SHORT REPORT

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Associative memory persistence in 3- to 5-year-olds

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Abstract

Adults struggle to recollect episodic memories from early life. This phenomenon—referred to as "infantile" and "childhood amnesia"—has been widely observed across species and is characterized by rapid forgetting from birth until early childhood. While a number of studies have focused on infancy, few studies have examined the persistence of memory for newly learned associations during the putative period of childhood amnesia. In this study, we investigated forgetting in 137 children ages 3–5 years old by using an interactive storybook task. We assessed associative memory between subjects after 5-min, 24-h, and 1-week delay periods. Across all delays, we observed a significant increase in memory performance with age. While all ages demonstrated above-chance memory performance after 5-min and 24-h delays, we observed chance-level memory accuracy in 3-year-olds following a 1-week delay. The observed age differences in associative memory support the proposal that hippocampal-dependent memory systems undergo rapid development during the preschool years. These data have the potential to inform future work translating memory persistence and malleability research from rodent models to humans by establishing timescales at which we expect young children to forget newly learned associations.

KEYWORDS
associative memory, childhood amnesia, early childhood, forgetting, infantile amnesia, relational binding

Research Highlights

- Three-, four-, and five-year-olds demonstrate above-chance relational memory after 5-min and 24-h delays, but 3-year-olds exhibit chance-level memory accuracy after 1 week.
- Across all delays, associative memory performance increases with age.
- Selection of previously seen lures and novel foils increases with time delay and decreases as age increases.
- Using an associative memory task, we establish timescales at which young children forget newly learned associations during this proposed sensitive period of memory development.

1 | INTRODUCTION

Memories from infancy and early childhood are often forgotten, a phenomenon referred to as "infantile" and "childhood amnesia" (for

review, see Madsen & Kim, 2016; Pillemer & White, 1989; Ramsaran et al., 2019). The period of life associated with infantile and childhood amnesia—from birth to early childhood—is characterized by rapid forgetting of declarative memories, including memories of specific events, associations, and episodic information (Pillemer & White, 1989; Ramsaran et al., 2019). Although "infantile" and "childhood

amnesia" are often used interchangeably, "childhood amnesia" has been proposed to refer to the developmental period approximately between ages 3–5, during which lasting episodic memories begin to emerge (Jack & Hayne, 2010; Newcombe et al., 2007). Indeed, in retrospective surveys, most adults report their first memory to fall between the first three and a half to five years of life, suggesting that this age window is likely a key transitional period of memory development (Bauer et al., 2014; Bruce et al., 2000; Ece et al., 2019; Jack & Hayne, 2007; Kingo et al., 2013; Wang, 2006; West & Bauer, 1999). While a substantial body of research has focused on memory in infancy (e.g., Bauer & Dow, 1994; Bauer & Leventon, 2013; Howe & Courage, 1993; Mullally & Maguire, 2014; Rovee-Collier, 1999), there is comparatively little research on the persistence of memories for newly learned associations during the childhood amnesia window.

Infantile amnesia is evolutionarily conserved and evident in many species (Campbell & Campbell, 1962; Campbell & Spear, 1972; Madsen & Kim, 2016). In particular, the development of learning and memory systems has been studied extensively in juvenile rodents. While the translation of rodent to human age depends on the neural or cognitive system under consideration (Auvin & Pressler, 2013; Clancy et al., 2001, 2007; Ohmura & Kuniyoshi, 2017; Semple et al., 2013), the juvenile period in rats (PN12 to PN21) is posited to correspond to approximately ages 1–7 years old in humans in terms of development of hippocampal-dependent memory systems (Alberini & Travaglia, 2017; Madsen & Kim, 2016). This period of rodent development is characterized by rapid forgetting of new information (for review, see Alberini & Travaglia, 2017; Li et al., 2014; Madsen & Kim, 2016). Although the precise duration of information retention varies depending on the task employed, in various forms of aversive learning and a novel object location task, juvenile rodents demonstrate forgetting within hours of initial learning and substantial or complete forgetting 24 h after learning, while older rodents demonstrate persistent memory for learned associations well past 24 h (e.g., Akers et al., 2014; Gold et al., 1982; Klein & Spear, 1969; Travaglia et al., 2016, 2018). Persistent retention of hippocampal-dependent memories (including spatial, contextual, and episodic information) begins to emerge toward the end of the juvenile period, around PN21 (for review, see Alberini & Travaglia, 2017; Campbell & Spear, 1972; Li et al., 2014; Madsen & Kim, 2016). Collectively, these observations indicate that the juvenile period in rats represents a sensitive period for hippocampal-dependent learning and memory processes (Alberini & Travaglia, 2017) and suggest that the corresponding period of early childhood in humans may be a similar critical window for the development of memory systems.

