, and then the placemat was removed. The two drawings (dot and line) were placed in the center of the table. The experimenter asked the child to label the dot and line (“What is this? You’re right, it’s a dot!”). If the child labeled one of the drawings differently (e.g. by calling the dot a “circle”) than the child’s label was used throughout the experiment. After the drawings were labeled, the experimenter placed the next colored placemat in front of the child and put a piece of paper on top. Then the first trial (Free Drawing or Constrained Drawing, counterbalanced) began.

The sequence of events was as follows. First, the experimenter began by holding either the paper (Free Drawing) or the child’s hand (Constrained Drawing) and said “I’m going to hold the paper [your hand] really hard so it doesn’t move.” Next, the experimenter requested that the child draw. In the free trial, she asked the child to draw the dot. In the constrained trial, she asked the child to draw the line, but prevented the child from doing so by holding her hand. Thus, the outcome on each trial was the same – a dot on the page.

After drawing, the experimenter checked children’s understanding of their own intentions and outcomes by asking “Which one did you try to draw?” and, while pointing to the child’s drawing, “Which one is this?” All responses to these questions were correct, with the exception of 2/20 who said they tried to draw the dot when constrained.

The experimenter then moved the placemat to the far end of the table and brought out the placemat for the next trial. Before beginning the next trial, she asked the *Alternate Choice* question by pointing to the placemat from the previous trial and saying, “Last time on the [red] mat, when I held [the paper/your hand] like this so that it didn’t move could you have drawn the line? She then asked the child to explain her answer.

Eleven children received the Free Drawing trial first; the remaining 9 received the Constrained Drawing trial first. The colored placemats was randomly ordered.

Results and Discussion

Like in the previous experiment, children’s responses to the Alternate Choice question (“Could you have drawn the line?”) demonstrate an understanding of freedom of choice. The majority of children (16/20; 80%) said that they could have drawn the line instead of the dot in the Free Drawing trial (binomial test, $p<.01$), going against their own just completed action and its visible outcome. In contrast, in the Constrained Drawing trial, only 3/20 (15%) children stated that they could have drawn the line (that is, could act against a physical constraint, binomial test, $p<.01$).

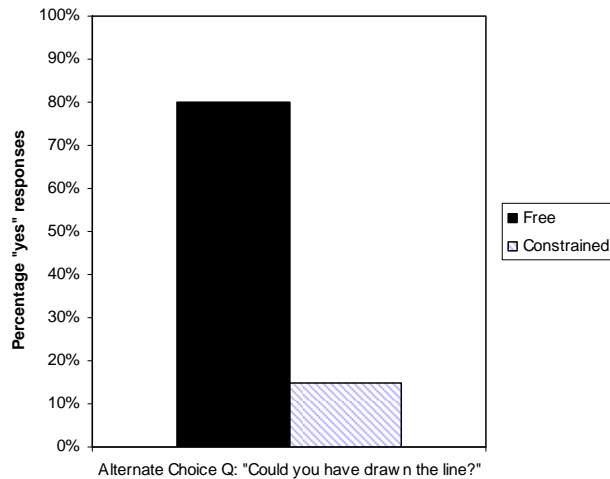


Figure 2: The percentage of children who said they “could have drawn the line” in response to the Alternate Choice question in each trial.

Importantly, Thirteen out of 20 children answered both Alternate Choice questions correctly. That is, they said “yes” when asked if they could have drawn the line on the Free Drawing trial and “no” when asked if they could have drawn the line on the Constrained Drawing trial. Three children said “yes” to both trials, and four said “no” to both trials. No child answered both questions incorrectly. Thus, this represents a significant change in responding between the Free Drawing and Constrained Drawing trials in the appropriate direction (McNemar’s test, $p=.0001$). These judgments, like those in Experiment 1, confirm that preschool children understand the difference between constrained and freely-chosen actions. In this case they make this distinction for their own just attempted actions.

Explanations help confirm and elaborate this result. In particular, for the 13 correct responders, when asked to explain their answers to the Free Drawing trial, only two children gave a psychological explanation (“I know how” “I can draw whatever I want”). Of the remaining children, the majority (6/13) offered restatements/reenactments (i.e. “like this” with a hand motion), one referred to the physical properties of the paper (“the paper was flat”), two referred to the constraint from the previous trial (“cause you weren’t helping me,” “this time you weren’t holding my hand”), and two did not offer an explanation. When asked to explain their answers to the constrained trial, 10 of the 13 mentioned the physical constraint (i.e. “cause you were holding it tight”), one said “I don’t know” and two didn’t answer. Thus, as in Experiment 1, these results also suggest that explaining actions in terms of psychological aspects of choice (“if unconstrained, I can do whatever I want”) may come after being able to make correct judgments about when one has freedom of choice.

