Journal of Experimental Child Psychology 158 (2017) 77–94

Contents lists available at ScienceDirect

Journal of Experimental Child Psychology

journal homepage: www.elsevier.com/locate/jecp

Why are children overconfident? Developmental differences in the implementation of accessibility cues when judging concept learning

Mariëtte van Loon [a,b,*], Anique de Bruin [b], Jimmie Leppink [b], Claudia Roebers [a]

[a] Department of Developmental Psychology, Faculty of Psychology, and Swiss Graduate School of Cognition, Learning, and Memory, University of Bern, CH-3012 Bern, Switzerland
[b] Department of Educational Development and Research and School of Health Professions Education, Maastricht University, 6200 MD Maastricht, The Netherlands

ARTICLE INFO

Article history:
Received 27 May 2016
Revised 20 January 2017
Available online 23 February 2017

Keywords:
Metacognition
Development
Overconfidence
Monitoring
Control
Cue use

ABSTRACT

Children are often overconfident when monitoring their learning, which is harmful for effective control and learning. The current study investigated children's (N = 167, age range 7–12 years) judgments of learning (JOLs) when studying difficult concepts. The main aims were (a) to investigate how JOL accuracy is affected by accessibility cues and (b) to investigate developmental changes in implementing accessibility cues in JOLs. After studying different concepts, children were asked to generate novel sentences and then to make JOLs, select concepts for restudy, and take a final test. Overconfidence for incorrect and incomplete test responses was reduced for older children in comparison with younger children. For older age groups, generating a sentence led to greater overconfidence compared with not being able to generate a sentence, which indicates that older children relied more on accessibility cues when making JOLs. This pattern differed in the youngest age group; younger children were generally overconfident regardless of whether they had generated sentences or not. Overconfidence was disadvantageous for effective control of learning for all age groups. These findings imply that instructions to encourage children to avoid metacognitive illusions need to be adapted to children's developmental stage.

* Corresponding author at: Department of Developmental Psychology, Faculty of Psychology, and Swiss Graduate School of Cognition, Learning, and Memory, University of Bern, CH-3012 Bern, Switzerland. Fax: +41 31 631 3981.
E-mail address: mariette.vanloon@psy.unibe.ch (M. van Loon).

http://dx.doi.org/10.1016/j.jecp.2017.01.008
0022-0965/

Introduction

Children in elementary school must develop skills that allow them to adapt to increasing study demands, including making plans, prioritizing study tasks, allocating study time, and making use of appropriate study strategies (Blair & Raver, 2015). To effectively meet these demands, it is important for children to be able to accurately monitor learning, detect errors, and identify the material that has yet to be learned (Krebs & Roebers, 2010; Roebers, Krebs, & Roderer, 2014). However, children's judgments of learning (JOLs) are often inaccurate (Finn & Metcalfe, 2014; Lipko, Dunlosky, Lipowski, & Merriman, 2012) in that most children are overconfident. That is, they are overly optimistic about their abilities, overestimate their actual performance, and often have a hard time acknowledging their errors (de Bruin & van Gog, 2012; Finn & Metcalfe, 2014; Lipko et al., 2012). Although some overconfidence may improve motivation and task persistence (Shin, Bjorklund, & Beck, 2007), extensive overconfidence has harmful effects on learning (Dunlosky & Rawson, 2012). Typically, overconfident learners prematurely stop studying materials that they believe they know already. Hence, overconfidence can lead to ineffective self-regulation and ultimately to underachievement (Destan & Roebers, 2015; Dunlosky & Rawson, 2012).

In the current study, we investigated overconfidence in elementary school children. Specifically, we aimed to explain developmental differences in overconfidence by investigating the cues that children of different ages (third grade to sixth grade) use to make their JOLs. To motivate the hypotheses and predictions for the age groups under investigation, we first describe findings from the literature regarding adults' overconfidence.

Explaining overconfidence

Research with adults shows that they do not have direct access to their memory when making JOLs. Instead, they make JOLs based on a variety of cues (Benjamin & Bjork, 1996; Brunswik, 1956; Koriat, 1993, 1997) such as the perceived ease of information processing (Koriat, Ackerman, Lockl, & Schneider, 2009), the perceived familiarity with the topic of study (Griffin, Jee, & Wiley, 2009), and even the font size of studied materials (Mueller, Dunlosky, Tauber, & Rhodes, 2014). When individuals base their judgments on valid cues, monitoring is typically relatively accurate, which leads to efficiently controlled actions. However, when JOLs are based on cues that are not indicative of actual learning, a discrepancy will occur between JOLs and actual performance, leading to inaccurate judgments (Koriat, 1997).

One cue on which adults base JOLs is the accessibility of information (Koriat, 1993, 1995; Koriat & Levy-Sadot, 2001), with their JOLs tending to increase when accessibility increases (i.e., the easier and faster individuals can retrieve information, the more confident they will be). When accessibility is predictive of successful recall, it is considered a valid or diagnostic cue. In contrast, when accessibility is not predictive of later recall performance, the cue is considered invalid or nondiagnostic; hence, using these invalid accessibility cues will lead to inaccurate JOLs. Unfortunately, accessibility might not always be a valid cue to predict performance; in fact, accessible information may be blatantly false and not predictive of final test performance (Benjamin, Bjork, & Schwartz, 1998; Finn & Metcalfe, 2014; Koriat, 1997).

In children, making use of invalid cues may contribute to their overconfidence. However, to date few researchers have investigated cues and their impact on children's judgments. When judging learning, children typically implement memorability cues (Ghetti, Papini, & Angelini, 2006) and easily learned, easily remembered cues (Koriat et al., 2009). Furthermore, children seem to use accessibility as a cue when making JOLs; they distinguish items for which they have accessible information from those for which they do not have accessible information in memory (Koriat & Shitzer-Reichert, 2002; Schneider, Visé, Lockl, & Nelson, 2000; van Loon, de Bruin, van Gog, & van Merriënboer, 2013a). As with adults, children have difficulty in monitoring the quality of memory, and children's JOLs also tend to be particularly overconfident when they hold incorrect knowledge (van Loon