Evidence in humans suggests that individuals begin to form lasting episodic memories in early childhood (Jack & Hayne, 2010; Newcombe et al., 2007). Many individuals report that their earliest memory falls between the ages of 3 and 5, with a substantial increase in events remembered following this transitional period (Bruce et al., 2000, 2005; Davis et al., 2008; Multhaup et al., 2005; Pillemer & White, 1989; Rubin, 2000). In line with these observations, retrospective (Bauer & Larkina, 2014) and prospective (Bauer & Larkina, 2016; Peterson et al., 2011) studies of narrative reports in children and adults suggest that autobiographical memories diminish at an accelerated rate in childhood compared to adulthood. The autobiographical memories provided in retrospective accounts are often rich in content and can involve an array of emotional, factual, and social details about a given experience or event (Bauer et al., 2007; Gardner et al., 2020). As a result, such recollections may reflect contributions from multiple memory systems with putatively differing forgetting functions (Graf et al., 1984; Squire & Zola, 1996; Yonelinas & Ritchey, 2015). Moreover, the subjective nature of autobiographical accounts poses a challenge for assessing accuracy of recall (Horselenberg et al., 2004; Rubin, 1982). In contrast, episodic memories formed in controlled laboratory tasks are likely better suited for systematic investigation of memory accuracy over time, in a way that more closely mirrors experiments conducted in non-human animals. This allows for cross-species integration of the literature on forgetting, particularly within hippocampal-dependent learning systems (Donato et al., 2020).

One important component of episodic memory that develops across early childhood is relational binding (Lloyd et al., 2009; Raj & Bell, 2010; Sluzenski et al., 2006). This hippocampal-dependent memory process involves encoding relations among elements that co-occur in a scene or event (Cohen et al., 1999; Ghetti, 2017; Olson & Newcombe, 2014). Ngo et al. (2018) demonstrated that while six-year-olds performed similarly to adults in a relational memory task after a 5-min delay, 4-year-olds were more likely to make mistakes related to binding, such that they more often chose an image that was paired with the same cue but in a different context. Similarly, Sluzenski et al. (2006) found that while 4- and 6-year-olds demonstrated similar recognition accuracy when cues and contexts were presented in isolation, 4-year-olds demonstrated worse recognition for previously seen cue-context pairs. This suggests that while item-level recognition memory is similar in 4- and 6-year-olds after a brief delay, differences in binding may drive developmental differences in episodic memory (Richmond & Pan, 2013). In line with the rodent literature, evidence suggests that differences between 4-year-olds and 6-year-olds in the ability to recall contextual details stem from age-related changes in hippocampal structure (Canada et al., 2019; Riggins et al., 2015) and functional connectivity (Geng et al., 2019; Riggins et al., 2016). Still, few studies have focused on how long newly learned, unrehearsed associations persist in memory during this stage of development.

