

relations uniquely contribute to recall performance of objects and actions.

**Conclusions:** Overall, the present study's findings suggest that prior event knowledge structures possessing causal and non-causal associative relations support new learning, especially compared to image pairs with no relations. Of interest, causality provides an additional boost to new learning above and beyond general associative relations. By focusing on the role of causality in event structures, our findings informed our understanding of how prior knowledge supports new learning. Considering that the effect of prior knowledge on new episodic learning is especially evident in older adults, since they more readily rely on their schematic knowledge, a future direction would entail investigating how causal links influence new memory formation in older adults.

**Categories:** Memory Functions/Amnesia

**Keyword 1:** memory: normal

**Keyword 2:** learning

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### 3 The Effect of Face and Body Expressions on the Process of Learning and Memory of Images Among Healthy Participants and Individuals with Traumatic Brain Injury (TBI): Examination Using Eye Movements

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**Objective:** Context-Dependent Effect (CDE) is a process by which restoring the original learning context enhances recall ability of the material being studied. One type of context is body expressions. Memory is one of the most common areas affected by Traumatic Brain Injury (TBI). However, although the performance of people with TBI is lower than that of healthy people in most memory-related parameters, both groups show evidence for CDE. We examined the CDE via behavioral and eye movement measures.

**Participants and Methods:** Twenty-four healthy individuals and 27 patients with moderate-to-

severe TBI participated in a memory task. Participants were exposed to pictures of people with neutral facial expression and neutral body expression and were asked to remember them for a subsequent memory test. In the testing session, they were asked to determine whether or not the person presented to them had appeared before, under two conditions: (1) where the context remains constant (facial expression and body expression remained neutral– the Repeat condition) (2) where the context changes (facial expression remained neutral and the body changed to angry or happy expression – the Re-pair condition).

**Results:** While memory of the individuals with TBI was poorer than that of the control group, both groups exhibited CDE, as this effect was stronger in the Repeat condition compared to the Re-pair angry condition. We found that participants spent most of their time looking at the head. In addition, in both groups, we found a CDE and a group effect with regard to the difference in Dwell Time, so DT toward faces in the Repeat condition was higher than toward faces in the Re-pair condition. Also, DT toward correctly recognized people was higher among the control group than the TBI group. This effect appeared in the study and test phases.

**Conclusions:** This study supports previous research showing evidence for CDE using body expression in the TBI group, like the control group, and extends our comprehension of the relationship between eye movements, memory, and context of facial and body expression.

**Categories:** Memory Functions/Amnesia

**Keyword 1:** brain injury

**Keyword 2:** memory: implicit

**Keyword 3:** traumatic brain injury

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### 4 Associations between prospective memory performance and cognitive domains

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**Objective:** Executive functions have been shown to predict prospective memory (PM) performance (Martin, Kliegel, & McDaniel,

2003). PM performance has also been associated with retrospective memory and working memory (Smith, 2003; McDaniel & Einstein, 2000). We investigated the association between PM performance and cognitive domains (executive functions, episodic memory, working memory) in adults at 40 years.

**Participants and Methods:** The participants ( $n = 470$ , age 40) were part of a longitudinal study including a cohort with a history of a birth risk (eg. asphyxia, low birth weight, hyperbilirubinemia) prospectively followed since birth and controls without birth risks. PM performance was assessed using the new Finnish Proper Prospective Memory Test (PROPS) offering a score for laboratory tasks and naturalistic tasks separately, for event-based PM (EBPM) and time-based PM (TBPM) performance, and a total score. Composite scores of three cognitive domains - executive functions, episodic memory, working memory - were formed by converting raw scores of nine cognitive test (e.g. the Wechsler subtests, the Stroop test, the Trail Making Test) to z scores, summed up and averaged. We calculated Spearman's correlation coefficient between the five PROPS scores and the composite scores of the cognitive domains.

**Results:** The episodic memory domain score correlated significantly with the PROPS laboratory tasks ( $r_s = .23$ ,  $p < .01$ ), naturalistic tasks, ( $r_s = .13$ ,  $p < .01$ ), the total score ( $r_s = .23$ ,  $p < .01$ ), EBPM ( $r_s = .25$ ,  $p < .01$ ), and TBPM ( $r_s = .15$ ,  $p < .01$ ). The executive functions domain score correlated with the PROPS laboratory tasks ( $r_s = .17$ ,  $p < .01$ ), the total score ( $r_s = .16$ ,  $p < .01$ ) and EBPM ( $r_s = .20$ ,  $p < .01$ ). The associations between the working memory domain and the PROPS test varied, in the laboratory setting ( $r_s = .14$ ,  $p < .01$ ), in the total score ( $r_s = .13$ ,  $p < .01$ ) and in EBPM ( $r_s = .21$ ,  $p < .01$ ). Furthermore, the composite score of the combined episodic memory and executive functions domains correlated significantly with the PROPS test in the laboratory setting ( $r_s = .25$ ,  $p < .01$ ), in the total score ( $r_s = .25$ ,  $p < .01$ ) and in EBPM ( $r_s = .28$ ,  $p < .01$ ).

**Conclusions:** The combination of the episodic memory domain and the executive functions domain was most associated with PM performance measured with the new Finnish Prospective Memory test (PROPS). Only the episodic memory domain was linked with the PROPS tasks in the naturalistic setting. Although the episodic memory domain was

more associated with PM performance, the results support the multidomain nature of PM functions.

**Categories:** Memory Functions/Amnesia

**Keyword 1:** memory: prospective

**Keyword 2:** cognitive functioning

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## 5 Longer Prospective Memory Delays Independently Predict Severity of Functional Decline in TBI

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**Objective:** Prospective memory (PM) tasks are common in everyday life and have been implicated in optimal daily functioning. However, less is known about the parameters of PM tasks that most influence functional decline, as well as the domains of everyday functioning most sensitive to PM impairment. The present study sought to examine these questions in individuals with traumatic brain injury (TBI).

**Participants and Methods:** Participants included 30 adults with chronic moderate-to-severe TBI who were at least one year removed from their injury (median [IQR] = 8.1 years [10.8]). Participants completed the Memory for Intentions Test (MIST), which is a 30-minute task that assesses time- and event-based PM with varying cue-intention delay length (2 versus 15 min) in the context of an ongoing task. Total scores were generated for each delay length and cue type. Additionally, participants completed a comprehensive neuropsychological battery, including assessments of processing speed, executive functions, attention, working memory, verbal fluency, and episodic learning and memory. Participants also completed questionnaires of self-reported cognitive and everyday functioning, including the Functional Behavior Profile (FBP), Prospective and Retrospective Memory Questionnaire (PRMQ) and a modified Lawton & Brody Instrumental Activities of Daily Living (IADL) Scale, which separately assessed 11 domains of everyday functioning.