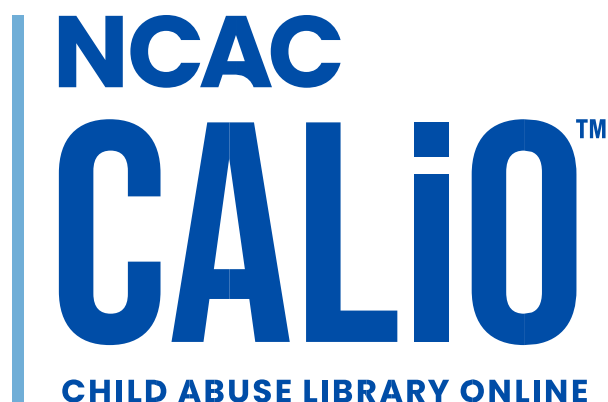




Children's Episodic & Script Memories

A Bibliography

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**Championing and Strengthening the
Global Response to Child Abuse**

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Scope

This bibliography lists research publications that cover a variety of issues related to children's memory at all ages.

Organization

Publications include articles, book chapters, reports, and research briefs and are arranged in date descending order. Links are provided to full text publications when possible. However, this collection may not be complete. More information can be obtained in the Child Abuse Library Online.

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Children's Episodic & Script Memories

A Bibliography

Benear, S. L., Onwukanjo, O. J., Olson, I. R., & Newcombe, N. S. (2025). Children's memory for events: The challenge of free recall. *Journal of Cognitive Neuroscience*, 1-12. DOI:10.1162/jocn_a_02221

Early childhood is a critical period for episodic memory development, with sharp behavioral improvements between ages 4 to 7 years. Prior work has demonstrated this extensively with prompted memory tasks, but we explored performance on unprompted, free recall of a naturalistic experience in children, and how their performance relates to other cognitive measures. We asked children and adults to view a television episode, a naturalistic task for which there exists a ground truth, and assessed their free recall memory for the episode. Children's free recall performance improved dramatically with age, with many young children producing no verbal free recall whatsoever, although prompted recognition memory measures showed retention of material. However, the detail in free recall was related to both recognition and temporal order forced-choice memory performance in our full sample, showing agreement among memory measures. Free recall was strongly predicted by verbal skills, suggesting that children's sparse recall reflects verbal skill development rather than a pure mnemonic deficit. We propose that free recall has a more protracted developmental trajectory because it requires more substantial verbal skills as well as metacognitive skills that direct memory search, as compared with forced-choice memory tasks.

Berthiaume, K. C., Acar, S., & Dumas, D. (2024). "My brain said that ... ": A qualitative study of sources of children's creative ideas. *Creativity Research Journal*, 1-25. DOI:10.1080/10400419.2024.2336739

Despite decades of research, the creative process remains to be fully understood, and most theories and empirical evidence focus on adults' creativity. Without understanding

children's creative processes, the generalizability of these theories is questionable, which is crucial for teaching, learning, and parenting. However, studying children's creative processes is challenging because of their still-developing meta-cognition, which is an essential component of the creative process. In this study, we conducted interviews with middle childhood-aged students ($n = 30$) after they completed four different types of divergent thinking tasks, examining the creative process during and beyond idea generation. Using inductive thematic analysis, we identified four main themes with associated subthemes, with Memory (experiences, knowledge, references, and personal and social interests) and Cognitive Strategies (evaluative processes and hypothetical thinking) as the primary themes. These data offer insight into how the main themes Memory and Cognitive Strategies reflect associative and executive processes, respectively, and the interplay between these in children's divergent thinking. Findings from this study revealed that children were able to explain their process of generating an idea in the vast majority of responses. Additionally, this work provides insight into improving creativity, methods of assessment, and our understanding of creativity development.

Borrelli, G., Lamberti Zanardi, A., Scognamiglio, C., Cinquegrana, V., & Perrella, R. (2024). [The relationship between childhood interpersonal and non-interpersonal trauma and autobiographical memory: A systematic review](#). *Frontiers in Psychology*, 15, 1328835. DOI:10.3389/fpsyg.2024.1328835

Childhood trauma can have negative effects on several domains of mental functioning, including Autobiographical Memory (AM). Conflicting results emerge in the scientific literature regarding the effects of childhood trauma on AM. In this review, we explored the relationship between the childhood trauma and AM, classifying childhood trauma as interpersonal, non-interpersonal and overall (interpersonal and non-interpersonal). We carried out a systematic literature review, following the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA statement). From

searching the PubMed, Scopus, and Web of Science databases, we identified 48 studies conducted from 2014 to 2023, which were included when they: (a) were written in English, (b) investigated the relationship between AM and childhood trauma, (c) included a sample of children, adolescents, or adults who had experienced childhood interpersonal and/or non-interpersonal trauma. Of the 48 eligible studies, 29 referred to trauma of an interpersonal nature, 12 to trauma of a non-interpersonal nature, and 7 to overall trauma. Regarding the relationship between childhood trauma and AM, 24 studies found a negative relationship between childhood interpersonal trauma and AM; among the articles on non-interpersonal trauma, 10 studies found no relevant relationship; in the studies on overall trauma, 4 articles found negative relationship between overall trauma and AM. The literature explored in our systematic review supports the prevalence of a negative relationship between interpersonal childhood trauma and AM. This relationship is present regardless of psychiatric disorders (e.g., Depression, Post Traumatic Stress Disorder, and Personality Disorders), and in the presence of the latter, AM results even more fragmented. Future research should use more accurate methodologies in identifying and classifying childhood trauma in order to more precisely determine its effect on AM.

Danby, M. C. (2024). [Five considerations about memory processes for child investigative interviewers](#). *Policing: A Journal of Policy and Practice*, 18, paad097.
DOI:10.1093/police/paad097

In cases of child abuse, children are required to retrieve details from their memory as accurately as possible. Previous research has shown that children's memory reports can be heavily influenced by an interviewer, but many interviewers do not understand memory processes or know how their practices impact children's memories. While interviewers are commonly recommended to adhere to expert guidelines, the current article aims to explain the memory-related reasons underlying *why* some interview practices are recommended and further aims to dispel some misconceptions about

memory. Five considerations about children's memory are described: (1) the rate that details are forgotten from memory cannot justify rushed interview planning, (2) considerations for eliciting details from different subsystems of long-term memory, (3) how question phrasing impacts children's memory retrieval processes, (4) the inaccuracies caused by the reconstructive nature of memory, and (5) the memory challenges for children reporting multiple incidents of abuse.

Guo, P., Carey, E., Plaisted-Grant, K., & Cheke, L. G. (2024). [Episodic memory during middle childhood: What is developing?](#) *Journal of Experimental Child Psychology*, 240, 105828. DOI:10.1016/j.jecp.2023.105828

Whereas previous research has concentrated on the emergence of episodic memory during the early years, fewer investigations have explored the details of this development through middle and late childhood. Considerable variation in task demands and testing methodologies have rendered the trajectory of episodic memory during this period unclear, particularly with regard to which elements are in a state of change at which time. This study separately assessed memory for item, location, and temporal order, as well as integrated what–where–when (WWW) information using a WWW memory test (the Treasure Hunt task), with 84 children aged 6 to 12 years. Two versions of the task were used, varying in the degree of retrieval support while keeping encoding constant. Results show that episodic memory continued to develop across this period, with individual item, spatial, temporal, and WWW memory all improving relatively linearly with age. These improvements were underpinned by both the associative binding and strategic control processes. These findings suggest that it is not any one element of episodic memory that is driving development during this period but that all aspects are continuing to mature in parallel.

Fan, C. L., Sokolowski, H. M., Rosenbaum, R. S., & Levine, B. (2023). [What about “space” is important for episodic memory?](#) *Wiley Interdisciplinary Reviews: Cognitive Science*, 14(3), e1645. DOI:10.1002/wcs.1645

Early cognitive neuroscientific research revealed that the hippocampus is crucial for spatial navigation in rodents, and for autobiographical episodic memory in humans. Researchers quickly linked these streams to propose that the human hippocampus supports memory through its role in representing space, and research on the link between spatial cognition and episodic memory in humans has proliferated over the past several decades. Different researchers apply the term “spatial” in a variety of contexts, however, and it remains unclear what aspect of space may be critical to memory. Similarly, “episodic” has been defined and tested in different ways. Naturalistic assessment of spatial memory and episodic memory (i.e., episodic autobiographical memory) is required to unify the scale and biological relevance in comparisons of spatial and mnemonic processing. Limitations regarding the translation of rodent to human research, human ontogeny, and inter-individual variability require greater consideration in the interpretation of this literature. In this review, we outline the aspects of space that are (and are not) commonly linked to episodic memory, and then we discuss these dimensions through the lens of individual differences in naturalistic autobiographical memory. Future studies should carefully consider which aspect(s) of space are being linked to memory within the context of naturalistic human cognition.