Whereas studies in animal models have leveraged a rapid developmental timecourse to estimate timescales at which juvenile rodents forget new information, the persistence of newly learned associations in memory during human early childhood remains unclear. Given that the childhood amnesia window is thought to be a time in which patterns of memory persistence and forgetting undergo substantial changes (Jack & Hayne, 2010; Newcombe et al., 2007), research that systematically investigates relational memory decay in young children is needed (Bauer, 2015; Callaghan et al., 2014). Many studies have assessed associative memory in children after a single delay, such as several minutes (e.g., Hayne & Imuta, 2011; Ngo et al.,

2018; Sluzenski et al., 2006) or 24 h after learning (e.g., Simcock & Hayne, 2003). While some studies have examined episodic memory after multiple delays in 4- to 6-year-olds (e.g., Darby & Sloutsky, 2015; Fivush et al., 1984), few studies have examined children as young as 3 over multiple delay periods (Scarf et al., 2013; Tustin & Hayne, 2016). Additionally, many existing studies assess memory following an extensive training period, during which children are exposed to repeated presentations of the same associative pairs, or incorporate an initial learning criterion (e.g., Darby & Sloutsky, 2015; Hartshorn et al., 1998; Richmond & Pan, 2013; Sluzenski et al., 2006). Given that episodic events are generally singular instances, paradigms that present episodic events once (i.e., without training) and assess incidental encoding (e.g., incorporate a surprise memory assessment) may more closely reflect real-world episodic experiences. To our knowledge, there has yet to be a study assessing the timescale of relational memory persistence in 3- to 5-year-olds following single exposures to multiple events or associations. Moreover, in order to assess memory rather than limitations in verbal abilities, memory paradigms for young children benefit from utilizing nonverbal recall (Hayne & Imuta, 2011; Howe & Courage, 1993; Kingo et al., 2014).

To delineate the timescales of memory persistence in 3- to 5-year-olds, we used an interactive associative learning and memory task that comprised single presentations of associative pairs and did not rely on verbal recall. Importantly, the ages in our sample were concentrated around the childhood amnesia period (Bruce et al., 2000, 2005; Davis et al., 2008; Multhaup et al., 2005; Rubin, 2000). A primary goal of this work was to assess associative memory persistence in an analogous manner to rodent models of childhood amnesia (Travaglia et al., 2018) in order to establish timescales at which we expect children within this proposed sensitive period of memory development to forget new associations. Using a storybook task (Richmond & Pan, 2013; Sluzenski et al., 2006), we assessed memory for learned associations between subjects after 5-min, 24-h, and 1-week delays. Based on previous work (Scarf et al., 2013), we hypothesized that, in comparison to older children in this age range, younger children would demonstrate more rapid forgetting.

2 | METHODS

2.1 | Participants

One hundred forty-five participants ages 3–5 years old enrolled in this cross-sectional study. Four participants were excluded due to failure to complete the task (mean age = 3.56, all male), three due to failure to understand the instructions after two attempted practice trials (mean age = 3.93, N female = 2), and one due to a technical error during the experiment (age = 4.91, female). Based on existing literature assessing episodic memory retention in young children (e.g., Hayne & Imuta, 2011; Scarf et al., 2013), we planned to have 45 participants in each age group (planned N = 135), with 15 participants in each age x delay bin. We employed a between-subjects design, as conducting multiple retrieval sessions within

subjects (in which each paired associate is tested only once) would have required a greater number of pairs, presenting a high memory load during learning. Our final sample consisted of 45 3-year-olds, 45 4-year-olds, and 47 5-year-olds (total N = 137; N female = 72). We assessed associative memory between subjects after 5-min (N = 45; 15 3-year-olds, 15 4-year-olds, and 15 5-year-olds), 24-h (N = 45; 15 3-year-olds, 15 4-year-olds, and 15 5-year-olds), and 1-week (N = 47; 15 3-year-olds, 15 4-year-olds, and 17 5-year-olds) delay periods. Participants were recruited via online flyers and from an existing online database of families in New York. Our sample was 8% Asian, 3% Black/African American, 60% Caucasian/White, 25% mixed race, and 0.7% Pacific Islander or Native American. Eighteen percent identified as Hispanic. Four percent of the families provided no answer for the race or ethnicity question.

