Children’s Evaluation of the Certainty of Inferences by Self and Other

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Introduction

Reflecting upon one’s own reasoning and evaluating the reasoning of others are important abilities for critical thinking, logical reasoning, understanding science, and social understanding. A series of studies investigated the development of children’s evaluations of their own or another person’s inferences. The goals of these studies were (a) to assess children’s recognition that inferences are different from guesses, (b) to assess children’s recognition of differences among different types of inferences, and (c) to compare children’s ability to evaluate their own inferences with children’s ability to evaluate another person’s inferences. Children from kindergarten to fourth-grade either made simple inferences or guesses, or observed someone else do so, and then rated their own certainty or another person’s certainty, using a five-point rating scale.

Study 1

Evaluation of deductions, inductions, and guesses

Participants rated their certainty about their own deductive inferences, inductive inferences, and guesses:

Deductive Inference: The child was shown two toys of different colors. After the toys were hidden in separate containers, the child looked into one of the containers, and was asked to name the color of the toy hidden in the other container.

Strong Inductive Inference: The child was shown a large brown bear and told that the bear had two babies, one in each of two containers. The child looked into one container and saw a smaller but otherwise identical bear, and then was asked about the color of the bear in the other container.

Weak Inductive Inference: The child was shown three containers. The child was told that each container held a different toy. After looking into two of the containers and seeing two dolls of the same color, the child was asked the color of the third doll.

Random Sequence: The child was shown a toy horse and told that there was a horse in each of two containers. After looking at one of the hidden horses and seeing that it was different from the first horse, the child was asked about the color of the third horse.

Informed Guess: The child initially saw two toys. After the toys were hidden in separate cans, the child was asked about the color of one of the hidden toys, but did not look into either can.

Pure Guess: The child was shown two containers, told that there was a marble in each, and asked the color of one of the hidden marbles.

Strong Inductive Inference: The child was shown three containers. The child was told that each container held a hidden toy. After looking into two of the containers and seeing two toys of different colors, the child was asked about the color of the toy hidden in the other container.

Study 2

Evaluations of deductions and guesses by self and other

Using procedures similar to Study 1, participants evaluated their own deductive inferences and guesses. Children from each grade had to make simple inferences or guesses, (b) to assess children’s recognition of differences among different types of inferences, and (c) to compare children’s ability to evaluate their own inferences with children’s ability to evaluate another person’s inferences.

Deductive Inference: The procedure was the same as in Study 1. Partial Information Guess: The child was shown three toys of different colors. Every toy was hidden in one of three plastic cans. Then the child looked into one of the cans and was asked about the color of the toy in one of the other cans.

Strong Inductive Inference: The child was shown three containers. The child was told that each container held a different toy. After looking at two of the containers and seeing two toys of different colors, the child was asked about the color of the toy hidden in the third container.

Weak Inductive Inference: The child was shown three containers. The child was told that each container held a different toy. After looking at two of the containers and seeing two toys of different colors, the child was asked about the color of the toy hidden in the third container.

Study 3

Evaluations of another observer’s inductions and guesses

The third study assessed (a) children’s recognition that another person’s feelings of certainty about an inductive conclusion may vary according to the strength of the supporting evidence, and (b) children’s ability to distinguish valid deductive inferences from guesses until fourth grade.

Strong Induction: After seeing a brown mother bear, and a brown baby bear, the puppet said that a hidden baby bear was also brown.

Weak Induction: After seeing two yellow cars, the puppet said that the third car was also black.

Random Guess: After seeing a yellow block, then a blue block, the puppet said that a red block had been hidden. Because the red block remained on the third container, neither the child nor the puppet could see what was inside.

Windows Match: The containers had windows facing the child. The child could see only the windows of the first two toys, but only the child could see into the third container. The puppet stated a correct belief about the color of the hidden toy.

Windows Mismatch: The containers had windows facing the child, but the puppet stated an incorrect belief about the third toy.

When asked to rate the puppet’s certainty in the Windows Match and Windows Mismatch conditions, children might base their ratings on the correctness of the puppet’s statement, rather than the strength of the evidence that puppet had seen. In these two conditions, to base their ratings on the puppet’s perspective, children had to ignore their own knowledge about the hidden toy.

When judging their own certainty, children in first grade and older rated deductive inferences as more certain than guesses.

When judging the puppet’s knowledge, children did not distinguish valid deductive inferences from guesses until fourth grade.

Fourth grade children differentiated the strong induction from the random guess only in the No Windows condition, where they shared the puppet’s perspective. The other age groups did not differentiate at all.

Summary

Children and adults rated Deductive Inference and Strong Induction as more certain than Weak Induction.

Kindergarten and first grade children rate their own deductive inferences as more certain than guesses or inductive inferences based on weak evidence.

Fourth-grade children begin to differentiate among their own inductive inferences by rating inductions based on stronger evidence as more certain than inductions based on weaker evidence.

Children recognize differences among inferences and guesses later when judging another person’s perspective than when rating their own perspective.

Children’s own knowledge about the truth of a conclusion often interferes with their ability to evaluate another person’s perspective.

Conclusion

These studies focused on children’s ability to evaluate a simple inferences in isolation. In academic settings, children often may need to evaluate of inferences in larger contexts, such as considering the relation between a scientific theory and empirical evidence, monitoring children’s own reasoning when constructing arguments from evidence, or critically evaluating the evidence and reasoning supporting another person’s argument in persuasive or expository text. Consideration of children’s ability to evaluate inferences may inform pedagogy in scientific and critical thinking, as well as epistemological development.

References


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