Hjuler, T. F., Sonne, T., Kingo, O. S., Berntsen, D., & Krøjgaard, P. (2023). [“I can’t remember!” Three-year-olds struggle to strategically access encoded and consolidated memories.](#) *Cognitive Development*, 65, 101292. DOI:10.1016/j.cogdev.2022.101292

We examined three-year-olds’ ($N = 50$) strategic recall of past events from their daily life that they recently had recalled spontaneously. Hence, in contrast to most research on memories of past events in young children, we had evidence that the events had been encoded and consolidated. Moreover, we examined whether the age of the to-be-

remembered events as well as language skills would affect the strategic recall. The results showed that even though the children's answers were coded exceedingly 'liberal', the children were unable to provide strategic recall in 51% of the cases. Language skills affected their performance, whereas the age of the to-be-remembered events and time since last remembrance did not. These results highlight the cognitive constraints related to the deliberate search process required when responding to direct questions concerning past events and add to the understanding of retrieval mechanisms in young children, by underscoring the advantage of spontaneous recall.

Léonard, C., Blause, S., Geurten, M., & Willems, S. (2023). Preschoolers' memory recall of new information: Relation to parental reminiscing. *Memory*, 31(4), 509–517.
DOI:10.1080/09658211.2023.2172184

The influence of parental reminiscing style (the way parents discuss past events with their children) on the development of children's autobiographical memory has been well documented. The specific mechanisms involved in this effect, however, remain unknown. We explored the association between specific components of parental reminiscing and preschoolers' episodic memory. Fifty-three parent-child dyads ($M_{\text{Child Age}} = 53.13$ months, 29 females) from Belgium were tested twice within a delay of about nine months. At the first time point, parental reminiscing style was assessed via a parent-child discussion of a prior standardised event (a museum visit) focusing on both the structure of parental interactions and the addressed content. At each time point, children were administered with story-recall tasks in the form of true-false recognition about previously heard stories. Generalised linear mixed-effect models were conducted on an item-by-item basis. Results indicated that parental reminiscing is associated with preschoolers' recognition memory performance at both time points, but not all reminiscing components equally influence children's performance. Specifically, parents' concretisations and metamemory talk were found to impact children's memory. The identification of these components

provided insights for exploring the processes underlying the reminiscing-memory influence (in-depth encoding of information, binding processes, and metacognition).

Sweatman, H., Lewis-de Los Angeles, C. P., Zhang, J., de Los Angeles, C., Ofen, N., Gabrieli, J. D., & Chai, X. J. (2023). [Development of the neural correlates of recollection](#). *Cerebral Cortex*, 33(10), 6028–6037. DOI:10.1093/cercor/bhac481

Recollection of past events has been associated with the core recollection network comprising the posterior medial temporal lobe and parietal regions, as well as the medial prefrontal cortex (mPFC). The development of the brain basis for recollection is understudied. In a sample of adults ($n = 22$; 18–25 years) and children ($n = 23$; 9–13 years), the present study aimed to address this knowledge gap using a cued recall paradigm, known to elicit recollection experience. Successful recall was associated with activations in regions of the core recollection network and frontoparietal network. Adults exhibited greater successful recall activations compared with children in the precuneus and right angular gyrus. In contrast, similar levels of successful recall activations were observed in both age groups in the mPFC. Group differences were also seen in the hippocampus and lateral frontal regions. These findings suggest that the engagement of the mPFC in episodic retrieval may be relatively early maturing, whereas the contribution to episodic retrieval of more posterior regions such as the precuneus and angular gyrus undergoes more protracted maturation.

Canada, K. L., Hancock, G. R., & Riggins, T. (2022). [Developmental changes in episodic memory across early- to mid-childhood: Insights from a latent longitudinal approach](#). *Memory*, 30(3), 248–261. DOI:10.1080/09658211.2021.2006233

Episodic memory is a cornerstone ability that allows one to recall past events and the spatiotemporal context in which they occur. In an effort to characterize the development of this critical ability, many different tasks have been used independently to assess age-

related variations in episodic memory. However, performance on memory tasks is multiply determined, and the extent to which different tasks with varying features relate to each other and represent episodic memory as a latent cognitive construct across childhood is unclear. The present study sought to address this question by exploring the feasibility of using four different laboratory-based tasks to characterize changes in episodic memory ability during early- to mid-childhood in 200 typically developing children (4 to 8 years). Using longitudinal data and a structural equation modeling framework, results suggest that multiple tests of episodic memory can be utilized to indicate a comparable latent construct of episodic memory ability over this period of development, and that this ability improves consistently between 4 to 8 years. Overall, results highlight that episodic memory measured as a construct increases at a similar rate over early- to mid-childhood and demonstrate the benefits of using multiple laboratory tasks to characterize developmental changes in episodic memory.

Krøjgaard, P., Sonne, T., Kingo, O. S., & Berntsen, D. (2022). Spontaneous verbal recall: A new look at the mechanisms involved in episodic memory retrieval in young children. *Developmental Review, 66*, 101050. DOI:10.1016/j.dr.2022.101050

Research on event memory in early childhood is predominantly based on asking direct questions to the children. To respond to questions concerning past events, children will have to engage in strategic retrieval involving a deliberate and cognitively demanding search process. Hence, strategic retrieval has become a proxy for retrieval in general which is assumed to depend on the involvement of prefrontal cortex. However, spontaneous retrieval is an important, yet hitherto largely overlooked, alternative mode of retrieval that involves less cognitive effort. Spontaneous retrieval is based on simple associations often triggered by distinct cues in the context, and as such neither a result of questions asked nor of deliberate search strategies. Although most parents are likely to have experienced their children having spontaneous recollections, and even though involuntary memories—the ‘adult’ equivalent to spontaneous recall—have been studied

extensively, surprisingly little is known from a scientific perspective about young children's spontaneous memories. However, recently we have seen an upsurge in research on spontaneous memories in young children. We review recent evidence suggesting that (a) the same memories for past events can be accessed by different retrieval mechanisms, and (b) that spontaneous retrieval (in contrast to strategic) does not necessarily become less effective as we investigate younger individuals. These findings suggest that that spontaneous retrieval may be an ontogenetic forerunner of strategic retrieval of past events and thus an important component to a more complete understanding of the development of memory for past events.

McMakin, D. L., Kimbler, A., Tustison, N. J., Pettit, J. W., & Mattfeld, A. T. (2022). [Negative overgeneralization is associated with anxiety and mechanisms of pattern completion in peripubertal youth](#). *Social Cognitive and Affective Neuroscience*, 17(2), 231–240. DOI:10.1093/scan/nsab089

This study examines neural mechanisms of negative overgeneralization, the increased likelihood of generalizing negative information, in peri-puberty. Theories suggest that weak pattern separation [overlapping representations are made distinct, indexed by dentate gyrus/ cornu ammonis (CA)3 hippocampal subfield activation] underlies negative overgeneralization. We alternatively propose that neuro-maturational changes that favor pattern completion (cues reinstate stored representations, indexed by CA1 activation) are modulated by circuitry involved in emotional responding [amygdala, medial prefrontal cortices (mPFC)] to drive negative overgeneralization. Youth ($n = 34$, 9–14 years) recruited from community and clinic settings participated in an emotional mnemonic similarity task while undergoing magnetic resonance imaging. At study, participants indicated the valence of images; at test, participants made recognition memory judgments. Critical lure stimuli, which were similar to images at study, were presented at test, and errors ('false alarms') to negative relative to neutral stimuli reflected negative overgeneralization. Negative overgeneralization was related to greater

and more similar patterns of activation in CA1 and both dorsal mPFC (dmPFC) and ventral mPFC (vmPFC) for negative relative to neutral stimuli. At study, amygdala exhibited greater functional coupling with CA1 and dmPFC during negative items that were later generalized. Negative overgeneralization is rooted in amygdala and mPFC modulation at encoding and pattern completion at retrieval.

Lokhandwala, S., & Spencer, R. M. (2021). [Slow wave sleep in naps supports episodic memories in early childhood](#). *Developmental Science*, 24(2), e13035.
DOI:10.1111/desc.13035

Naps have been shown to benefit visuospatial learning in early childhood. This benefit has been associated with sleep spindles during the nap. However, whether young children's naps and their accompanying physiology benefit other forms of declarative learning is unknown. Using a novel storybook task, we found performance in children (N = 22, mean age = 51.23 months) was better following a nap compared to performance following an equivalent interval spent awake. Moreover, performance remained better the following day if a nap followed learning. Change in post-nap performance was positively associated with the amount of time spent in slow wave sleep during the nap. This suggests that slow wave sleep in naps may support episodic memory consolidation in early childhood. Taken in conjunction with prior work, these results suggest that multiple features of brain physiology during naps may contribute to declarative memory processing in early childhood.

Salomão, S., Canário, C., & Cruz, O. (2021). [Narrative abilities and episodic memory in school-aged children followed by child protective services](#). *Children*, 8(10), 849.
DOI:10.3390/children8100849

The ability to narrate routine familiar events develops gradually during middle childhood, in increasingly higher levels of coherence and temporal cohesion. Improvements in

episodic memory are also observed, reflecting children's increasing ability to recall specific circumstances of past events and personal experiences. Even though several studies have evaluated children's narrative abilities and episodic memory, little information is available regarding the children exposed to risks that justify their referral to Child Protective Services (CPS). The current study analysed children's narrative abilities and episodic memory performance, according to the circumstances related to the referral to CPS. Event schema representation, narrative coherence, narrative temporal cohesion, and episodic memory concerning routine and specific personal events in family context were analysed in a sample of 56 school-aged children followed by the CPS in Portugal. Children referred to CPS due to disruptive behaviour presented higher episodic memory performance, compared to those exposed to domestic violence, neglect, and abuse. No significant differences were found between groups regarding narrative abilities related to familiar routine events. Results highlight the relevance of evaluating the adverse circumstances that lead to CPS referral, considering the levels of risk and danger involved, given its differential effects on children's episodic memory development.

