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Primary and secondary memory differences as a function of age and education

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Background

Age- and education-related changes in primary and secondary memory are well-documented in the literature. However, differences between primary and secondary memory measures as a function of age and education have received much less attention. Increased interindividual and intraindividual variability in cognitive test performance with advancing age has been documented in some studies (e.g., Christensen *et al.*, 1999), but discrepancies between secondary and primary memory measures have not been specifically examined. Knowledge about such discrepancies has important implications for neuropsychological inference. The present study investigates changes in differences between secondary and primary memory, and between delayed and immediate recall with age and education.

Materials and methods

A sample of 191 community-dwelling middle aged and elderly volunteers without known memory pathology or psychiatric disorder was administered primary and secondary memory tests from the Wechsler Memory Scale-II. The memory measures were z-transformed before entering the statistical analyses.

Results

Analyses of variance showed the expected age- and education-associated decline in the primary and secondary memory measures. A secondary-primary difference measure, computed by subtracting the primary memory measure from the secondary memory measure, showed no age-related differences and very small education-related differences in terms of effect size. Interestingly, the direction of the differences was opposite in the two subgroups formed when the sample was divided by education: The low education group had higher delayed recall than working memory, whereas the high education group had higher working memory than delayed recall. A delayed-immediate difference measure, computed by subtracting the immediate memory score from the delayed memory score, showed no age or education differences. Separate regression analyses using primary and secondary memory measures as dependent variables and age and education as continuous predictor variables confirmed the above findings. Although education and age accounted for significant and medium-large amounts of the variance in the primary and secondary memory measures, they accounted for a very small amount of the variance in the secondary-primary difference measure and were not significant predictors of the delayed-immediate difference measure.

Discussion

The small effects of age on the secondary-primary difference measure suggest that secondary memory is not selectively impaired in nonpathological ageing in the age range examined. Lack of an effect of age on the delayed-immediate difference measure further supports the above conclusion. The results are consistent with age-related changes in brain structures supporting primary memory (e.g., Head *et al.*, 2002). The findings are also discussed in terms of the mediating role of education in memory function as well as implications for clinical practice.

References

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