This study was approved by the Institutional Review Board at New York University, where testing took place. Parental consent and child verbal assent were obtained prior to participation. Participants were compensated monetarily and with a toy prize.

2.2 | Storybook task: learning phase

Participants completed an interactive storybook task adapted from existing relational memory tasks for preschool-aged children (Richmond & Pan, 2013; Sluzenski et al., 2006). The task was coded in MATLAB 2017a using Psychtoolbox-3 (Brainard, 1997; Kleiner et al., 2007; Pelli, 1997) and administered on a touchscreen computer. At the beginning of the storybook, a narration told participants that they would learn about animals and their favorite places. Participants were told to press a green button in the middle of the screen to learn about each animal. This was included to help maintain the child's attention during the learning phase. Once pressed, the button would make a chime sound, and the storybook would continue. Before the task, participants practiced pressing the button on the touchscreen. If participants did not press the button after more than 5 s, the experimenter would encourage them to do so. Children were not told that there would be a memory assessment.

The storybook presented eight animal-place pairs in a randomized order. The animal and place stimuli were selected to be recognizable for preschool children (e.g., cat, sheep; castle, playground). Participants were randomly assigned to one of four counterbalanced versions of the task, created from two lists of animals and two lists of places. Each version had unique animal-place pairs.

On each trial, participants were presented with an animal, followed by a place, then the animal in that place (Figure 1a). Each screen was presented for 5 s with narration (e.g., "Here is the cat." "The cat's favorite place is the mountain." and "Here is the cat in its favorite place, the mountain."). Participants were only shown each animal, place, and animal-place pair once. Participants did not have to make any responses during the task besides pressing the button after each animal-place pair to continue.

To prevent practice or verbal labeling of the paired associates, participants were encouraged not to talk during the task. If a child

(a) Learning phase

(b) Memory assessment

FIGURE 1 During the learning phase (a), participants were shown an animal, then a place, followed by the animal in that place. Each screen was presented for 5 s. After a 5-min, 24-h, or 1-week delay, participants completed a memory assessment (b), in which they were shown an animal for 5 s and were asked to press the picture associated with the animal from the four choice options (one correct target, two previously seen lures, and one novel foil)

commented on the task, the experimenter redirected attention back to the screen.

2.3 | Distractor task

To prevent rehearsal or discussion, immediately following the learning phase, all participants watched 5 min of the Pixar film *La Luna* (2011), an age-appropriate film without dialogue. Participants in the 5-min condition were administered the memory assessment immediately after the film. Participants in the 24-h and 1-week delay conditions finished their first lab session after the film and completed the memory assessment at their second lab session.

2.4 | Storybook task: memory assessment

Before the memory assessment, participants completed a practice trial that served as the instructions. In the practice, participants were first shown a new animal, a new place, and the animal in that place ("Here is the bird in its favorite place, the boat."). This was identical in structure to the storybook learning phase but used a new animal-place pair. Immediately after, participants were shown the animal in the center of the screen ("Here is the bird."), and then four places were shown in each corner of the screen. Participants were asked to touch the picture associated with the animal ("Touch the picture of the bird's favorite place."). All four place images in the practice trial were not previously used in the storybook. If participants chose the correct image, they received positive feedback ("Great job!"). If participants chose incorrectly, they were prompted to try again. Participants who failed to answer correctly after two practice trials were excluded from analyses (N = 3; N female = 2; mean age = 3.93).