Conclusion

Taken together, the results of the two experiments demonstrate that preschoolers can appropriately reason about their own and others’ freedom of choice. In Experiment 1, children saw a character achieving a desired outcome, yet reasoned that he could have done otherwise. In Experiment 2, children themselves achieved a desired outcome, yet also reasoned that they could have made a different choice. In both experiments, children correctly reasoned that actions which are physically impossible (Experiment 1) or physically constrained (Experiment 2) limit freedom of choice.

This study represents a first step in establishing that even very young children understand the context in which alternate choices could have been made, and can separate choices from desires. However, the two experiments here do not yet provide a comprehensive picture of the scope of children’s understanding of freedom of choice. For example, are there differences between children’s ability to understand the choice not to act and the choice to act differently? If these are equally accessible notions to children, this could have implications for the development of moral reasoning. Also, this idea could have practical implications for the regulation of behavior; parents of preschoolers are familiar with recent replacement of the words “stop” with the phrase “make a different choice.” However, our experiments are not directly comparable in this regard, as one involves the actions of others and one involves the actions of the child herself. Additionally, it is unknown whether children’s ability to inhibit and/or redirect their own actions may provide experiences critical to these understandings (Mischel, Shoda & Rodriguez, 1989).

Furthermore, it is important to investigate not only whether preschoolers can reason about freedom of choice, but whether they can use this understanding in making moral judgments. We have begun by showing, in Experiment 1, that children know that a character has the ability not to act on a desire. Do young children also distinguish between freedom of choice and intentions? Previous findings suggest that young children are often confused about intentions, either conflating them with outcomes (Montgomery & Lightner, 2004; Shultz & Wells, 1985) or desires (Schult, 2002). For adults, freedom to choose involves not only the ability to choose a different action, but the ability to “change your mind” (i.e. to choose a different intention). Clearly, more developmental evidence is needed if we are to understand the underpinnings of our folk-psychological notions of choice, and of their connections to our understanding of morality and of the social world in general.

Acknowledgments

This research was supported by an NICHD post-doctoral fellowship to the first author, and by the McDonnell Collaborative Initiative on Causal Learning. We would like to thank Shelley Housey, Laura Dean, Hannah Fish, Jesse

Emerick Sarah Fogel, Lauren Schneider, and Diana Capous for help with data collection, transcription, and coding.

References

- Baer, J., Kaufman, J., & Baumeister, R. (2008). *Are We Free? Psychology and Free Will*. New York, NY US: Oxford University Press.
- Gopnik, A., & Meltzoff, A. (1997). *Words, Thoughts and Theories*. Cambridge, MA: MIT Press.
- Harris, P., German, T., & Mills, P. (1996). Children's use of counterfactual thinking in causal reasoning. *Cognition*, *61*, 233-259.
- Inagaki, K., & Hatano, G. (1993). Young children's understanding of the mind-body distinction. *Child Development*, *64*, 1534-1549.
- Meltzoff, A. N. (1995). Understanding the intentions of others: Re-enactment of intended acts by 18-month-old children. *Developmental Psychology*, *31*, 838-850.
- Mischel, W., Shoda, Y., & Rodriguez, M. L. (1989). Delay of gratification in children. *Science*, *244*, 933-938.
- Montgomery, D. E. & Lightner, M. (2004). Children's developing understanding of the differences between their own action and passive movement. *British Journal of Developmental Psychology*, *22*, 417-438.
- Nichols, S. (2004). The folk psychology of free will: Fits and starts. *Mind & Language*, *19*, 473-502.
- Nichols, S. (in press). How can psychology contribute to the free will debate? In J. Baer, J. Kaufman, & R. Baumeister (eds.) *Psychology and Free Will*, Oxford University Press.
- Ross, L. (1977) The intuitive psychologist and his shortcomings: Distortions in the attribution process. In L. Berkowitz (Ed), *Advances in Experimental Social Psychology*, Vol 10, (pp. 174-220). New York: Academic Press.
- Schult, C. (2002). Children's understanding of the distinction between intentions and desires. *Child Development*, *73*(6), 1727-1747.
- Schult, C. A. & Wellman, H. M. (1997). Explaining human movements and actions: Children's understanding of the limits of psychological explanation. *Cognition*, *62*, 291-324.
- Schulz, T. R. & Wells, D. (1985). Judging the intentionality of action-outcomes. *Developmental Psychology*, *21*, 83-89.
- Wegner, D. (2002). *The Illusion of Conscious Will*. Cambridge, MA: MIT Press.
- Wellman, H. M. (1990). *The Child's Theory of Mind*. Cambridge, MA: MIT press.
- Wellman, H. M. & Miller, J. G. (2006). Developing conceptions of responsive intentional agents. *Journal of Cognition and Culture*, *6*, 27-55.