
The brighter side of brain aging: about the relationship between cognitive decline, emotional reactivity, and physical fitness

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Abstract

Several studies demonstrated age-related differences in processing negative emotional information. Older participants recall and/or recognize fewer negative pictures than young adults, even when differences in memory performance are controlled. Moreover, older adults report less negative affect in everyday life than younger adults do. Differences in motivation as well as cumulative experiences and learning have been discussed as being at the basis of this age-related difference. However, whereas the link between brain aging and cognitive decline is clearly established, less is known about possible relationships between brain aging and emotional processing. We tested the hypothesis that brain decline might account for a reduced negativity in older adults. 82 participants between 62 and 79 years of age were examined with functional MRI during performance of a cognitive and an emotional task. Overall, our data support the hypothesis that a higher functional brain age is associated with reduced processing of negative emotional stimuli in older adults. In a next step, we performed a one-year physical intervention study (cardiovascular walking training, 3 times a week, 1 hour each). As expected, the intervention group, as compared to a control group, improved their performance in the cognitive tests. In addition, they revealed more youth-like activation patterns in the brain during the cognitive tasks. What is more, increased physical fitness and rejuvenation of brain activation patterns were related to more negative arousal. Overall, the data support our hypothesis that age-related brain changes have not only an impact on executive functioning but also on processing of emotional stimuli.

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