Sipe, S. J., & Pathman, T. (2021). Memory at play: Examining relations between episodic and semantic memory in a children's museum. *Child Development*, 92(3), e270-e284. DOI:10.1111/cdev.13484

The relation between episodic and semantic memory was examined by testing how semantic knowledge influences children's episodic memory for events and their locations. Five-, six-, and seven-year-olds ($N = 87$) engaged in events in a children's museum designed as a town. Events were semantically congruent or incongruent with the spatial location (e.g., sorting mail at post office vs. grocery store). In addition to this experimental paradigm, a semantic interview assessed children's semantic knowledge about real-world locations. Accuracy in the experimental paradigm showed that children's semantic memory influenced memory for locations. Interviews revealed age-

related improvements in children's semantic knowledge. Regression analyses examined factors that best supported episodic memory. These results provide novel insights and highlight the utility of research in naturalistic settings.

Baker-Ward, L., Tyler, C. S., Coffman, J. L., Merritt, K. A., & Ornstein, P. A. (2020). Children's expectations and episodic reports over 12 weeks: Influences on memory for a specially designed pediatric examination. *Applied Cognitive Psychology, 34*(2), 330–342. DOI:10.1002/acp.3619

This investigation extended work on the linkage between knowledge and remembering by exploring the relation between generic and episodic memory representations. Thirty 6-year-old children experienced a mock physical examination with some expected components omitted and other unexpected actions included. Immediately and again after 12 weeks, the children reported the event, answered questions about what usually happens in an examination, and rated their confidence in aspects of their reports. They remembered more typical than atypical present components, that is, those included in the examination, and, over time, falsely reported more typical than atypical actions. The children produced intrusions of expected-but-omitted medical features at the delay but with lower confidence ratings than they provided for correctly recalled items. Performance on a source monitoring task was associated with aspects of the children's confidence ratings for intrusions. The findings provide evidence that the relation between episodic and generic representations is dynamic and suggest that the capacity to differentiate between them contributes to the development of accurate eyewitness memory.

Massol, S., Vantaggio, S., & Chainay, H. (2020). Emotional modulation of episodic memory in school-age children and adults: Emotional items and their associated contextual details. *Journal of Experimental Psychology: General*, 149(9), 1684-1703. DOI:10.1037/xge0000744

It is well established that emotional events are better remembered than neutral events. However, little is known about emotional enhancement of memory (EEM) in children. This is particularly the case when the main components of episodic memory are considered: core information (item memory) and its associated contextual details (associative memory). In 2 experiments, the present study tested whether the negative or positive emotional valence of words and pictures can influence item and associative memory. The contextual information to be associated with items was the gender of the voice pronouncing words and the type of frame in which pictures were displayed in Experiment 1, and the spatial location of stimuli in Experiment 2. Two groups of 8- to 11-year-old children (Experiment 1 $n = 32$ and Experiment 2 $n = 36$) performed the experiments and were compared to two groups of equivalent numbers of young adults. Participants completed an intentional-encoding task followed by immediate item recognition, associative recall and item recall tasks. Over the two experiments and in both groups, the results revealed (a) no EEM for words and pictures in recognition tasks, (b) EEM for words in item recall and associative recall tasks, and (c) mixed results for pictures, with an EEM being observed in item recall tasks but not systematically in associative recall tasks. By extending the results over two types of stimuli and their associated contextual information, our study provides new knowledge concerning the effect of emotions on episodic memory in children, which seems to be similar to that observed in young adults.

Riggins, T., Canada, K. L., & Botdorf, M. (2020). [Empirical evidence supporting neural contributions to episodic memory development in early childhood: Implications for childhood amnesia](#). *Child Development Perspectives*, 14(1), 41–48.
DOI:10.1111/cdep.12353

Memories for events that happen early in life are fragile—they are forgotten more quickly than expected based on typical adult rates of forgetting. Although numerous factors contribute to this phenomenon, data show that one major source of change is the protracted development of neural structures related to memory. Recent empirical studies in early childhood reveal that the development of specific subdivisions of the hippocampus (i.e., the dentate gyrus) is related directly to variations in memory. Yet, the hippocampus is only one region within a larger network supporting memory. Data from young children have also shown that activation of cortical regions during memory tasks and the functional connectivity between the hippocampus and cortex relate to memory during this period. Taken together, these results suggest that protracted neural development of the hippocampus, cortex, and connections between these regions contribute to the fragility of memories early in life and may ultimately contribute to childhood amnesia.

Sonne, T., Kingo, O. S., Berntsen, D., & Krøjgaard, P. (2020). Age affects strategic but not spontaneous recall in 35- and 46-month-old children. *Journal of Cognition and Development*, 21(4), 603–621. DOI:10.1080/15248372.2020.1797748

It is well documented that young children have difficulties with strategically remembering past events. Recent evidence on event memory in 35- and 46-month-old children suggests that strategic retrieval (yes/no questions) improves with age, whereas spontaneous retrieval is relatively unaffected by age. We here replicate and extend those findings (N = 124): First, a novel free (strategic) recall test was added to improve ecological validity. Second, the free recall procedure allowed us to make direct comparisons between spontaneous and free strategic recall relative to age. The free recall test revealed similar results in the standard yes/no questions (older children

outperformed younger). The direct comparison between spontaneous and free recall revealed a reliable interaction between age and retrieval mode: While the children's age did not affect spontaneous recall, the 46-month-olds outperformed the 35-month-olds on the free recall test. The results add to the accumulating evidence that spontaneous recall of events is an early developmental achievement.

Almeida, T. S., Lamb, M. E., & Weisblatt, E. J. (2019). [Effects of delay, question type, and socioemotional support on episodic memory retrieval by children with autism spectrum disorder](#). *Journal of Autism and Developmental Disorders*, 49(3), 1111–1130. DOI:10.1007/s10803-018-3815-3

Twenty-seven autistic children and 32 typically developing (TD) peers were questioned about an experienced event after a two-week delay and again after a two-month delay, using the Revised National Institute of Child Health and Human Development (NICHD) Investigative Interview Protocol. Recall prompts elicited more detailed and more accurate responses from children than recognition prompts. Autistic children recalled fewer correct narrative details than TD peers when questioned using open invitations, cued invitations, and directive questions. Nonetheless, they were as accurate as TD peers when responding to all types of prompts. The informativeness and accuracy of children's reports remained unchanged over time. Social support was beneficial when children were interviewed for the first time but not after a longer delay.

Asperholm, M., Högman, N., Rafi, J., & Herlitz, A. (2019). What did you do yesterday? A meta-analysis of sex differences in episodic memory. *Psychological Bulletin*, 45(8), 785–821. DOI:10.1037/bul0000197

To remember what one did yesterday is an example of an everyday episodic memory task, in which a female advantage has sometimes been reported. Here, we quantify the impact of sex on episodic memory performance sample-specific moderators. Analyses were based on 617 studies conducted between 1973 and 2013 with 1,233,921 participants.

A 5-level random-effects meta-analysis showed an overall female advantage in episodic memory ($g = 0.19$, 95% CI $[0.17, 0.21]$). The material to be remembered affected the magnitude of this advantage, with a female advantage for more verbal tasks, such as words, sentences, and prose ($g = 0.28$, 95% CI $[0.25, 0.30]$), nameable images ($g = 0.16$, 95% CI $[0.11, 0.22]$), and locations ($g = 0.16$, 95% CI $[0.11, 0.21]$), and a male advantage in more spatial tasks, such as abstract images ($g = -0.20$, 95% CI $[-0.35, -0.05]$) and routes ($g = -0.24$, 95% CI $[-0.35, -0.12]$). Furthermore, there was a female advantage for materials that cannot easily be placed along the verbal-spatial continuum, such as faces ($g = 0.26$, 95% CI $[0.20, 0.33]$), and odor, taste, and color ($g = 0.37$, 95% CI $[0.18, 0.55]$). These differences have remained stable since 1973. For verbal episodic memory tasks, differences were larger in Europe, North America, Oceania, and South America than in Asia, and smaller in childhood and old age than for other ages. Taken together, results suggest that men may use their spatial advantage in spatially demanding episodic memory tasks, whereas women do well in episodic memory tasks that are verbalizable and tasks that are neither verbal nor spatial, such as remembering faces and odors/tastes/colors.

