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Make your own kinds of cues: When children make more accurate inferences than adults



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ABSTRACT

In everyday decision making, we do not always have the luxury of using certain knowledge but often need to rely on cues, that is, pieces of information that can aid reasoning. We ask whether and under what circumstances children can focus on informative cues and make accurate inferences in real-world problems. We tested second-, third-, and fifth-grade children and young adults on two problems: which of two real cars is more expensive and which of two real cities has more inhabitants. We manipulated whether cues were given to the participants or the participants needed to generate their own cues. The main result was that when generating their own cues, younger children matched older children and young adults in accuracy or even outperformed them. On the other hand, when cues were given, children were less accurate than young adults. A possible explanation for this result is that children, on their own, tend to generate “perceptual” cues (e.g., “Which car is longer?”) that are informative in the problems we studied. However, children are not able to recognize the most informative cues in a set that is given to them because they are not familiar with all cues (e.g., non-perceptual cues such as which car has more horsepower).

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Introduction

Which one of Fiat’s two cars, Doblò or Panda, is the more expensive model? If you do not know the answer already, you will need to rely on cues. A cue is a piece of information such as a question, feature, or concept that is useful for making decisions. Children ask questions such as “Which of the two

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cars is longer?” whereas adults may ask questions such as “Which of the two cars has greater horsepower?”

In this article, we address the following question: Can children focus on informative cues—cues that often lead to the correct answer—when making inferences in the real world? We investigated how the way cues are obtained by children (younger and older) and young adults affects (a) the informativeness of the cues and (b) the accuracy of the inferences. In particular, we manipulated whether participants needed to generate their own cues from memory (Experiment 1) or were provided with cues that were displayed on an information board (Experiment 2). Note that in all previous studies, information search was investigated by providing cues on an information board (for an exception, see Katz, Bereby-Meyer, Assor, & Danziger, 2010). In addition, virtually none of the developmental studies used real problems in which an objectively correct inference exists.

Previous research on children's cue-based decision making

The previous studies investigating children's cue-based decision making have mainly examined whether children adapt their search strategies in response to different task characteristics. Davidson (1991a) studied how second graders (7- and 8-year-olds), fifth graders (10- and 11-year-olds), and eighth graders (13- and 14-year-olds) search for predecisional information (i.e., cues) when making choices. Her results suggest that second graders are exhaustive in their information search, even though they are less systematic than older children, who were more likely than younger children to base their decision on the same two or three cues (e.g., the color and cost of a bicycle).

In a subsequent study, Davidson (1991b) investigated whether older children search for information more systematically than younger children because they focus on the dimensions they find relevant or important for making the decision. In particular, Davidson manipulated the scenarios, as well as the ways in which the cues were displayed, so that some cues were presented and displayed as more “relevant” or “important” than others. Results show that older children were more likely than younger children to examine the cues defined as relevant in the cover story. In contrast, younger children tended to attend to irrelevant information more often than older children, a finding that is in line with earlier research (e.g., Hagen & Hale, 1973; Pick & Frankel, 1973). Davidson (1996) also found that by highlighting the relevant cues on the information board, second and fifth graders searched more on relevant dimensions and selected the best alternative. However, most of the younger children still searched information exhaustively and without any systematic pattern.

These results are in line with other findings that in the absence of an external motivational incentive, younger children gather more information than older children (Gregan-Paxton & Roedder John, 1995, 1997; Howse, Best, & Stone, 2003). However, younger children search for less information when cues are costly than when they are not (Gregan-Paxton & Roedder John, 1997; Howse et al., 2003).

In a more recent study, Mata, von Helversen, and Rieskamp (2011) investigated the ability of 9- to 12-year-olds to focus their decisions on the most *informative* cues as opposed to the most relevant cues. In particular, Mata and colleagues asked the participants to infer which of two cars would win a race after providing the values of the cars' cues (e.g., horsepower, number of cylinders) displayed on a computerized information board. The informativeness of a cue was defined as the probability of the cue leading to a correct inference in that task. The informativeness of the given cues was learned in a previous training session. Mata and colleagues concluded that less than 30% of the children spontaneously used strategies that employed one cue or just a few cues. The authors suggested that children do not use such frugal strategies because they cannot easily focus on the most informative cues.

All of the studies presented above used an information board procedure or a computerized version of it. An information board presents a matrix of information; the rows represent the choice or decision alternatives (e.g., Car 1 and Car 2), and the columns contain information related to a cue (e.g., 100 horsepower). Participants choose an alternative after having explored the information board, examining as much information as they considered necessary to make the decision in any order they wanted.

We argue that the information board procedure might not be a suitable methodology to test children's ability to focus on the most relevant or informative cues. First, a set of cues to choose among is a necessarily constrained selection that might not include all of the possible information a child could come up with. Second, it requires children to assess and compare the informativeness of exogenously

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