After completing the practice, the narration prompted participants to think back to the storybook. Each trial began by presenting an animal from the storybook in the center of the screen with narration (e.g., "Here is the cat.") for 5 s. The animal remained on the screen, and four places were presented in the corners of the screen (Figure 1b). Each trial had one target (correct place), one novel foil (a new place, not previously shown in the storybook), and two lures (places that appeared in the storybook but were matched to a different animal). All places from the storybook were presented as the correct target on one trial and as a lure on two trials. The narration then prompted the participant to choose the place associated with the cue animal (e.g., "Touch the picture of the cat's favorite place."). Once participants pressed an image, an outline appeared over the chosen image for 1 s, and the screen changed to the next trial. The memory assessment was self-paced, but the experimenter encouraged children to respond if they had not made a selection after about 5 s. No feedback was provided. The positions of the correct option, novel foil, and two incorrect lures on the screen were counterbalanced across trials. Trial order was randomized.

2.5 | Statistical analyses

All data processing and statistical analyses were completed using R version 3.5.1 (R Core Team, 2016). Mixed-effects models were run using the "lme4" package (version 1.1-17) functions glmer (for trial-wise analyses) and lmer (for repeated measures analyses) (Bates et al., 2014). Each model included a random intercept for each participant. Age was treated as a continuous variable in these analyses and was z-scored across all participants. Statistics were reported from analysis of deviance (Type III Wald χ^2 tests) performed on glmer models and analysis of variance (Type III using Satterthwaite's
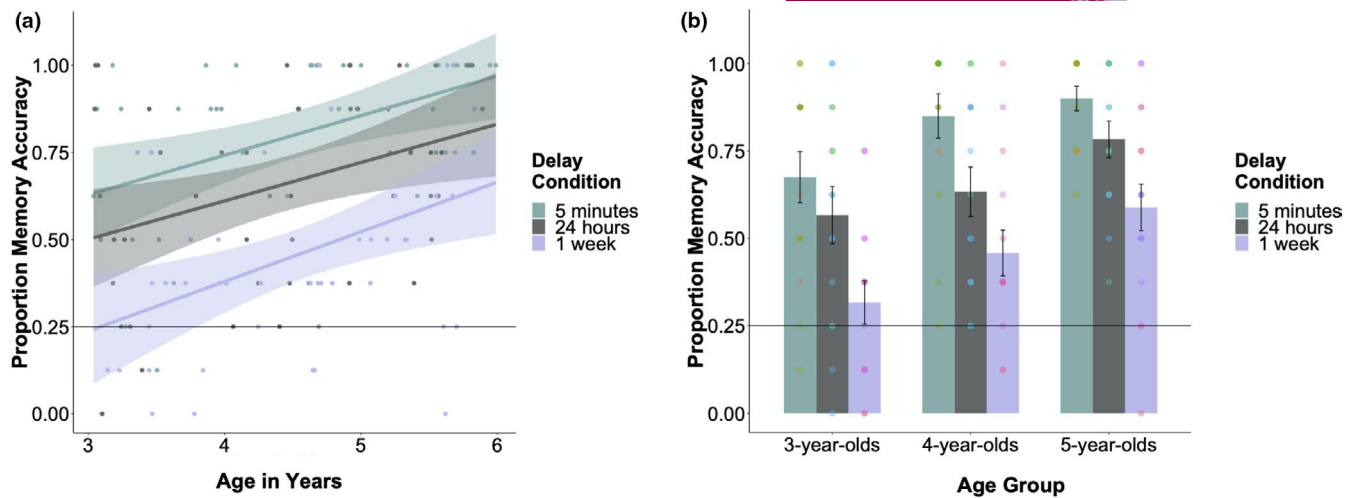
FIGURE 2 Proportion memory accuracy by (a) delay condition and continuous age and (b) delay condition and age group, where different colored points represent individual participants. Lines in (a) represent best fitting regression line by delay condition. Both plots depict the same data visualized in different ways. Horizontal line represents chance accuracy. Error bars represent standard error

method) performed on lmer models. One-sample t tests were performed for analyses of memory accuracy (relative to chance) in each age group (3, 4, or 5-year-olds).