Danby, M. C., Sharman, S. J., Brubacher, S. P., & Powell, M. B. (2019). The effects of episode similarity on children's reports of a repeated event. *Memory*, 27(4), 561-567.
DOI:10.1080/09658211.2018.1529798

Much research has tested techniques to improve children's reporting of episodes from a repeated event by interviewing children after they have experienced multiple episodes of a scripted event. However, these studies have not considered any effects of the similarity shared between event episodes on children's reports. In the current study, 5- to 9-year-olds experienced four episodes of a scripted repeated event that shared a high ($n = 76$) or low ($n = 76$) degree of similarity, and were subsequently interviewed about individual episodes. The proportional amount and accuracy of children's reported details were tallied. Children reported proportionally more details and more script deviations after

experiencing the high, compared to low, similarity event. Conversely, children were more accurate in their episodic reports when they experienced the low, compared to high, similarity event. The current findings have implications for the generalisability and comparability of past results across laboratory studies.

Wang, J. Y., Weber, F. D., Zinke, K., Inostroza, M., & Born, J. (2018). More effective consolidation of episodic long-term memory in children than adults—Unrelated to sleep. *Child Development, 89*(5), 1720–1734. DOI:10.1111/cdev.12839

Abilities to encode and remember events in their spatiotemporal context (episodic memory) rely on brain regions that mature late during childhood and are supported by sleep. We compared the temporal dynamics of episodic memory formation and the role of sleep in this process between 62 children (8–12 years) and 57 adults (18–37 years). Subjects recalled “what–where–when” memories after a short 1-hr retention interval or after a long 10.5-hr interval containing either nocturnal sleep or daytime wakefulness. Although children showed diminished recall of episodes after 1 hr, possibly resulting from inferior encoding, unlike adults, they showed no further decrease in recall after 10.5 hr. In both age groups, episodic memory benefitted from sleep. However, children’s more effective offline retention was unrelated to sleep.

Connolly, D. A., Gordon, H. M., Woiwod, D. M., & Price, H. L. (2016). What children recall about a repeated event when one instance is different from the others. *Developmental Psychology, 52*(7), 1038–1051. DOI:10.1037/dev0000137

This research examined whether a memorable and unexpected change (deviation details) presented during 1 instance of a repeated event facilitated children’s memory for that instance and whether a repeated event facilitated children’s memory for deviation details. In Experiments 1 and 2, 8-year-olds (N = 167) watched 1 or 4 live magic shows. Children were interviewed about the last or only show, which did or did not contain

deviation details. Children reported more accurate information about the instance when deviation details were presented than when they were not, but repeated experience did not improve memory for deviation details. In Experiment 3, children (N = 145; 6- to 11-year-olds) participated in 4 magic shows and answered questions about each one. Deviation details were manipulated such that they caused a change in how the show was experienced (continuous) or had no such effect on the rest of the show (discrete). Younger, but not older, children's recall of all instances improved when a continuous deviation occurred compared to no deviation. Implications for how deviation details are represented in memory, as well as forensic applications of the findings, are discussed.

Roberts, K. P., Brubacher, S. P., Drohan-Jennings, D., Glisic, U., Powell, M. B., & Friedman, W. J. (2015). [Developmental differences in the ability to provide temporal information about repeated events](#). *Applied Cognitive Psychology*, 29(3), 407–417.
DOI:10.1002/acp.3118

Children (n = 372) aged 4–8 years participated in one or four occurrences of a similar event and were interviewed 1 week later. Compared with 85% of children who participated once, less than 25% with repeated experience gave the exact number of times they participated, although all knew they participated more than once. Children with repeated experience were asked additional temporal questions, and there were clear developmental differences. Older children were more able than younger children to judge relative order and temporal position of the four occurrences. They also demonstrated improved temporal memory for the first and last relative to the middle occurrences, while younger children did so only for the first. This is the first systematic demonstration of children's memory for temporal information after a repeated event. We discuss implications for theories of temporal memory development and the practical implications of asking children to provide temporal information.

Brubacher, S. P., & La Rooy, D. (2014). Witness recall across repeated interviews in a case of repeated abuse. *Child Abuse & Neglect*, 38(2), 202–211.
DOI:10.1016/j.chiabu.2013.06.010

In this *illustrative* case study we examine the three forensic interviews of a girl who experienced repeated sexual abuse from ages 7 to 11. She disclosed the abuse after watching a serialized television show that contained a storyline similar to her own experience. This triggered an investigation that ended in successful prosecution of the offender. Because this case involved abuse that was repeated on a weekly basis for 4 years we thus investigated the degree to which the child's narrative reflected *specific episodes* or *generic accounts*, and both the interviewer's and child's attempts to elicit and provide, respectively, specific details across the 3 interviews collected in a 1 month period. Across the 3 interviews, the child's account was largely generic, yet on a number of occasions she provided details specific to individual incidents (*episodic leads*) that could have been probed further. As predicted: earlier interviews were characterized more by episodic than generic prompts and the reverse was true for the third interview; the child often responded using the same style of language (episodic or generic) as the interviewer; and open questions yielded narrative information. We discuss the importance of adopting children's words to specify occurrences, and the potential benefits of permitting generic recall in investigative interviews on children's ability to provide episodic leads. Despite the fact that the testimony was characterized by generic information about what usually happened, rather than specific episodic details about individual occurrences, this case resulted in successful prosecution.

Brubacher, S. P., Powell, M. B., & Roberts, K. P. (2014). [Recommendations for interviewing children about repeated experiences](#). *Psychology, Public Policy and Law*, 20(3), 325–335. DOI:10.1037/law0000011

For just over 2 decades, researchers have been conducting empirical studies devoted to understanding children's memory for, and ability to describe, individual occurrences of

events they have experienced repeatedly. This knowledge is critical because children making allegations of repeated abuse are required to provide details particular to an individual incident in many jurisdictions internationally. Much of this work has thus far been conducted in rigorously controlled analog settings, and empirical study of their generalizability to the context of field interviews is urgently needed. We outline in detail the empirical and theoretical foundations that underlie a set of specific suggestions that practitioners might consider when assisting children to report as much information as possible about individual occurrences of repeated abuse. Our recommendations cover both presubstantive (i.e., “practice”) and substantive phases of the interview. The particular challenges involved with describing individual incidents of repeated events are discussed, followed by evidence-based guidelines aimed at overcoming these difficulties. We highlight research that has included comparisons between lab and field data, and draw attention to areas of understanding that require further validation in forensic interviews. The inaugural guidelines we present are not meant as a replacement to existing best-practice interviews, but to serve as more detailed procedures in cases of repeated allegations.

Connolly, D. A., & Gordon, H. M. (2014). Can order of general and specific memory prompts help children to recall an instance of a repeated event that was different from the others?. *Psychology, Crime & Law*, 20(9), 852-864.
DOI:10.1080/1068316X.2014.885969

Does asking about the general event before asking about a specific instance help children to report details of a particular instance of a repeated event that was different from the others? Six- to eight-year-old children either experienced or heard stories about a magic show. An equal number of children had one, four, or six similar experiences. One week later, half of the children were asked to describe what *happens* during the magic shows and then what *happened* during the target experience and half were asked what *happened* followed by what *happens*. Following free recall, all children were asked cued

recall questions about the target instance. Memory reports were more complete when the general prompt was administered first than when it was administered second. Implications for the forensic interviewing of children who allege repeated abuse are discussed.

Brubacher, S. P., Malloy, L. C., Lamb, M. E., & Roberts, K. P. (2013). [How do interviewers and children discuss individual occurrences of alleged repeated abuse in forensic interviews?](#) *Applied Cognitive Psychology*, 27(4), 443–450.
DOI:10.1002/acp.2920

Police interviews (n = 97) with 5- to 13-year-olds alleging multiple incidents of sexual abuse were examined to determine how interviewers elicited and children recounted specific instances of abuse. Coders assessed the labels for individual occurrences that arose in interviews, recording who generated them, how they were used and other devices to aid particularisation such as the use of episodic and generic language. Interviewers used significantly more temporal labels than did children. With age, children were more likely to generate labels themselves, and most children generated at least one label. In 66% of the cases, interviewers ignored or replaced children's labels, and when they did so, children reported proportionately fewer episodic details. Children were highly responsive to the interviewers' language style. Results indicate that appropriately trained interviewers can help children of all ages to provide the specific details often necessary to ensure successful prosecution. Copyright © 2013 John Wiley & Sons, Ltd.

Hershkowitz, I., Lamb, M. E., Katz, C., & Malloy, L. C. (2013). Does enhanced rapport building alter the dynamics of investigative interviews with suspected victims of intra-familial abuse? *Journal of Police and Criminal Psychology*, 30(1), 6–14.
DOI:10.1007/s11896-013-9136-8

Professional guidelines for forensic interviews of children emphasize cognitive factors associated with memory retrieval and pay less attention to emotional factors that may

inhibit cooperativeness. Can an additional focus on rapport-building alter the dynamics of interviews with alleged victims of intra-familial abuse, who are often uncooperative? Transcripts of interviews with 199 suspected victims who made allegations when interviewed were coded to identify expressions of interviewer support and children's reluctance and uncooperativeness in the pre-substantive portions of the interviews. Half of the children were interviewed using a Protocol that emphasized enhanced rapport-building and non-suggestive support, the others using the standard NICHD Protocol. Although there were no group differences in the use of recall-based questions, interviews conducted using the rapport-focused Protocol contained more supportive comments and fewer unsupportive comments. Children interviewed in this way showed less reluctance and the level of reluctance was in turn associated with the number of forensically relevant details provided by the children. A focus on enhanced rapport-building thus altered interview dynamics without changing the appropriateness or forensic riskiness of the questions asked.

