

Children's and Adults' Differentiation of Controlled and Automatic Cognitive Activities

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Introduction

This study examined children's intuitions about whether cognitive activities are deliberate or automatic. Recognizing the controlled-automatic distinction may facilitate children's monitoring of their own cognition and children's reasoning about other's mental activities.

Learning about the controllability vs. automaticity of cognitive activities is important because:

- Theories of cognition commonly distinguish between deliberate, controlled processes and automatic processes, and this distinction is likely to be included in adults' commonsense psychology.
- Controlled and automatic processes should differ in their phenomenology. Because controlled processes are deliberate and more effortful, there may be more conscious cues associated with their occurrence. Thus, first-person experience may provide evidence that contributes to children's learning about the controlled-automatic distinction.
- Recognition of the difference between controlled and automatic processes may be important for children's monitoring and evaluation of their own thinking.
- Recognizing that other people may engage in automatic cognitive processes, as well as controlled processes, could facilitate children's ability to evaluate others' reasoning.

Previous studies indicate that younger children overestimate the controllability of the stream of consciousness and dreams (Flavell, Green, & Flavell, 1995; Woolley & Boerger, 2002). The present study sought to extend this work by examining children's judgments about the relative controllability of a range of cognitive processes.

We investigated (a) age related changes in judgments of the controllability of particular processes, and (b) the emergence of a controlled-automatic distinction in children's understanding of the mind.

Specifically, we asked children and adults to make two judgments about object recognition, deductive inference, interpretative inference, and pretend: (a) the degree to which the outcome of each process is influenced by what one wants, and (b) the ease of producing an alternative outcome for each process.

Participants should judge that the outcomes of automatic processes are less optional than those of controlled processes. Therefore, compared to controlled processes, automatic processes are less influenced by wanting and more difficult to alter.

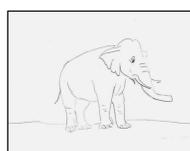
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Method

Participants: 18 first-grade children, 24 third-grade children, 23 fifth-grade children, and 24 adults participated.

Tasks: Participants engaged in 4 tasks:

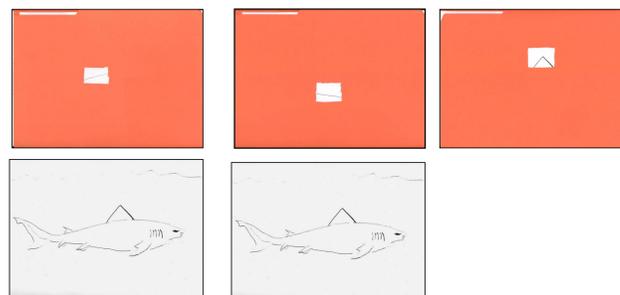
▪ **Object Recognition:** Participants saw a drawing of an elephant and were asked to identify it.



▪ **Deduction Inference:** Participants saw a blue and a green dinosaur. After the dinosaurs were hidden in separate containers, participants viewed one of them and were asked to identify the color of the other dinosaur, which remained hidden.



▪ **Interpretative Inference:** Participants viewed a sequence of three pictures of sharks. Each picture was inside of a file folder, and a small square aperture had been cut out of each folder so that a nondescript portion of the drawing was visible. A different region of the shark was visible for each of the three drawings. Participants first viewed each picture through the square aperture and then opened to folder to reveal the full shark. While viewing the third picture through the aperture, which showed the triangle of the shark's fin, participants were asked to identify the picture. Participants made decisions before opening each folder.



▪ **Pretend:** Participants were asked to pretend there was something inside an empty box.



Scale Introduction:



- **Want:** Some times you do things because you want to, and sometimes you things just happen. You can use this arrow to show how much you want to do something. When you want to do something a lot, put the arrow here. When something just happens, put the arrow here. When you want to something a little bit, put the arrow here. You can put the arrow on any of these places
- **Option Difficulty:** Some things are easy to do and some things are hard to do. You can use this arrow to show how easy something is to do. When something is very easy to do, put the arrow here. When is hard to do, put the arrow here. When something is a little bit easy to do, put the arrow here. You can put the arrow on any of these places.