3 | RESULTS

We first examined trial-wise associative memory accuracy by age and delay condition (Figure 2a). There was a significant main effect of age, $\chi^2(1, N = 137) = 11.65$, $p < 0.001$, indicating that memory accuracy increased with age. There was also a significant main effect of delay condition, $\chi^2(2, N = 137) = 44.09$, $p < 0.0001$, such that memory accuracy decreased as the duration of the delay between learning and the memory assessment increased. There was no significant interaction between age and delay condition, $\chi^2(2, N = 137) = 0.59$, $p = 0.75$.

Due to our a priori hypothesis that younger children might forget learned associations at longer delays, we next conducted one-sample t tests in each age group (3, 4, and 5-year-olds) to determine whether memory performance had fallen to chance level (0.25) after 1 week (Figure 2b). All age groups demonstrated above-chance memory after 5 min and 24 h (all and $ts > 3.8$ and $ps < 0.002$). While memory accuracy in 4-year-olds, $t(14) = 3.19$, $p = 0.007$, and 5-year-olds, $t(16) = 5.07$, $p < 0.001$, were significantly above chance level after a week, memory accuracy in 3-year-olds did not significantly differ from chance, $t(14) = 1.07$, $p = 0.30$. These results suggest that while all ages demonstrated above-chance memory performance after 5-min and 24-h delays, 3-year-olds forgot learned associations following a 1-week delay.

We next separately examined trial-wise selection of the inaccurate choice options—novel foils and previously seen lures—by age and delay condition. The analysis of novel foil selection indicated a significant main effect of age, $\chi^2(1, N = 137) = 9.64$, $p = 0.002$, such

that younger children tended to choose novel foils more than older children. There was also a significant effect of delay condition, $\chi^2(2, N = 137) = 9.78$, $p = 0.008$, such that foil choices increased with a longer delay between learning and the memory test. The analysis of lure selection similarly revealed a significant effect of age, $\chi^2(1, N = 137) = 4.01$, $p = 0.045$, and a significant main effect of delay condition, $\chi^2(2, N = 137) = 37.64$, $p < 0.0001$, indicating that lures were chosen more frequently at younger ages and as the delay increased. There was no age by delay interaction for novel foil, $\chi^2(2, N = 137) = 0.46$, $p = 0.80$, or lure selection, $\chi^2(2, N = 137) = 1.42$, $p = 0.49$.

