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Young Children's Reports of When Events Occurred: Do Event Type and Assessment Method Matter?

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Studying young children's reporting about when various events occurred informs about the development of episodic memory and metacognition. In two experiments, 55 3- to 5-year-old children participated in two activity sessions, a week apart. During the activity sessions, they learned novel animal facts and body movements, and they coloured animal pictures and posed for body movement photos. Immediately after the second activity session, children were interviewed about when they experienced the various events. Overall, children were as accurate about learning events as physical events, but they were more accurate when asked temporal distance (e.g. 'Which did you learn a longer time ago, "X" or "Y"?') than temporal location questions (e.g. 'Which did you learn before today, "X" or "Y"?'). The results suggest that young children's apparent difficulty recognizing new learning is not due to a rapid 'remember-to-know shift'. Rather, the way we ask young children about when they experienced various events determines their accuracy. Copyright © 2016 John Wiley & Sons, Ltd.

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Young children learn many new things as they grow and mature. Are they aware that they have just learned something new, thus attuned to the transitions in their knowledge? It would seem that young children experience a lot of difficulty reporting when learning events occurred. For example, Taylor, Esbensen, and Bennett (1994) reported several experiments in which 4- and 5-year-olds were taught, among other things, that the reason tigers' stripes go up and down is to provide them with camouflage. Immediately after the learning episodes, children were asked whether they had known the information for a long time or if they had just learned the information that day. A majority of the 4- and 5-year-olds reported

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that they had known the new knowledge for a long time. This pattern of response was elicited across a variety of learning events.

Following this initial research, Esbensen, Taylor, and Stoess (1997) investigated the possibility that children recognized learning events better when the events involved behaviours as opposed to facts. In two experiments, Esbensen and colleagues taught 4- and 5-year-old children a variety of new facts and behaviours. For example, they taught children the fact that 'grambees (a made-up animal that was green with a seal-like head and amoeba-like body) eat grass' and the behaviour of 'zwibbing' (an invented body movement involving standing with feet slightly apart, bending over, and twisting the body to reach for the oor behind one's heels). After fact or behaviour was taught, children were asked whether they had known the knowledge for a long time or a short time, and whether they knew the knowledge 'yesterday'. As it turned out, children recognized behavioural learning more easily than factual learning, although children of this age range exhibited a general dif culty recognizing that they had just learned something new: The majority of 4- and 5-year-olds failed to do this in Esbensen et al. (1997).

Even though preschool children do not seem to recognize that they just learned something new, their reporting about when they just physically obtained something new is more accurate. For example, in the fourth experiment, Taylor et al. (1994) gave children a variety of stickers during the testing session: Nearly all (90%) of the children correctly reported to have just received the stickers (in response to questions such as 'Have you had that sticker for a long time or did you get it today?'). Taylor and colleagues thus concluded that preschool children were able to report when a physical event occurred. Of course, if children have dif- culty understanding the questions asked of them [as in the second experiment of Esbensen et al. (1997)], they can have problems recognizing even physical events. In the second experiment, Esbensen et al. (1997) gave children small gifts such as stickers and toy dinosaurs at the same time when children were taught new knowledge. Since children in that experiment appeared not to understand the entire line of questioning, they answered the questions in a random fashion, failing to recognize even when they received the small gifts.

Using a similar research paradigm, Tang, Bartsch, and Nunez (2007) gave young children stickers as they taught children new knowledge. When reporting on a sticker that was given to them just a few minutes ago ('Did you have the seashell sticker yesterday?), 4-, 5-, and 6-year-olds were 71%, 88%, and 91% correct (when they said 'no' to the above question). Also, in Tang and Bartsch's (2012) Experiment 2, when asked about when they received a small present that was given to them a few minutes ago ('Did you have the play dough yesterday?'), 4- and 5-year-old children were 70% correct (when they responded 'no' to the question).

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monitoring abilities appear to improve steadily between early and middle childhood, so that by age 10, children can perform as well as adults on many source monitoring tasks (Earhart & Roberts, 2014). Much investigation on the development of source monitoring skills involved young children (e.g. Kondo, 2011; Kovacs & Newcombe, 2006; Robinson, 2000; Thierry, 2009). Hala, Brown, McKay, and San Juan (2013) even worked with 2½-year-olds and uncovered these very young children's competency in source monitoring using a simple action-based task, i.e. identifying who put items (apples, flowers, shovel, watering can, etc.) in a model farm, themselves or the experimenter. As pointed out by Roberts (2002), the development of source monitoring skills in children follows an uneven path: Children demonstrate earlier competency in some aspects (e.g. distinguishing actions performed by self or others, reporting when behavioural learning took place) than other aspects (e.g. differentiating between real and

of when learning events occurred using questions assessing the understanding of temporal location (e.g. 'Did you know X yesterday?') and temporal distance (e.g. 'Which have you known about longer, X or Y?'). In Tang et al. (2007) and Tang and Bartsch's (2012) Experiment 2, young children did signi cantly better responding to temporal distance questions than temporal location questions. In Tang et al. (2007), 81% of the 4-, 5-, and 6-year-olds were correct under the temporal distance assessment, whereas they were 44% correct with the temporal location assessment. In Tang and Bartsch's (2012) Experiment 2, 4- and 5-year-old children were 83% correct responding to temporal distance questions, but only 35% correct responding to temporal location questions.