Scarf, D., Gross, J., Colombo, M., & Hayne, H. (2013). To have and to hold: Episodic memory in 3- and 4-year-old children. *Developmental Psychobiology*, 55(2), 125-132.
DOI:10.1002/dev.21004

Episodic memory endows us with the ability to reflect on our past and plan for our future. Most theorists argue that episodic memory emerges during the preschool period and that its emergence might herald the end of childhood amnesia. Here, we show that both 3- and 4-year-old children form episodic memories, but that 3-year-old children fail to retain those memories following a delay (Experiments 1 and 2). In contrast, 4-year-old children retained episodic memories over delays of 24 hr (Experiment 1) and 1 week (Experiment 3). This marked change in the retention of episodic memories between 3 and 4 years of age suggests that it is our ability to retain, rather than to form, an episodic memory that limits our ability to recall episodes from early childhood.

Brubacher, S. P., Roberts, K. P., & Powell, M. (2012). [Retrieval of episodic versus generic information: Does the order of recall affect the amount and accuracy of details reported by children about repeated events?](#) *Developmental Psychology*, 48(1), 111-122. DOI:10.1037/a0025864

Children (N = 157) 4 to 8 years old participated 1 time (single) or 4 times (repeated) in an interactive event. Across each condition, half were questioned a week later about the only or a specific occurrence of the event (depth first) and then about what usually happens. Half were prompted in the reverse order (breadth first). Children with repeated experience who first were asked about what usually happens reported more event-related information overall than those asked about an occurrence first. All children used episodic language when describing an occurrence; however, children with repeated-event experience used episodic language less often when describing what usually happens than did those with a single experience. Accuracy rates did not differ between conditions. Implications for theories of repeated-event memory are discussed.

Pyykkönen, P., & Järvikivi, J. (2012). [Children and situation models of multiple events.](#) *Developmental Psychology*, 48(2), 521-529. DOI:10.1037/a0025526

The present study demonstrates that children experience difficulties reaching the correct situation model of multiple events described in temporal sentences if the sentences encode language-external events in reverse chronological order. Importantly, the timing of the cue of how to organize these events is crucial: When temporal subordinate conjunctions (before/after) or converb constructions that carry information of how to organize the events were given sentence-medially, children experienced severe difficulties in arriving at the correct interpretation of event order. When this information was provided sentence-initially, children were better able to arrive at the correct situation model, even if it required them to decode the linguistic information reversely with respect to the actual language external events. This indicates that children even aged 8–12 still experience difficulties in arriving at the correct interpretation of the event structure, if the

cue of how to order the events is not given immediately when they start building the representation of the situation. This suggests that children's difficulties in comprehending sequential temporal events are caused by their inability to revise the representation of the current event structure at the level of the situation model.

Brubacher, S. P., Glisic, U., Roberts, K. P., & Powell, M. (2011). [Children's ability to recall unique aspects of one occurrence of a repeated event](#). *Applied Cognitive Psychology*, 25(3), 351–358. DOI:10.1002/acp.1696

Preschool and school-age children's memory and source monitoring were investigated by questioning them about one occurrence of a repeated lab event ($n = 39$). Each of the four occurrences had the same structure, but with varying alternatives for the specific activities and items presented. *Variable* details had a different alternative each time; *hi/lo* details presented the identical alternative three times and changed once. *New* details were present in one occurrence only and thus had no alternatives. Children more often confused *variable*, *lo* and *new* details across occurrences than *hi* details. The 4- to 5-year-old children were less accurate than 7- to 8-year-old children at attributing details to the correct occurrence when specifically asked. Younger children rarely recalled *new* details spontaneously, whereas 50% of the older children did and were above chance at attributing them to their correct occurrence. Results are discussed with reference to script theory, fuzzy-trace theory and the source-monitoring framework. Copyright © 2010 John Wiley & Sons, Ltd.

Brubacher, S. P., Roberts, K. P., & Powell, M. (2011). [Effects of practicing episodic versus scripted recall on children's subsequent narratives of a repeated event](#). *Psychology, Public Policy, and Law*, 17(2), 286–314. DOI:10.1037/a0022793

Children ($N = 240$) ages 5 to 8 years participated in 1 or 4 activity sessions involving interactive tasks (e.g., completing a puzzle); children with single-event participation

served as a control group. One week after their last/only session, all children were practiced in episodic recall of unrelated experiences by asking about either the (a) a single-experience event, (b) a specific instance of a repeated event, or (c) scripted recall of a series of events. Children were subsequently interviewed in an open-ended, nonsuggestive manner about 1 of the activity sessions; children with repeated experience were permitted to nominate the session they wanted to talk about. For children who participated 4 times, practice recalling a specific instance benefited 5- and 6-year-old children most; they reported more target details than other conditions and showed awareness of the repeated nature of the activity sessions. Accuracy levels were maintained regardless of practice type. Children with single-event experience were largely unaffected by manipulation of practice condition. Practical implications for interviews with child victim/witnesses and theoretical implications on children's ability to recall specific incidents of repeated events are discussed.

Feltis, B. B., Powell, M. B., & Roberts, K. P. (2011). [The effect of event repetition on the production of story grammar in children's event narratives](#). *Child Abuse & Neglect*, 35(3), 180-187. DOI:10.1016/j.chiabu.2010.11.004

This study examined the effect of event repetition on the amount and nature of story-grammar produced by children when recalling the event. Children aged 4 years (N = 50) and 7 years (N = 56) participated in either 1 or 6 occurrences of a highly similar event where details varied across the occurrences. Half the children in each age and event group recalled the last/single occurrence 5-6 days later and the other half recalled the last/single occurrence after 5-6 weeks (the final and single occurrence was the same). Children's free recall responses were classified according to the number and proportion of story-grammar elements (Stein & Glenn, 1979—setting, initiating event, internal response, plan, attempt, direct consequence, and resolution) as well as the prevalence of causal links between the individual story-grammar elements. More story-grammar detail and more links between individual story-grammar elements were reported about

the final compared to single occurrence. The amount of story-grammar increased with age and decreased over time. Further, an interaction was revealed such that the effect of retention interval on the production of story-grammar was negligible for older children who experienced the repeated event. Event repetition has a beneficial effect on the production of children's story-grammar content in situations where event details varied from occasion to occasion. This study highlights the importance of eliciting free recall when conducting evidential interviews with child witnesses about repeated events.

Ghetti, S., & Lee, J. (2011). Children's episodic memory. *Wiley Interdisciplinary Reviews: Cognitive Science*, 2(4), 365–373. DOI:10.1002/wcs.114

Episodic memory develops during childhood and adolescence. This trajectory depends on several underlying processes. In this article, we first discuss the development of the basic binding processes (e.g., the processes by which elements are bound together to form a memory episode) and control processes (e.g., reasoning and metamemory processes) involved in episodic remembering. Then, we discuss the role of these processes in false-memory formation. In the subsequent sections, we examine the neural substrates of the development of episodic memory. Finally, we discuss atypical development of episodic memory. As we proceed through the article, we suggest potential avenues for future research.

Rhodes, S. M., Murphy, D., & Hancock, P. J. (2011). Developmental changes in the engagement of episodic retrieval processes and their relationship with working memory during the period of middle childhood. *British Journal of Developmental Psychology*, 29(4), 865–882. DOI:10.1111/j.2044-835X.2010.02014.x

We examined the development of children's engagement of the episodic retrieval processes of recollection and familiarity and their relationship with working memory (WM). Ninety-six children (24 in four groups aged 8, 9, 10, and 11 years) and 24 adults

performed an episodic memory (EM) task involving old/new, remember/know (R/K), and source memory judgements and numerous WM tasks that assessed verbal and spatial components of WM and delayed short-term memory (STM). Developmental changes were observed in EM with younger children (8-, 9-, 10-year-olds) making fewer remember responses than 11-year-olds and adults while 11-year-olds did not differ from adults. Only children aged 10 years plus showed a relationship between EM and WM. EM was related to verbal executive WM in 10- and 11-year-old children suggesting that children at this stage use verbal strategies to aid EM. In contrast, EM was related to spatial executive WM in adults. The engagement of episodic retrieval processes appears to be selectively related to executive components of verbal and spatial WM, the pattern of which differs in children and adults.

Schneider, L., Price, H. L., Roberts, K. P., & Hedrick, A. M. (2011). [Children's episodic and generic reports of alleged abuse](#). *Applied Cognitive Psychology*, 25(6), 862-870. DOI:10.1002/acp.1759

With the present data, we explored the relations between the language of interviewer questions, children's reports, and case and child characteristics in forensic interviews. Results clearly indicated that the type of questions posed by interviewers—either probing generic or episodic features of an event—was related to the specificity of information reported by children. Further, interviewers appeared to adjust their questioning strategies based on the frequency of the alleged abuse. Children alleging single instances of abuse were asked more episodic questions than those alleging multiple abuses. In contrast, children alleging multiple incidents of abuse were asked a greater proportion of generic questions. Given that investigators often seek forensically relevant episodic information, it is recommended that training for investigators focus on recognition of prompt selection tendencies and developing strategies for posing non-suggestive, episodically focused questions.