Questions: Using a 5-point scale, participants rated how much they wanted to think about the outcome of each task and how easy it would be to think about an alternative answer.

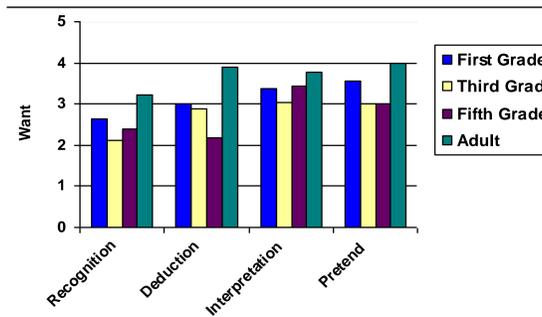
▪ **Want Question:** e.g., "When you looked at the picture, did you want to see an elephant? Show me with the arrow. How much did you want to see an elephant? Put the arrow here if you wanted to do it a lot, put the arrow here if it just happened, and put the arrow here if you wanted to do it a little bit."

▪ **Option Difficulty Question:** e.g., "When you looked at the picture, did you have to see an elephant or could you see a giraffe instead? Show me with the arrow. Put the arrow here if it would be very easy. Put the arrow here if it would be very hard, and put the arrow here if it would be very easy."

Results

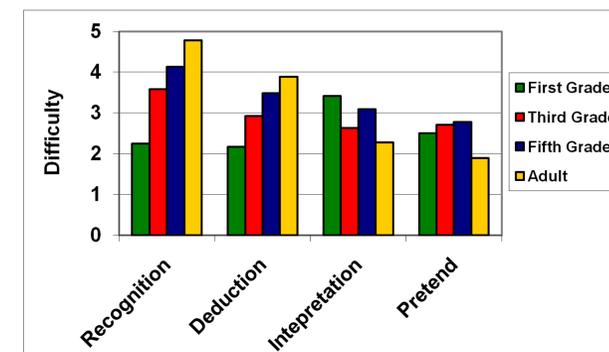
Because object recognition is automatic and pretend is controlled, those two tasks provided standards for comparison.

▪ **Want Question:** There were main of effects of Age and Task, with Adults giving higher ratings than children overall, and Object Recognition receiving lower ratings than the other tasks.



Option Difficulty Question: Main effects of Age and Task, and an Age x Task Interaction:

- First-grade children did not distinguish among the 4 tasks in their ratings.
- Both third-grade and fifth-grade children gave higher difficulty ratings for the alternative option for Object Recognition than they did for Interpretative Inference or Pretend.
- Adults gave higher difficulty ratings for the alternative option for Object Recognition than they did for Interpretative Inference or Pretend, and adults also gave higher ratings for Deductive Inference compared to Interpretative Inference or Pretend.



Conclusion

A distinction between controlled and automatic processes appears to emerge by third-grade, but is further refined between fifth-grade and adulthood.

- First-grade children did not differentiate among processes in either Want or Option Difficulty ratings
- Third- and fifth-grade children distinguished Object Recognition from Interpretative Inference and Pretend, and appear to regard Object Recognition as more automatic and Interpretative Inference and Pretend as more controlled.
- Adults appear to regard both Object Recognition and Deduction as more automatic and Interpretative Inference and Pretend as more controlled.
- Children and adults differentiate automatic and controlled processes in terms of (a) the extent to which outcomes are influenced by what a person wants, and (b) the ease of deliberately altering the outcome of a process.

References

Flavell, J. H., Green, F. L., & Flavell, E. R. (1995). Children's understanding of the stream of consciousness. *Child Development*, 64, 387-398.

Woolley, J. D., & Boerger, E. A. (2002). Development of beliefs about the origin and controllability of dreams. *Developmental Psychology*, 38, 24-41.