Nonetheless, it is also premature to draw the conclusion that temporal distance assessment is better than temporal location assessment in eliciting correct responses from young children regarding their own learning. This is due to the fact that in both Tang et al. (2007) and Tang and Bartsch (2012), the type of temporal assessment was confounded by question frame, such that temporal location was assessed using yes/no questions, but temporal distance was asked with forced-choice questions. Young children may simply perform better with forced-choice questions than with yes/no questions. In both Siegal and Peterson (1998) and Peterson and Grant (2001), 3- to 5-year-old children performed better with forced-choice questions than with yes/no questions. Therefore, the confounding variable of question frame needs to be controlled for in order to know with more certainty that temporal distance assessment works better with young children than temporal location assessment. This was therefore the second goal of the current research.

To recapitulate, the goals of our research were twofold: First, assess the inuence of event type on young children's reporting about when events occurred. Based on past research (e.g. Esbensen et al., 1997; Tang et al., 2007; Tang & Bartsch, 2012; Taylor et al., 1994) showing young children's general dif culty recognizing new learning and less dif culty recognizing that they just physically obtained something new, we predict that young children will have a time reporting

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First activity session

Three experimenters interacted with small groups of three to five children each time in a quiet room at the preschool. After introducing themselves, the experimenters proceeded first to teach (learning event) children the fictional animal fact of 'grambees eat grass', first used by Esbensen et al. (1997). One experimenter showed children a laminated 8½ × 11 in. white poster with a coloured line drawing of a grambee and said:

> Do you know what grambees eat? Well. Grambees eat grass. Look. This is a grambee (the experimenter pointed to the grambee). Grambees are green in color and have a head that looks like a seal's. They have a large body but have no arms or legs. Grambees eat grass. So now do you know what grambees eat? That's right (after ensuring that children learned)!

The child's first name had already been pre-written on the top margin of the paper. The experimenter told the children: 'Now you have one minute to color a wug picture'. As each child turned in the coloured wug paper, he or she was asked: 'So one last time: Where do wugs sleep? Very good (after child gave the correct answer)!

To teach (learning event) children how to hink (a made-up body movement first used in Esbensen et al., 1997), the second experimenter said:

> Do you know how to hink? Well, you can hink with us. To hink, you stand with feet together (all three experimenters demonstrated). You then lift your right leg out to the side with your knee and ankle bent, and hold this position for a moment. Let's hink together again: Feet together, lift your leg, and hold. So now do you know how to hink? Show us (if children failed to demonstrate at this point). That's right (after child correctly displayed the body movement)!

Right after, each child was asked (physical event) to hink and hold the pose for the third experimenter to take a Polaroid photo. After the photo developed, the experimenter wrote down the child's first name on the top border of the photo. As each child examined and turned in his or her Polaroid hink photo, the third experimenter asked 'So one last time: How do you hink? Very good (after child showed the correct body movement)!'

Interview session

A few minutes after the second activity session, children were interviewed individually by an experimenter who did not appear in either of the two activity sessions. After greeting each child, the interviewer said 'I am talking to children to see how well they can remember things. I have a few questions to ask you. Is that okay?'

After the child assented, the interviewer followed an interview script that contained 12 questions, eight of them being key questions, using the two animal posters, the two crayoned animal pictures, and the child's two Polaroid photos as props. The interviewer also demonstrated the two body movements herself as each body movement was mentioned in her questions.

Four questions were asked to establish a natural lead into the relevant key questions. They were 'So, what do grambees eat?', 'So, where do wugs sleep?', 'So, how do you zwib?', and 'So, how do you hink?'. After either the two animal questions or the two behaviour questions were asked, four key questions about either the animals or the behaviours followed.

Regardless of the child's answer, the interviewer proceeded to ask the following eight (four about the animals and four about the behaviours) key questions: 'Which did you learn before today, "grambees eat grass" or "wugs sleep in the sand"?' (Learning-Location), 'Which did you color before today, the grambee picture or the wug picture?' (Physical-Location), 'Which did you learn a longer time ago, "grambees eat grass" or "wugs sleep in the sand"?' (Learning-Distance), 'Which did you color a longer time ago, the grambee picture or the wug picture?' (Physical-Distance), 'Which did you learn before today, how to zwib or how to hink?' (Learning-Location), 'Which did you pose for before today, the zwib photo or the hink photo?' (Physical-Location), 'Which did you learn a longer time ago, how to zwib or how to hink?' (Learning-Distance), and 'Which did you pose for a longer time ago, the zwib photo or the hink photo?' (Physical-Distance). 'Learning' in the above parentheses represented the first level (i.e. learning event) of the first independent variable (event type); 'Physical' represented the second level (i.e. physical event); 'Location' indicated the first level (i.e. temporal location)