Yang, T. X., Chan, R. C., & Shum, D. (2011). The development of prospective memory in typically developing children. *Neuropsychology*, 25(3), 342–352.
DOI:10.1037/a0022239

This study aimed to use specifically designed tasks to capture time-based, activity-based, and event-based prospective memory (PM) performance in typically developing school-age children. Method: Two PM tasks (Fishing Game & Happy Week) were used to examine the developmental patterns of PM in these children. Retrospective memory (RM) was also examined in these tasks. A total of 120 children aged between 7 and 12 years (10 girls and 10 boys in each age band) were recruited. Tests of working memory, inhibition, and IQ were also administered. Results: The age effect on PM accuracy was significant, with improvements identified between ages 7 to 8 and 10 to 11 years. For both tasks, performance on the time-based PM task was significantly poorer than that on the event-based PM task, which in turn was significantly poorer than that on the activity-based PM task. In terms of errors, results indicated that while errors associated with the PM component of the tasks decreased with age, errors associated with the RM component showed an inverted-U shape. The different patterns of errors suggest qualitative as well as quantitative differences in PM development in children. Finally, IQ, working memory, and inhibition were found to relate to PM when age was partialled out. Conclusions: Results of the study highlight the importance of contextual cues, such as activities and events, for prospective remembering in children. In addition, they have provided a general picture of PM development in school-age children and have implications for educators and parents.

Czernochowski, D., Mecklinger, A., & Johansson, M. (2009). Age-related changes in the control of episodic retrieval: An ERP study of recognition memory in children and adults. *Developmental Science*, 12(6), 1026–1040. DOI:10.1111/j.1467-7687.2009.00841.x

We examined developmental aspects of the ability to monitor the temporal context of an item's previous occurrence while event-related potentials (ERPs) were recorded. In a

continuous recognition task, children between 10 and 12 years and young adults watched a stream of pictures repeated with a lag of 10–15 intervening items and indicated recurrences. In a second run, these already familiar pictures were repeated as non-targets along with new pictures, while subjects were instructed to indicate only recurrences *within* the run. Young adults were able to maintain high performance levels in both tasks, whereas children had longer response times and committed a large number of false alarms to non-targets. ERPs in both age groups showed similar parietal old/new effects for target repetitions within runs. In addition, adults' ERPs showed similar old/new effects at frontal electrodes for repetitions and non-targets, presumably reflecting assessments of familiarity, whereas for children repeated relative to first presentations were associated with more negative-going waveforms at anterior frontal recording sites. Together, these results suggest a continuing maturation of the brain networks assessing novelty or familiarity. Recollection as indexed by parietal old/new effects appeared similar between young adults and children, but the development of controlled episodic retrieval, resulting in recollection of non-target information, appears to continue well into adolescence.

Guadagno, B. L., & Powell, M. B. (2009). A qualitative examination of police officers' questioning of children about repeated events. *Police Practice and Research: An International Journal*, 10(1), 61–73. DOI:10.1080/15614260802128468

For an offender to be convicted in relation to repeated child abuse, most jurisdictions require that each separate act be identified with reasonable precision with reference to time, place, or some other unique contextual detail (*S v. R*, 1989). The current study provided a qualitative examination of the way in which police officers assist children to identify and distinguish between occurrences of a repeated event. Field, as well as mock interviews (about an innocuous staged event) were examined, with child witnesses' ages ranging from 3 to 16 years. Overall, several problems in the questioning were highlighted. These included: over-reliance on specific questions, use of 'labels' for occurrences without

inquiring as to whether these were unique, and frequent shifting of the focus between occurrences. The implications of these findings are discussed.

Odegard, T. N., Cooper, C. M., Lampinen, J. M., Reyna, V. F., & Brainerd, C. J. (2009). Children's eyewitness memory for multiple real-life events. *Child Development*, 80(6), 1877-1890. DOI:10.1111/j.1467-8624.2009.01373.x

The present research examined the influence of prior knowledge on children's free recall, cued recall, recognition memory, and source memory judgments for a series of similar real-life events. Forty children (5–12 years old) attended 4 thematic birthday parties and were later interviewed about the events that transpired during the parties using the National Institute of Child Health and Human Development protocol. Of the events, half were generic in that they could have occurred at any birthday party, and half were specific to the theme of the party. Older children demonstrated more evidence of using gist-based information to guide their memory performance than did younger children. However, younger children were able to use global gist to inform their source memory judgments, qualifying past word-learning research.

Connolly, D. A., Price, H. L., Lavoie, J. A., & Gordon, H. M. (2008). Perceptions and predictors of children's credibility of a unique event and an instance of a repeated event. *Law and Human Behavior*, 32(1), 92-112. DOI:10.1007/s10979-006-9083-3

Perceptions of children's credibility were studied in two experiments wherein participants watched a videotape of a 4- to 5- or a 6- to 7-year old child report details of a play session that had been experienced once (single-event) or was the last in a series of four similar play sessions (repeat-event). The child's report was classified as high or low accurate. In Experiments 1 and 2, reports of repeat-event children were judged to be less believable on several measures. In Experiment 1, younger children were viewed as less credible than older children. In both experiments, neither undergraduates nor community

members correctly discriminated between high- and low-accurate reports. Content analysis in Study 3 revealed the relationship between age and event frequency and children's credibility ratings was mediated by the internal consistency of children's reports. Recent research on children's reports of instances of repeated events has identified several challenges facing children who report repeated abuse. These data bring to light another potential difficulty for these children.

Stokes, D. J., Dritschel, B. H., & Bekerian, D. A. (2008). Semantic and episodic autobiographical memory recall for memories not directly associated with childhood sexual abuse. *Journal of Family Violence, 23*(6), 429-435.
DOI:10.1007/s10896-008-9168-5

A pattern of overgeneral autobiographical memory recall for memories not directly associated with the abuse has been found in previous research. However, studies with a non psychiatric population are limited. In a non psychiatric student population sample, this study will use two methods of accessing autobiographical memory, The Children's Autobiographical Memory Inventory (CAMI) and the Autobiographical Memory Task (AMT). Contrary to the predictions, this study did not find that episodic recall to the AMT was less specific and episodic recall to the CAMI contained greater detail for both the abuse group and the trauma control group compared to a no trauma control group. Significant differences were found between groups on personal semantic recall with the CSA group reporting significantly lower semantic recall than the two control groups. These findings are relevant to therapeutic interventions as well as having potential implications for interviewing and obtaining statements to be used as evidence.

Hoerl, C. (2007). Episodic memory, autobiographical memory, narrative: On three key notions in current approaches to memory development. *Philosophical Psychology*, 20(5), 621–640. DOI:10.1080/09515080701537988

According to recent social interactionist accounts in developmental psychology, a child's learning to talk about the past with others plays a key role in memory development. Most accounts of this kind are centered on the theoretical notion of autobiographical memory and assume that socio-communicative interaction with others is important, in particular, in explaining the emergence of memories that have a particular type of connection to the self. Most of these accounts also construe autobiographical memory as a species of episodic memory, but its episodic character, as such, is not typically seen as falling within the remit of an explanation in social interactionist terms. I explore the idea that socio-communicative interaction centered on talk about the past might also have an important role to play, quite independently of considerations about the involvement of the self in memory, in accounting for the emergence of memories that are episodic in character, i.e., memories that involve the recollection of particular past events. In doing so, I also try to shed light on a distinctive role that talk about the past plays in socio-communicative interaction.

Powell, M., Roberts, K., & Guadagno, B. (2007). [Particularisation of child abuse offences: Common problems when questioning child witnesses](#). *Current Issues in Criminal Justice*, 19(1), 64–74. DOI:10.1080/10345329.2007.12036415

Price, H. L., & Connolly, D. A. (2007). Anxious and nonanxious children's recall of a repeated or unique event. *Journal of Experimental Child Psychology*, 98(2), 94–112. DOI:10.1016/j.jecp.2007.05.002

The current study examined 4- and 5-year-olds' memory for an event that was experienced once or was the first in a sequence of four similar events. The event was private swimming lessons for beginners that, because of natural variation in fear of water,

were experienced as stressful for some children and not stressful for others. Consistent with much previous research, there was evidence that repeat-event children remembered less than did single-event children. There was some evidence for a beneficial influence of stress on resistance to suggestions. No other effects of stress were found in either the single- or repeat-event children. Implications for the debate on the influence of stress on memory and for children's testimony are discussed.

Connolly, D. A., & Price, H. L. (2006). Children's suggestibility for an instance of a repeated event versus a unique event: The effect of degree of association between variable details. *Journal of Experimental Child Psychology, 93*(3), 207-223.
DOI:10.1016/j.jecp.2005.06.004

Are children who experience an event repeatedly more suggestible about an instance of the event than children who experience it once? Researchers have answered this question both in the affirmative and in the negative. In this study, we hypothesized that the degree of association between details that changed across instantiations of the event would help to explain the discrepancy. Preschoolers (4- and 5-year-olds) and first graders (6- and 7-year-olds) participated in either a single play session or four repeated play sessions, each of which contained 16 critical details. Across play sessions in the repeat-event condition, half of the critical details were associated and half were not associated. During a biasing interview 2 weeks later, children were misinformed about half of the critical details. The next day, children answered free and cued recall questions about the target play session. Among older children, repeat-event participants were more suggestible than single-event participants, especially for high-association details. Among younger children, repeat-event participants were more suggestible than single-event participants for low-association details. Consistent with some current theories of children's memory, older children were more suggestible than younger children.

