

Processing speed, cognitive reserve and paradigm mediate task switching performance across the life span

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Task switching paradigms have often been employed over the last 20 years to investigate how flexibility in goal-directed behavior is achieved. This ability has been found to be disrupted to some extent in older individuals. At the same time, the debate on the factors contributing to age-related cognitive decline has led to the formulation of theories linking the phenomenon either to specific domain impairments or to a common disrupted function. Among the latter explanations, Salthouse [1], has proposed speed of processing to be at the core of age-related differences in tasks tapping executive functions.

The aim of the present study was to assess the role of processing speed in a task switching paradigm, and whether life experiences can mediate cognitive decline as proposed by Stern [2]. Individuals (n = 97) ranging from 21 to 79 years took part to the study: along with a task switching paradigm with transparent cues for spatial/non –spatial rules, measures of cognitive integrity (MoCa), depression (BDI), speed of processing (Symbol-digit substitution test), and cognitive reserve (CRIq) were administered. Data were then used to build linear models distinguishing the role for each variable in predicting two indices of task switching performance, namely switching and mixing costs. Further, cue-to-target interval manipulations (100-1200 ms) allowed us to test possible differences due to temporal constrains.

The results indicate that speed of processing is indeed a highly significant predictor for both switching ($r = -.52$, $p < .001$) and mixing costs ($r = -.41$, $p < .001$): as predicted, its importance was higher when participants were provided with little time to prepare. Among the factors that were supposed to protect older individuals from cognitive decline, education was the only one to reach significance in predicting switching costs ($r = -.25$, $p = .01$). Finally, a pattern of increased switching costs and preserved comparable costs emerged when comparing older adults' performance with the rest of the sample. Even though previous literature usually reveals the opposite pattern (i.e. preserved switch cost, increased mixing costs), we believe that the current use of a transparent cue may be the key feature in explaining the differences, opening further questions about task switching methodology.

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2. Stern Y., (2009). Cognitive reserve. *Neuropsychologia* 47(10), 2015-28