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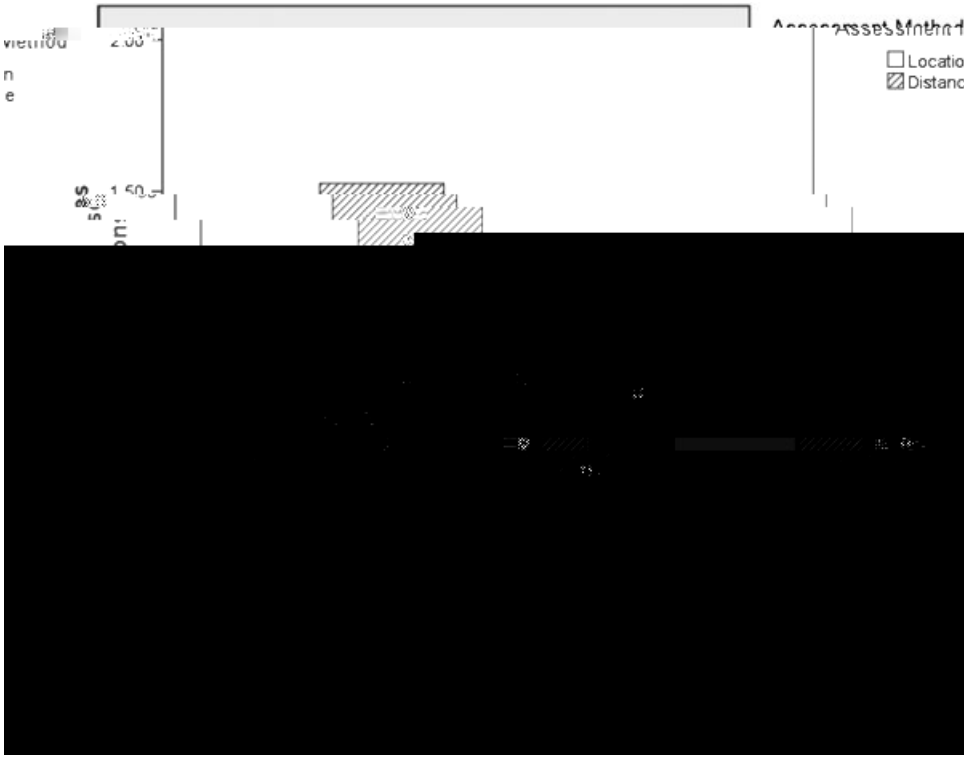

Figure 1. Experiment 1: children's mean response scores as a function of event type (Learning vs. Physical) and assessment method (Location vs. Distance).

tangible objects. Now that physical events were more like learning events in that there was no longer any concrete external cue indicating to the children that they just experienced them, young children in Experiment 1 also had dif culty recognizing when physical events occurred.

Our second hypothesis was partially supported. Even though temporal distance assessment did not help children more than temporal location assessment in recognizing physical events, temporal distance assessment did help children more than temporal location assessment when recognizing learning events. In fact, young children 's performance on the recognition of learning events when assessed with temporal distance questions was improved above chance level performance. This research in essence replicated the research of Tang et al. (2007) and Tang and Bartsch (2012) even after controlling for the confounding variable of question frame, solidifying the internal validity of those research.

Since Experiment 1 was the rst effort that we know of to directly compare children's reporting of when learning and physical events occurred, replication was in order. Also, to make sure that the various tasks were not more or less memorable for young children, we needed to switch the order of the two activity sessions to achieve a balanced study design. Finally, extant research investigating young children's source monitoring almost always samples from White, middle-class children. Recruiting from a more diverse demographic could enhance the external validity of our research ndings. With the above three considerations in mind, we conducted a second experiment.

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events more than temporal location questions; in Experiment 2, relative to temporal location questions, temporal distance questions helped children better recognize both learning and physical events. Our research thus replicated the ndings of Tang et al. (2007) and Tang and Bartsch (2012) after controlling for the extraneous variable of question frame that confounded the above two investigations. The replication was remarkable considering the close resemblance of the two assessment methods as a result of our effort to strengthen experimental control: Both temporal location and temporal distance questions were asked in the forced-choice format and with the exact the same two choices. The two assessment methods were only different from each other by two to three words in a rather long sentence.

In addition to hypothesis testing, comparisons of children's performance to chance revealed that children in Experiment 1 performed better answering temporal distance questions about learning events, whereas children in Experiment 2 were marginally better than chance answering temporal distance questions about learning events, but exceeded chance level performance when answering temporal distance questions about physical events. Methodological differences across the two experiments could have shed light on the above discrepancy. For one, our two experiments recruited children from very different ethnic and socioeconomic background: These demographic differences could have contributed to the inconsistency. For another, changes in the order of the activities between Experiments 1 and 2 could have led to the difference between the results. For example, in Experiment 1, children needed to choose colouring the grambee picture and posing for the zwibbing photo a longer time ago than colouring thethetdrenT-301(d609g(abougd)-23dou)-8

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