Isaac, C. L., Cushway, D., & Jones, G. V. (2006). Is posttraumatic stress disorder associated with specific deficits in episodic memory?. *Clinical Psychology Review*, 26(8), 939–955. DOI:10.1016/j.cpr.2005.12.004

People with PTSD often report difficulties remembering day to day information unrelated to their traumatic episode. In addition, structural and functional imaging techniques have identified abnormalities in the brains of people with PTSD in regions known to be important for memory functioning. Nevertheless, studies investigating cognitive functioning in people with PTSD have reported widely varying results. The aim of this review is to investigate studies reporting performance on tests of episodic memory. Specifically, papers were examined in relation to the hypothesised memory functions of the frontal lobes, the hippocampus and the amygdala. It is concluded that while there is reasonable evidence of frontal lobe involvement, memory deficits caused by hippocampal involvement have been more difficult to detect. There are no published studies looking at the involvement of the amygdala although preliminary evidence suggests that people with PTSD do have memory deficits resulting from dysfunction of this structure. Reasons for the inconclusiveness of the results are discussed.

Melinder, A., Endestad, T. O. R., & Magnussen, S. (2006). Relations between episodic memory, suggestibility, theory of mind, and cognitive inhibition in the preschool child. *Scandinavian Journal of Psychology*, 47(6), 485–495. DOI:10.1111/j.1467-9450.2006.00542.x

The development of episodic memory, its relation to theory of mind (ToM), executive functions (e.g., cognitive inhibition), and to suggestibility was studied. Children (n= 115) between 3 and 6 years of age saw two versions of a video film and were tested for their memory of critical elements of the videos. Results indicated similar developmental trends for all memory measures, ToM, and inhibition, but ToM and inhibition were not associated with any memory measures. Correlations involving source memory was found in relation to specific questions, whereas inhibition and ToM were significantly correlated to resistance to suggestions. A regression analysis showed that age was the main

contributor to resistance to suggestions, to correct source monitoring, and to correct responses to specific questions. Inhibition was also a significant main predictor of resistance to suggestive questions, whereas the relative contribution of ToM was wiped out when an extended model was tested.

Sluzenski, J., Newcombe, N., & Ottinger, W. (2004). Changes in reality monitoring and episodic memory in early childhood. *Developmental Science*, 7(2), 225-245.
DOI:10.1111/j.1467-7687.2004.00341.x

The purposes of this research were to examine the developmental relation between reality monitoring and episodic memory, to link reality monitoring to autobiographical memory by using extended naturalistic events, and to examine prefrontal functioning as a potential contributor to development in reality monitoring and episodic memory. In Experiment 1, 4-year-olds were worse than 6- or 8-year-olds at reality monitoring after a week delay, despite the fact that they remembered more about real than imagined events and remembered different aspects of each. In Experiments 2 and 3, reality monitoring and episodic memory were evaluated for 4- and 6-year-olds immediately after the events occurred and, in Experiment 3, again after a week delay. Reality monitoring was at higher levels for both age groups, but age differences remained. These data suggest that preschoolers' difficulties with reality monitoring result from a combination of episodic memory deficits and strategic differences. In addition, correlation analyses more directly linked preschoolers' reality monitoring to episodic memory and supported the hypothesis that episodic memory development is related to prefrontal functioning.

Pearse, S. L., Powell, M. B., & Thomson, D. M. (2003). The effect of contextual cues on children's ability to remember an occurrence of a repeated event. *Legal and Criminological Psychology*, 8(1), 39–50. DOI:10.1348/135532503762871228

This study examined the usefulness of contextual cues in enhancing the accuracy of children's narrative accounts of an occurrence of a repeated event. Children aged 6 to 7 years took part in the same staged event four times whereby 16 target details varied in each occurrence (e.g. the colour of a cloak varied each time). Three days later, the children's free recall of the final occurrence was elicited. This occurrence was identified in one of two ways. Either it was identified via the temporal term 'last', or else the term 'last' was combined with a feature related to the environmental context or setting that was unique to the occurrence (i.e., the interviewer referred to a new object that was worn throughout the occurrence or a new person who carried out the event). For each condition, performance was compared to that of children who experienced the event only once. Children's memory of details specific to the target occurrence was better after the single than the repeated event. However for both event types, children who were given the contextual and temporal cue performed better than those who were given the temporal cue only. The benefit of using a contextual cue did not result in an increase in errors. Contextual cues (generated by an interviewer) can facilitate children's recall of an occurrence of an event. However, further research needs to determine whether this finding would generalize to a more practical situation where the child (rather than the interviewer) generates the cues.

Powell, M. B., & Thomson, D. M. (2003). Improving children's recall of an occurrence of a repeated event: Is it a matter of helping them to generate options?. *Law and Human Behavior*, 27(4), 365–383. DOI:10.1023/A:1024032932556

Three experiments were conducted to explore whether children's recall of an occurrence of a repeated event could be improved by encouraging them to consider various details that occurred across a series of events prior to making a judgement about which details

were included in the target (to-be-recalled) occurrence. Experiment 1 explored whether children's recall of the target occurrence was better after the interviewer presented all the items from the series prior to the child identifying the final item. Experiment 2 explored whether having the children generate all the items facilitated their subsequent recall of the target occurrence. Finally, Experiment 3 directly compared the effectiveness of the above 2 procedures. Regardless of the children's age, the retention interval, or the type of item, children's capacity to identify which details were included in a target occurrence was enhanced when they were initially provided with all the possible details from the series of events. However, without relying on the interviewer to generate the options, the benefit of the technique was directly contingent on the children's ability to generate content details; this was a distinct source of difficulty for the children.

Powell, M. B., Thomson, D. M., & Ceci, S. J. (2003). Children's memory of recurring events: Is the first event always the best remembered?. *Applied Cognitive Psychology*, 17(2), 127-146. DOI:10.1002/acp.864

Three experiments were conducted to examine the effect of age (4–5 and 6–8 years) and retention interval on children's ability to remember separate occurrences of a repeated event that varied in terms of content (items, dialog, etc.) Experiment 1 explored children's ability to recall the first versus last occurrence of a series of six events, at either one week or six weeks delay. Experiments 2 and 3 explored children's ability to identify the position of items in terms of their order of presentation within the series across two retention intervals. Overall, the results revealed clear age differences in children's performance. In general, the 6- to 8-year-old children performed better on all tasks than the 4- to 5-year-old children. Further, the older children showed relatively good memory of the first and last items compared to the middle items, although the last items were more likely to be forgotten or misplaced in the sequencing tasks over time than the first items. For the younger children, the patterns of results were sometimes but not always consistent with

that of the older children. The relevance and generalisability of these findings to the legal setting are discussed as well as directions for future research.

Connolly, D. A., & Lindsay, D. S. (2001). The influence of suggestions on children's reports of a unique experience versus an instance of a repeated experience. *Applied Cognitive Psychology, 15*(2), 205-223. DOI:10.1002/1099-0720(200103/04)15:2<205::AID-ACP698>3.0.CO;2-F

In Experiment 1 we compared the influence of misleading suggestions on 4-, 6-, and 8-year-olds' reports of details of an instance of a repeated experience versus a unique experience. For children who experienced the event repeatedly, some components remained constant across instances (fixed) whereas others varied (variable). Relative to children who had experienced the event only once, those who had experienced it repeatedly were less affected by suggestions regarding fixed details and more affected by suggestions regarding variable details. In Experiment 2 a misinformation effect was observed in responses to questions about variable details but not in responses to questions about fixed details. Copyright © 2001 John Wiley & Sons, Ltd.

Roberts, K. P., & Powell, M. B. (2001). Describing individual incidents of sexual abuse: A review of research on the effects of multiple sources of information on children's reports. *Child Abuse & Neglect, 25*(12), 1643-1659. DOI:10.1016/S0145-2134(01)00290-3

For successful prosecution of child sexual abuse, children are often required to provide reports about individual, alleged incidents. Although verbally or mentally rehearsing memory of an incident can strengthen memories, children's report of individual incidents can also be contaminated when they experience other events related to the individual incidents (e.g., informal interviews, dreams of the incident) and/or when they have similar, repeated experiences of an incident, as in cases of multiple abuse. Research is reviewed on the positive and negative effects of these related experiences on the length,

accuracy, and structure of children's reports of a particular incident. Children's memories of a particular incident can be strengthened when exposed to information that does not contradict what they have experienced, thus promoting accurate recall and resistance to false, suggestive influences. When the encountered information differs from children's experiences of the target incident, however, children can become confused between their experiences—they may remember the content but not the source of their experiences. We discuss the implications of this research for interviewing children in sexual abuse investigations and provide a set of research-based recommendations for investigative interviewers.

