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Objective: Following a traumatic brain injury (TBI), the majority of patients report difficulties with prospective memory (PM). However, there is not always a significant relationship between subjective and objective PM measures. Several variables may influence the degree of severity of perceived difficulties, including the severity of the injury and psychoemotional status. The aim of this study was to determine whether the severity of the TBI and anxiety and depressive symptoms were related to objective and subjective difficulties of PM.
Participants and Methods: 50 patients (mean age = 31,3 years old) with a TBI (20 mild and 30 moderate/severe) in the post-acute phase of recovery and 15 matched healthy control participants (mean age = 32,3 years old) were recruited. They completed inventories assessing the presence of anxiety (BAI) and depressive (BDI) symptoms and performed the *Ecological test of prospective memory* (TEMP), an objective measure of PM. The *Comprehensive Assessment of PM* (CAPM), a subjective measure of PM, was also filled out by participants and their relatives.
Results: In patients with moderate/severe TBI, significant correlations were found between the CAPM and the BDI (r =.601, *p*<.001) and the BAI (r =.507, *p*=.004). A negative correlation was also observed between the relatives' CAPM scores and the performance of the patients on the TEMP (r= -.374, *p*=.042). In patients with mild TBI, there was only a strong significant correlation between the CAPM and the BAI scores (r =.574, *p*=.008). However, no other correlation was significant between this group of patients and their relatives. Additionally, results on the TEMP were not significantly correlated with the CAMP completed by healthy control participants or their relatives. A linear regression conducted in the group of participants with TBI showed that BAI and BDI scores are the only significant predictors of the results on the CAPM (31% of the variance), while TBI severity is the only significant predictor of the results on the TEMP (37% of the variance).

Conclusions: The perception of PM difficulties in patients with a TBI does not seem to be related to their objective performance. Anxiety and depressive symptoms appear to influence their perception more than their objective performance. As suggested by their relatives, a decrease in self-awareness could explain the lack of relationship between subjective PM difficulties of patients with moderate/severe TBI and their objective performance. On the other hand, TBI severity is more strongly related to objective performance on PM tests. These results highlight the importance of using different measures to accurately assess PM and the various factors influencing this construct.

Categories: Acquired Brain Injury (TBI/Cerebrovascular Injury & Disease - Adult)
Keyword 1: memory: prospective
Keyword 2: traumatic brain injury
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21 Patterns of Neural Activation Associated with Judgments of Learning and Retrospective Confidence Judgments in Individuals with TBI

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Objective: Metacognition is defined as the ability to observe, monitor, and make judgments about one's own cognitive status. Judgments of learning (JOLs) and retrospective confidence judgments (RCJs) are two elements of metacognition related to memory, or meta-memory. JOLs refer to one's assumptions of their memory performance prior to completing a memory task, while RCJs describe one's subjective assessment of their memory performance after they have completed the task. Traumatic brain injury (TBI) is known to negatively impact general metacognitive functioning. However, the nuanced effects of TBI on constituent metacognitive subprocesses like JOLs and RCJs remain unclear. This study

aimed to characterize patterns of brain activity that occur when individuals with TBI render JOLs and RCJs during a meta-memory task. Differences between JOL- and RCJ-related patterns of activation were also explored.

Participants and Methods: 20 participants with moderate-to-severe TBI completed a metacognition task while undergoing functional magnetic resonance imaging (fMRI). Participants were first exposed to target slides with a set of polygons placed in specific locations, then asked to identify the target slides within a set of distractors. Before identifying the target slides, participants rated how well they believed they would remember the polygons' shape and location (JOL). After answering, they rated how confident they were that the answer they provided was correct (RCJ). First-level time series analyses of fMRI data were conducted for each participant using FSL FEAT. Higher-level random effects modeling was then performed to assess average activation across all participants. Finally, contrasts were applied to examine and compare JOL- and RCJ-specific patterns of activation.

Results: JOLs were associated with activation of the left frontal gyri, bilateral anterior cingulate, left insula, and right putamen ($p < 0.01$). RCJs were associated with activation of the bilateral frontal gyri, bilateral posterior and anterior cingulate, left insula, right putamen, and left thalamus ($p < 0.01$). Compared to RCJs, JOLs demonstrated greater left insula activation ($p < 0.01$). Compared to JOLs, RCJs demonstrated greater activation of the left superior frontal gyrus, bilateral middle frontal gyrus, and bilateral anterior cingulate ($p < 0.01$).

Conclusions: The areas of activation found in this study were consistent with structures previously identified in the broader metacognition literature. Overall, RCJs produced activity in a greater number of regions that was more bilaterally distributed compared to JOLs. Moreover, several regions that were active during both metacognitive subprocesses tended to be even more active during RCJs. A hypothesis for this observation suggests that, unlike JOLs, the additional involvement of reflecting on one's immediate memory of completing the task during RCJs may require greater recruitment of resources compared to JOLs. Importantly, these findings suggest that, while different metacognitive subprocesses may recruit similar brain circuitry, some subprocesses may require more potent and widespread activation of this circuitry than

others. As such, subprocesses with greater activational needs and complexity, such as RCJs, may be more susceptible to damage caused by TBI. Future research should aim to compare patterns of activation associated with certain metacognitive subprocesses between survivors of TBI and healthy controls.

Categories: Acquired Brain Injury (TBI/Cerebrovascular Injury & Disease - Adult)
Keyword 1: traumatic brain injury
Keyword 2: metacognition
Keyword 3: neuroimaging: functional
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22 Head Injury and Executive Functioning in the MIDUS Cohort

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Objective: It has been well established that sustaining a head injury can result in cognitive impairments, but there is little research on the impact of head injuries within middle-aged and older adult samples. Given the two most common samples for head trauma research are athletes and military service members, most of this literature presents findings of individuals under 35 years old. It is important to study head injury outcomes in older samples because greater lengths of time may have passed since the injuries occurred, which may influence findings. Additionally, research indicates that head injuries can lead to measurable executive functioning difficulties – a cognitive domain previously established as susceptible to cognitive ageing-related decline. Therefore, the current investigation seeks to assess the connection between history of head injury and executive functioning performance in middle-aged and older adult participants.

Participants and Methods: The current study examined 1150 participants from the 2nd wave of the Midlife in the United States cohort (MIDUS) and 801 participants of the MIDUS refresher panel. As a part of the biomarkers study, participants indicated how many head injuries they experienced (up to three) along with whether they were hospitalized and the year the