Journal of Experimental Child Psychology 137 (2015) 30–38

Contents lists available at ScienceDirect

Journal of Experimental Child Psychology

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

Brief Report

Liar, liar, working memory on fire: Investigating the role of working memory in childhood verbal deception

Tracy Packiam Alloway [a,*], Fiona McCallum [b], Ross G. Alloway [a], Elena Hoicka [c]

[a] Department of Psychology, University of North Florida, Jacksonville, FL 32224, USA
[b] University of Stirling, Stirling FK9 4LA, Scotland, UK
[c] Department of Psychology, University of Sheffield, Sheffield S10 2TP, UK

ARTICLE INFO

Article history:
Received 29 May 2014
Revised 26 March 2015

Keywords:
Deception
Lying
Verbal working memory
Visuo-spatial working memory
Semantic leakage
Second-order belief

ABSTRACT

The aim of the current study was to investigate the role of working memory in verbal deception in children. We presented 6- and 7-year-olds with a temptation resistance paradigm; they played a trivia game and were then given an opportunity to peek at the final answers on the back of a card. Measures of both verbal and visuospatial working memory were included. The good liars performed better on the verbal working memory test in both processing and recall compared with the bad liars. However, there was no difference in visuospatial working scores between good liars and bad liars. This pattern suggests that verbal working memory plays a role in processing and manipulating the multiple pieces of information involved in lie-telling.

Introduction

Verbal deception, or lying behavior, is an important ability in a range of different contexts, from social interaction and politeness situations (Talwar, Murphy, & Lee, 2007) to court witness and legal proceedings (Lee, Cameron, Doucette, & Talwar, 2002). A commonly used paradigm to investigate verbal deception is the temptation resistance paradigm (Lewis, Stanger, & Sullivan, 1989; Polak & Harris,

* Corresponding author. Fax: +1 904 620 3814.
E-mail address: t.alloway@unf.edu (T.P. Alloway).

http://dx.doi.org/10.1016/j.jecp.2015.03.013
0022-0965/

1999). The researcher instructs the child not to look at a specific—and often desirable—object, such as a toy, placed behind the child's chair. The researcher then leaves the room for a brief period. The researcher returns to the room and asks the child if he or she peeked at the toy. The researcher then asks the child a series of follow-up questions involving the identity and color of the toy that was placed behind the chair.

If the child peeks at the toy, the child's ability to feign ignorance when answering the follow-up questions is called *semantic leakage control* and involves second-order belief understanding (Talwar, Gordon, & Lee, 2007). To skillfully avoid detection, the child needs to first adopt the examiner's perspective. The child assumes that the examiner is unaware that the child looked at the toy when the examiner left the room. Consequently, the child surmises that the researcher expects the child to have no knowledge of the correct answers to the follow-up questions about the toy's size and color. The child's ability to hide his or her transgressions by lying about the size and color of the toy demonstrates how well the child is able to understand the researcher's perspective and create a statement to match that perspective.

It is well established that verbal deception is evident in children as young as 3 years (Chandler, Fritz, & Hala, 1989; Fu, Evans, Xu, & Lee, 2012; Lewis et al., 1989; see also Lee & Evans, in press, for a review). Lying abilities improve with age (Talwar & Lee, 2002), with several researchers pointing to the development of false belief—understanding another's perspective—as one explanation for this improvement (Chandler et al., 1989; Polak & Harris, 1999; Talwar, Gordon, et al., 2007; Talwar & Lee, 2008).

Other executive function skills, such as working memory, may also play a role in verbal deception (Evans & Lee, 2011). Working memory is the ability to process multiple pieces of information, continually update memory contents with incoming stimuli, and recall the appropriate information (Baddeley, 1996; Cowan, 2006; Engle, Tuholski, Laughlin, & Conway, 1999; Lustig, May, & Hasher, 2001; Miyake, Friedman, Rettinger, Shah, & Hegarty, 2001). There is reason to predict that working memory is involved in lie-telling because it could be recruited to keep multiple pieces of information in mind such as the researcher's perspective and the actual transgression that occurred. The child would also rely on working memory to update his or her responses with follow-up questions from the researcher and shift between the researcher's perspective and the fabricated reality that the child constructed in order to avoid detection.

To date, there have been a few studies that examined the role of working memory in verbal deception. However, the results have been mixed. In a 2008 study, Talwar and Lee gave 3- to 8-year-olds a memory game in which there were six boxes with stickers. The children needed to select one box at a time to find the sticker and remove it. The boxes were scrambled after each turn. This game involved visuospatial memory because the children needed to keep track of the boxes they had already selected in order to retrieve the remaining stickers. When Talwar and Lee looked at the children's responses in a temptation resistance paradigm task, they did not find any difference among the lie-tellers, confessors, and non-peekers. In contrast, Evans and Lee (2011) found that older children (8–16 years) with higher working memory scores, measured with backward digit recall, were better at semantic leakage control or covering their tracks. One possible reason for the difference in findings could be due to the nature of the working memory tasks. When it comes to verbal deception, verbal working memory may play a more prominent role compared with visuospatial working memory. Thus, it is possible that Talwar and Lee (2008) did not find a significant difference in their groups because they used a visuospatial memory task. Age may also have played a role because Evans and Lee (2011) recruited an older sample than those who participated in Talwar and Lee's study. Research by Lewis and colleagues (1989) found that there is a clear age advantage when it comes to verbal deception, possibly as a function of better language skills (see also Evans & Lee, 2011).

The aim of the current study was to clarify the roles of verbal and visuospatial working memory in verbal deception using a temptation resistance paradigm. Children played a trivia game and were then given an opportunity to peek at the final answers, although they were told not to peek. This paradigm allowed us to examine the children's ability to control semantic leakage—their ability to maintain consistency in their responses while telling lies.

To extend the previous research that investigated the role of working memory, we included both verbal and visuospatial measures of working memory and calculated the processing and recall aspects