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Direct and indirect admission of ignorance by children



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ABSTRACT

Research has shown that children are able to admit their own ignorance directly (i.e., verbally) by 3 years of age when they are totally ignorant about what is hidden in a box (total ignorance task) but fail to do so until 5 or 6 years of age when having seen different objects without seeing which of them is being hidden (partial exposure task). This study investigated whether an earlier understanding of own ignorance in the partial exposure task is found when using an indirect measure—when children are allowed to either opt out from a risky decision (Experiment 1) or seek clarifying information by peeking inside (Experiment 2). No evidence for an earlier understanding was found in Experiment 1. In Experiment 2, however, 3- and 4-year-olds searched for clarifying information under partial exposure more often when being ignorant than when being knowledgeable. We argue that this discrepancy is related to whether spontaneous information seeking involves metacognitive processes or not.

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Introduction

Metacognition is commonly defined as cognition about cognition or, in everyday parlance, thinking about thinking (Dunlosky & Metcalfe, 2009; Flavell, 1979). In developmental psychology, it was first

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studied as metamemory, that is, what children know about their memorial abilities (Flavell, 1979). In this study, however, we focused on the development of meta-knowing. Interestingly, a firm understanding of “knowing about knowing” develops surprisingly late—not until around 6 years of age (Rohwer, Kloo, & Perner, 2012).

An early impetus came from Nelson and Narens (1990), who put the field on a theoretical footing as a cognitive system that monitors and affects more basic cognitive processes. If metacognition is not just a system for monitoring but can also influence cognition, it becomes of great practical significance. This spurred intensive research in different fields of psychology (e.g., social, developmental, educational). To illustrate, one of the sections of the European Association for Research on Learning and Instruction (EARLI) is devoted to metacognition. In particular, there is research on monitoring one’s learning progress (Metcalfe, 2008), how metacognition shapes the course of learning and problem solving (Metcalfe & Finn, 2008; Simon, 1979; Simon & Reed, 1976), comprehension monitoring (e.g., Baker & Brown, 1984; Markman, 1977; Myers & Paris, 1978), communicative competence (e.g., Flavell, Speer, Green, August, & Whitehurst, 1981), and memory performance (e.g., Dufresne & Kobasigawa, 1989; Lockl & Schneider, 2004).

This large body of research investigates practical issues of metacognitive development and focuses on how much children know about their own mental abilities. At the same time, relatively little is known about the foundational issue of when children acquire a conception of having inner mental states and can reflect on them in principle (Beran, Brandl, Perner, & Proust, 2012, p. 11). Existing research on this basic question takes a very direct approach. Children are shown a box and asked whether they know what is inside; either they have been shown or told what is inside or they are without any information in total ignorance. In the *informed* (or *knowledge*) condition, nearly all children from 3 years of age onward correctly acknowledge that they know (e.g., Pillow, 1989; Pratt & Bryant, 1990; Ruffman & Olson, 1989; Tardif, Wellman, Fung, Liu, & Fang, 2005). In the *total ignorance* condition of the very first study (Wimmer, Hogrefe, & Perner, 1988, Experiment 1), only about 50% of 3-year-olds correctly denied any knowledge. However, later research found that by 3 years (Pratt & Bryant, 1990) or even 2 years (Rohwer et al., 2012, Experiment 1), practically all children acknowledged their ignorance.

Quite a different picture of metacognitive competence emerges when we look to *partial exposure* tasks. Sodian and Wimmer (1987, Experiment 1) showed children in one of their control conditions a tray with beads of different colors. One of the beads was taken out and put inside a bag without the children being able to see which bead it was. When asked whether they knew the color of the bead, many 4-year-olds and even some 6-year-olds claimed to know. Rohwer et al. (2012) used objects of a different kind (e.g., a car and a ball) and contrasted the partial ignorance condition with total ignorance and knowledge conditions. Even 2- and 3-year-olds gave more than 80% correct answers in the knowledge and total ignorance conditions. In stark contrast, in the partial ignorance condition, a majority of children even in the group of 4-year-olds claimed to know which toy was in the bag. Only after 5 years of age (Experiment 2) or 6 years (Experiment 1) did children correctly deny any knowledge in more than 80% of trials. Moreover, the results were the same whether only 2 alternatives or up to 10 alternatives were used (Experiment 2), ruling out that children claim to know on the basis of the likelihood of making a correct guess.

Children’s failure to accurately assess their knowledge under partial exposure is also underlined by their inaccurate use of the concepts *know* and *guess*. For instance, when asked to indicate which of two (or more) boxes has been baited, children can only guess. However, when they guess correctly, they tend to claim that they knew where the bait was. Only when guessing incorrectly do they admit ignorance. So up to about 6 years of age children seem to identify *knowing* with *getting it right* (Johnson & Wellman, 1980; Miscione, Marvin, O’Brien, & Greenberg, 1978; Perner & Ruffman, 1995).

Children’s problems in expressing their lack of knowledge do not hinge on their deviant use of the words “to know.” Pillow (2002) asked 5-year-olds to express their uncertainty on a rating scale and found only a minimal difference in rating between the guess condition (77% certainty) and the informed knowledge condition (82%). One should note that although children are not asked explicitly about their knowledge at test, the instructions for how to use the rating scales refer to mental states like “uncertainty.” Lyons and Ghetti (2011; see also Ghetti, Hembacher, & Coughlin, 2013) used a rating scale depicting a child expressing certainty or uncertainty for 3-, 4-, and 5-year-olds to indicate how they felt

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