In order to better understand associative memory specificity at the time point where we see differential forgetting across ages, we examined the proportion of responses to each choice option after 1 week by age. Choice option was a categorical variable with each level representing one of the four choice options during the memory assessment: the target, the novel foil, previously seen lure 1 (randomly assigned), and previously seen lure 2 (randomly assigned; See Figure 3 for visualization). Lures were randomly assigned as lure 1 and lure 2 in order to model each possible response option in the memory test and to avoid artificially inflating the proportion of times a lure was selected, given that there were twice as many lure options (two) as target or foil options (one each) on each trial. A mixed-effects model examining the proportion of responses by age and choice option showed a significant main effect of choice option, $\chi^2(3, N = 47) = 80.60$, $p < 0.0001$, and no effect of age, $\chi^2(1, N = 47) = 0$, $p = 1$. These main effects were qualified by a significant age by choice option interaction, $\chi^2(3, N = 47) = 33.09$, $p < 0.0001$. Mirroring the behavioral data, mixed-effects model-derived predicted probabilities indicated that while younger participants did not clearly favor one choice option over the others, older participants chose the target most frequently (Figure 4).
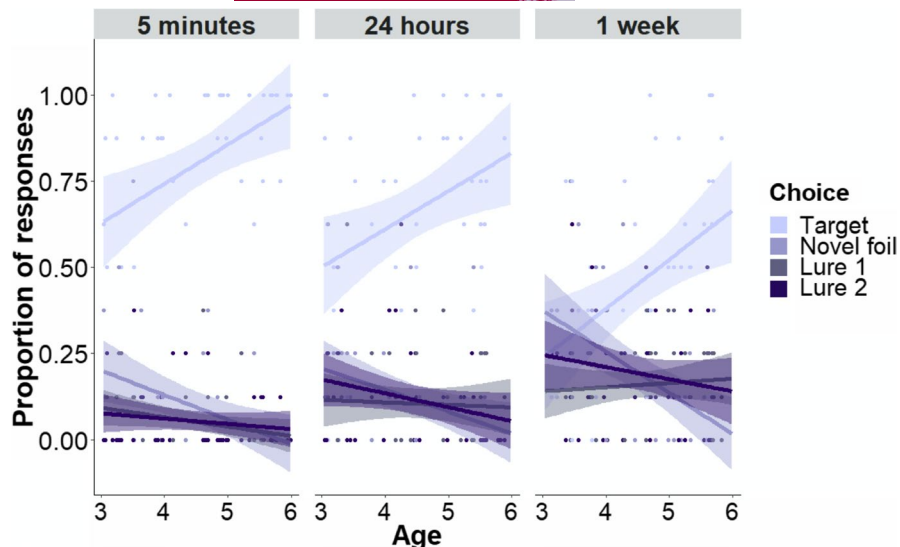
FIGURE 3 Proportion of responses for each choice option in the memory assessment after 5-min, 24-h, and 1-week by age. Points represent subject-specific proportions, colored by choice option. Lure 1 and Lure 2 are randomly assigned labels. Lines represent best fitting regression line by choice option. Error bars represent standard error
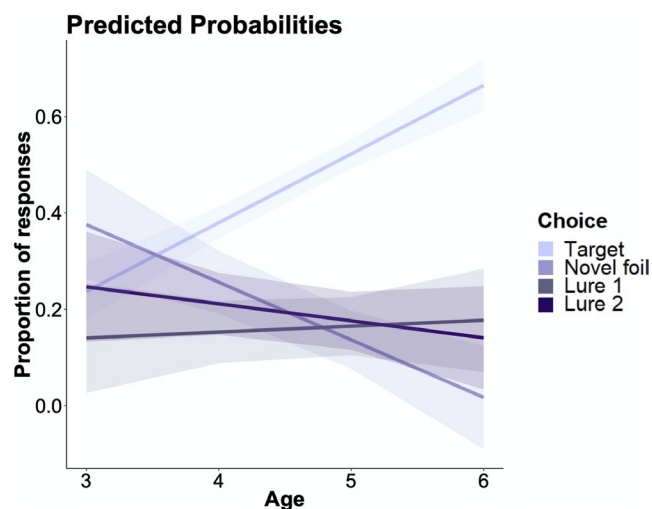

FIGURE 4 Predicted probabilities of responses for each choice option after one week. Error bars represent standard error

4 | DISCUSSION

The present study used an interactive storybook task to examine associative memory persistence after 5-min, 24-h, and 1-week delays in children ages 3–5 years old, during a proposed sensitive period for the development of hippocampal-dependent learning and memory. Despite only seeing paired associates once, memory following a 5-min delay was high across all ages, consistent with previous work (Hayne & Imuta, 2011). We found that while relational memory accuracy improved with increasing age and declined as the delay period increased, only 3-year-olds' memory accuracy, on average, fell to chance-level after 1 week. These data lend support to the proposal that hippocampal-dependent memory systems undergo rapid development during the putative period of childhood amnesia and provide insights into the timeframe over which young children forget newly learned associations.