Tulving, E. (2001). [Episodic memory and common sense: How far apart?](#) *Philosophical Transactions of the Royal Society B: Biological Sciences*, 356(1413), 1505–1515.
DOI:10.1098/rstb.2001.0937

Research has revealed facts about human memory in general and episodic memory in particular that deviate from both common sense and previously accepted ideas. This paper discusses some of these deviations in light of the proceedings of The Royal Society's Discussion Meeting on episodic memory. Retrieval processes play a more critical role in memory than commonly assumed; people can remember events that never happened; and conscious thoughts about one's personal past can take two distinct forms—'autonoetic' remembering and 'noetic' knowing. The serial—dependent— independent (SPI) model of the relations among episodic, semantic and perceptual memory systems accounts for a number of puzzling phenomena, such as some amnesic patients' preserved recognition memory and their ability to learn new semantic facts, and holds that episodic remembering of perceptual information can occur only by virtue of its mediation through semantic memory. Although common sense endows many animals with the ability to remember their past experiences, as yet there is no evidence that humanlike episodic memory—defined in terms of subjective time, self, and autonoetic awareness—is present in any other species.

Farrar, M. J., & Boyer-Pennington, M. E. (1999). Remembering specific episodes of a scripted event. *Journal of Experimental Child Psychology*, 73(4), 266–288. DOI:10.1006/jecp.1999.2507

Children's memory for a specific episode of a repeated event was investigated in 2 experiments. In Experiment 1, eighty 4- and 7-year-olds experienced a standard novel event 1, 2, or 4 times, followed by an episodic event for those children who had multiple standard event experiences. The episodic event involved the addition of both schema-typical and schema-atypical activities to the standard event. Following a 1-week delay, children were asked to recall both event types. Four-year-olds were more confused than older children regarding when the new activities had been experienced, although experience improved memory for the schema-atypical activities. In contrast, 7-year-olds were able to establish more accurate memories for both the schema-typical and the schema-atypical changes. Experiment 2 demonstrated that 4-year-olds could, however, establish distinct memories for both types of changes when the standard event was simplified. The results are discussed in terms of the development of the relation between script memory and memory for a specific instance of an event.

Powell, M. B., Roberts, K. P., Ceci, S. J., & Hembrooke, H. (1999). The effects of repeated experience on children's suggestibility. *Developmental Psychology*, 35(6), 1462–1477. DOI:10.1037/0012-1649.35.6.1462

The effect of suggestive questions on 3- to 5-year old and 6- to 8-year old children's recall of the final occurrence of a repeated event was examined. The event included fixed (identical items) as well as variable items where a new instantiation represented the item in each occurrence of the series. Relative to reports of children who participated in a single occurrence, children's reports about fixed items of the repeated event were more accurate and less contaminated by false suggestions. For variable items, repeated experience led to a decline in memory of the specific occurrence; however, there was no increase in susceptibility to suggestions about details from nontarget occurrences.

Although younger children and children who were interviewed a while after the event were more suggestible, respectively, than older children and those interviewed soon after the event, repeated experience attenuated these effects.

Tulving, E., & Markowitsch, H. J. (1998). Episodic and declarative memory: Role of the hippocampus. *Hippocampus*, 8(3), 198–204. DOI:10.1002/(SICI)1098-1063(1998)8:3<198::AID-HIPO2>3.0.CO;2-G

The fact that medial temporal lobe structures, including the hippocampus, are critical for declarative memory is firmly established by now. The understanding of the role that these structures play in declarative memory, however, despite great efforts spent in the quest, has eluded investigators so far. Given the existing scenario, novel ideas that hold the promise of clarifying matters should be eagerly sought. One such idea was recently proposed by Vargha-Khadem and her colleagues (Science 1997; 277:376–380) on the basis of their study of three young people suffering from anterograde amnesia caused by early-onset hippocampal pathology. The idea is that the hippocampus is necessary for remembering ongoing life's experiences (episodic memory), but not necessary for the acquisition of factual knowledge (semantic memory). We discuss the reasons why this novel proposal makes good sense and why it and its ramifications should be vigorously pursued. We review and compare declarative and episodic theories of amnesia, and argue that the findings reported by Vargha-Khadem and her colleagues fit well into an episodic theory that retains components already publicized, and adds new ones suggested by the Vargha-Khadem et al. study. Existing components of this theory include the idea that acquisition of factual knowledge can occur independently of episodic memory, and the idea that in anterograde amnesia it is quite possible for episodic memory to be more severely impaired than semantic memory. We suggest a realignment of organization of memory such that declarative memory is defined in terms of features and properties that are common to both episodic and semantic memory. The organization of memory thus modified gives greater precision to the Vargha-Khadem et

al. neuroanatomical model in which declarative memory depends on perihippocampal cortical regions but not on the hippocampus, whereas episodic memory, which is separate from declarative memory, depends on the hippocampus. © 1998 Wiley-Liss, Inc.

Fivush, R. (1997). Event memory in early childhood. In N. Cowan (Ed.), *The development of memory in childhood* (pp. 139-161). Psychology Press.

Connolly, D. A. (1996). A developmental evaluation of frequency memory for actions presented in lists, scripts, and stories. *Memory*, 4(3), 243-264.
DOI:10.1080/096582196388942

In Experiment 1, adults estimated the frequency of typical and atypical actions presented in stories about scripted routines. Judgments of frequency were more accurate for atypical than for typical actions. In Experiments 2 and 3, children and adults estimated the frequency of atypical actions that were presented in lists, or embedded in stories that described activities that are scripted, or in stories that described unfamiliar activities. The results supported Hasher and Zacks's (1984) proposal that encoding of frequency information is automatic and invariant across a wide range of ages. However, both children's and adults' frequency estimates were influenced by manipulations that varied the difficulty of retrieving the representation of each occurrence of an event. The studies also provide novel support for the Script-Pointer-Plus-Tag theory of script memory.

Davidson, D., & Jergovic, D. (1996). Children's memory for atypical actions in script-based stories: An examination of the disruption effect. *Journal of Experimental Child Psychology*, 61(2), 134-152. DOI:10.1006/jecp.1996.0009

The disruption effect was examined in two recall experiments with 6- and 8-year-old children. The disruption effect refers to the finding that atypical actions that disrupt the goal or subgoals in a story are better recalled than atypical actions that are irrelevant to

the goals. However, in the first recall experiment, vivid irrelevant actions were better recalled than disruptions that were obstacles (i.e., blocked or impeded the flow of the story's actions in some way), but were not better recalled than disruptions that were distractions, or unexpected mishaps. In order to examine why the disruption effect was found for distractions but not for obstacles several factors were considered, including type of disruption, typicality ratings, and the potential consequences that could be generated from the disruptions. The results of a second recall experiment suggest that disruptions that lead to more potential consequences, particularly more severe consequences, are better recalled than other disruptions. The results of these experiments provide evidence that the disruption effect is more complex than originally believed and may be dependent upon both the type of irrelevant and disruptive atypical actions present in a story.

Hudson, J. A., Fivush, R., & Kuebli, J. (1992). Scripts and episodes: The development of event memory. *Applied Cognitive Psychology*, 6(6), 483–505.
DOI:10.1002/acp.2350060604

This article reviews recent research on how children organize general script knowledge and memories of specific episodes in memory. First, we discuss developmental issues concerning how children represent single episodes during the initial stages of script acquisition. Research indicates that even very young children quickly grasp the role of variation and invariance in recurring experiences. After only a few varying experiences, children come to expect more variation, but if the initial experiences are invariant they expect that all future occurrences will be the same. However, there are developmental differences in children's ability to 'sort out' a standard script from its variations if a single experience is different from all others during the initial four or five exposures with an event. In the second section we focus on how typical and atypical episodes are remembered after a script is established. Here, there are few developmental differences. Very young children up to adults are better able to recall deviation episodes than episodes that

closely follow a script. However, cueing plays an important role in remembering both routine and deviation episodes. In the last section we discuss explanations for developmental differences in children's memory for specific episodes during the initial phases of script acquisition and suggest areas for future research.

Farrar, M. J., & Goodman, G. S. (1990). Developmental differences in the relation between scripts and episodic memory: Do they exist?. In R. Fivush, & J. Hudson (Eds.), *Knowing and remembering in young children* (pp. 30-64). Cambridge University Press.

Myles-Worsley, M., Cromer, C. C., & Dodd, D. H. (1986). Children's preschool script reconstruction: Reliance on general knowledge as memory fades. *Developmental Psychology*, 22(1), 22-30. DOI:10.1037/0012-1649.22.1.22

Examined children's memory for preschool routines as a function of current grade level and successive modifications to the schoolday script. In Exp I, 50 preschoolers through 3rd graders who had attended the same preschool were tested with pictures for recognition of preschool script components (item memory) and memory for their sequence (order memory). In Exp II, 40 children in kindergarten through 3rd grade who had never attended preschool performed the same tasks. For preschool attendees, an evolving general schoolday script biased memory away from atypical activities unique to preschool and toward typical activities common across most grades. A comparison of preschool attendees and nonattendees showed that over time, item memory depended progressively less on experience-based or episodic memory and progressively more on general knowledge or semantic memory. Order memory was more experience-based and more durable than item memory over the 5-yr period. Results suggest that as memory fades, children reconstruct an old script by integrating remembered information with their growing general knowledge of similar events. (19 ref).