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Adult language use and infant comprehension of English: Associations with encoding and generalization across cues at 20 months

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ABSTRACT

Adult-provided language shapes event memory in children who are preverbal and in those who are able to discuss the past using language. The research conducted to date, however, has not yet established whether infant language comprehension abilities moderate the extent to which preverbal infants benefit from adult-provided supportive language. The present study was conducted to address this question by examining immediate imitation and 1-week delayed generalization across cues in 20-month-old infants as a function of (a) variability in adult-provided linguistic support at encoding and test, (b) infant language comprehension abilities, and (c) their interaction. The provision of supportive adult language at encoding and test was associated with delayed generalization across cues although supportive adult language at encoding did not influence performance at immediate imitation. Infant language comprehension abilities were associated with performance at immediate imitation and delayed generalization across cues. In addition, infant language comprehension abilities moderated the extent to which infants benefited from adult-provided supportive language at encoding and test. The findings contribute to the literature by demonstrating that adult language use and infant language comprehension are independently and differentially associated with immediate imitation and 1-week delayed generalization across cues but also serve to jointly structure event memory in the second year of life.

1. Introduction

Adult language use shapes event memory in childhood. Previous research has indicated that the information children recall is associated both with adult–child conversations that occur as an event unfolds (for example, Boland, Haden, & Ornstein, 2003; Haden, Ornstein, Eckerman, & Didow, 2001; McGuigan & Salmon, 2004, 2006) and with adult–child conversations about the past (Conroy & Salmon, 2006; Fivush, 1991; Fivush & Fromhoff, 1988; Haden, Haine, & Fivush, 1997; Hudson, 1993; Reese, Haden, & Fivush, 1993). The facilitating effect of adult language use has also been documented in infants and children who are not yet capable of verbally reporting on the past themselves (referred to as "preverbal" in this report), such that supportive adult language use has been associated with enhanced recall memory (Hayne & Herbert,

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2004) and delayed generalization across cues (Herbert, 2011). One potentially important factor that may be associated with the extent to which preverbal infants benefit from adult-provided language is infant comprehension abilities. Although a limited literature documents associations between language comprehension and recall memory in those who cannot verbally recount the past (Heimann et al., 2006), research has not yet been conducted to our knowledge to examine whether language comprehension moderates the extent to which preverbal infants use adult-provided language to structure their event memories. The present study was conducted to address this question by examining immediate imitation and 1-week delayed generalization across cues in 20-month-old infants as a function of (a) variability in adult-provided linguistic support at encoding and test, (b) infant language comprehension abilities, and (c) their interaction.

As indicated, both experimental studies (for examples, see Boland et al., 2003; Conroy & Salmon, 2006; Haden et al., 2001; Hudson & Nelson, 1993; McGuigan & Salmon, 2004; Peterson, Jesso, & McCabe, 1999; Tessler & Nelson, 1994) and naturalistic research (for examples, see Fivush, 1991; Fivush & Fromhoff, 1988; Haden et al., 1997; Hudson, 1993; Reese et al., 1993) alike support the notion that adult-provided language is associated with recall memory in children who are old enough to verbally report on the past. In particular, more supportive adult language use has been associated with more accurate recall (Boland et al., 2003; Conroy & Salmon, 2006; McGuigan & Salmon, 2004; Tessler & Nelson, 1994) as well as with more complex or dense accounts of past events (Fivush, 1991; Fivush & Fromhoff, 1988; Peterson et al., 1999; Reese et al., 1993). The extent to which adult-provided language facilitates recall memory and related abilities in preverbal infants is somewhat less well established. Part of the challenge in understanding the influence of adult language use on recall memory and related abilities in the first years of life is methodological: these individuals cannot report on their past experiences using language. Because of this limitation, recall memory and related abilities are commonly assessed behaviorally using the elicited or deferred imitation procedure. In one version of this procedure, infants interact with novel stimuli during a brief baseline period before watching as a researcher models a sequence of actions. The infant is then allowed to interact with the stimuli either immediately (elicited imitation), after a delay (deferred imitation), or both. The data are coded to determine whether the infant performs the actions that were modeled by the experimenter and whether they were completed in the correct temporal order (see Bauer, DeBoer, & Lukowski, 2007, for additional information on the elicited imitation procedure).

Research examining the influence of adult-provided linguistic support on recall memory and related abilities indicates that adult-provided language influences memory in preverbal infants, particularly after a delay. In one early study, Bauer, Hertsgaard, and Wewerka (1995) presented 15-month-old infants with three-step event sequences. The experimenter provided the name of each event sequence and modeled the three actions along with the name of the event and narration of the demonstrated actions. Immediate imitation was permitted and was cued by presenting infants with the sequence materials and the name of the event. Delayed recall was assessed after 1 week and was cued by presenting the sequence materials along with the name of the event for infants in the Verbal Reminder group; recall was cued by presenting the sequence materials only for infants in the No Verbal Reminder group. Infants in both groups encoded and recalled the demonstrated actions and their order relative to baseline. Group-related differences in forgetting were apparent, however, such that infants tested in the No Verbal Reminder group evidenced significant forgetting over the 1-week delay whereas infants tested in the Verbal Reminder group did not. These findings demonstrate that the provision of a verbal reminder at test in combination with supportive language at encoding effectively reduced forgetting.

More recent research has systematically investigated the influence of variability in adult-provided linguistic support at both encoding and test on recall memory in preverbal infants. Hayne and Herbert (2004; Experiment 1) presented 18-month-olds with three-step event sequences in one of two groups; delayed recall was tested after 4 weeks. At the first session, infants enrolled in the Full Narration group viewed the sequence demonstration as the experimenter provided the name of the event and narrated the three actions as they were completed; recall was cued at the second session by providing infants with the sequence materials along with the name of the event. Infants enrolled in the Empty Narration group viewed the sequence demonstration as the experimenter provided language that did not provide any meaningful information about the event ("Let's have a look at this. Then we have this bit. That was pretty neat, wasn't it?", p. 131); recall was cued at the second session by providing the infants with the sequence materials along with a general verbal prompt. The results indicated that both groups of infants recalled the target actions relative to control groups that had not seen the modeled actions. Infants tested in the Full Narration group, however, performed more target actions after the 4-week delay relative to infants in the Empty Narration group.

In another study, Hayne and Herbert (2004; Experiment 2A) examined whether the facilitative effect of full narration would also be observed at encoding, as indexed by immediate imitation. The authors used the same linguistic support manipulation as in Experiment 1 but tested recall immediately after the sequences were modeled. The results indicated that infants in both groups performed more target actions at immediate imitation relative to a control group that had not seen the modeled actions. The authors suggested that full narration did not affect performance at immediate imitation and speculated that adult-provided supportive language at test may be a more effective mnemonic cue than supportive language provided at encoding. They then tested this hypothesis in their final experiment (Experiment 2B).

To further disentangle the independent contributions of supportive adult language provided at encoding or test on long-term recall memory, Hayne and Herbert (2004; Experiment 2B) manipulated the timing of linguistic support and observed effects on recall memory after a 4-week delay. Infants in the Language at Encoding group were presented with the sequence materials along with the name of the event and narration of the demonstrated actions at the first session; at the second session, these infants were provided with the sequence materials along with a general verbal prompt ("What can we do with these things?", p. 136). The infants in the Language at Test group were presented with the sequence materials and