The finding that 3-year-olds demonstrate worse memory accuracy at all timepoints and show chance-level memory after 1 week is consistent with prior work indicating that children of this age display difficulty retaining episodic information following a delay (Scarf et al., 2013). However, our data suggest that memories for learned associations at this age may still persist longer than some previous accounts have suggested (Scarf et al., 2013). These differences may reflect, in part, key differences in the tasks used to assess relational memory. Our task used multiple paired associates, assessed memory at multiple delays via nonverbal responses, and did not involve training or rehearsal. These differentiating features may be particularly useful in future studies that aim to translate findings and theories from the non-human animal literature to young children (Donato et al., 2020). For example, variants of this paradigm can be used to test an experience-dependent model of hippocampal memory system maturation (Alberini & Travaglia, 2017) by examining how different types of learning experiences influence associative memory persistence within this possible sensitive period of development.

To assess both age- and delay-related changes in associative memory specificity, we separately examined two types of memory errors: selection of a novel foil image or selection of a previously seen lure. We found that selection of both novel foils and lures increased across delays and decreased with age, indicating increased forgetting of learned associations in our youngest participants and with the passage of time. An analysis directly comparing the choices made during the memory test after 1 week revealed a significant difference in the types of choices made by younger relative to older children within the 3- to 5-year age range. While older participants more frequently chose the target paired associate, younger participants did not show evidence of discriminating between the target and the non-target (novel foil and lure) options. The lack of discrimination between foils and lures does not provide evidence that either novelty or familiarity biases choices during retrieval; however, we use caution in interpreting the absence of such effects. Together, these results provide further evidence that 3-year-olds forget a set of newly learned associations after 1 week.

How long memories persist in young children depends on the memory system in question, as well as specific details of the experimental paradigm. Several forms of learning that are not strictly dependent on the hippocampus (e.g., operant learning, conditioning, and priming) (Squire & Dede, 2015) exhibit distinct patterns of age-related change in memory persistence (Hartley & Lee, 2015). For example, in an operant learning task in which an action was reinforced with the movement of a toy train, 6- to 18-month-olds can remember the reinforced response 2–13 weeks after initial learning (Hartshorn et al., 1998). Here, we focused on unrehearsed relational binding, a putatively hippocampal-dependent learning process (Cohen et al., 1999; Ghetti, 2017) that undergoes substantial development during the period of childhood amnesia (Lloyd et al., 2009; Raj & Bell, 2010; Sluzenski et al., 2006). Still, further research that uses brain imaging to clarify the role of the hippocampus in various forms of learning and memory during early childhood is needed in order to more comprehensively understand memory persistence during the childhood amnesia window (Donato et al., 2020).

The present study provides a foundation for future studies investigating memory persistence in early childhood. Here, we manipulated delay periods and did not manipulate memory load. Using a limited number of paired associates likely promoted engagement and sustained attention in the youngest participants and enabled participants to learn the associations without training (Richmond & Pan, 2013; Sluzenski et al., 2006). However, future studies might use differing numbers of paired associates to determine how load affects memory persistence. Additionally, although we see clear effects of age on memory, we also observe substantial variability in memory accuracy across participants. Future studies examining the neurocognitive mechanisms associated with such individual variability may shed light on factors that contribute to when individuals begin to form lasting memories. Lastly, a compelling literature has demonstrated that "forgotten" memories can be reinstated with reminders (Howe et al., 1993; Li et al., 2014; Rovee-Collier et al., 1980; Travaglia et al., 2016). Future work examining how reminders influence reinstatement of memories in young children is merited.

The window of childhood amnesia is a unique period in which lasting memories begin to emerge (Jack & Hayne, 2010; Newcombe et al., 2007). The current study provides important insights into the persistence of associative memory during this developmental stage and introduces a publicly available, interactive task that is amenable to various experimental manipulations. This research may inform future work translating memory research from rodent models to investigate rapid forgetting and memory malleability during a possible sensitive period of hippocampal-dependent learning and memory in humans.

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CONFLICT OF INTEREST

The authors report no conflict of interest.

DATA AVAILABILITY STATEMENT

The original data, analysis code, and task are available on Open Science Framework (https://osf.io/4m9kx/).

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