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Global versus domain-specific scores in the measurement of cognition: A study of the differences in correlations with relevant criteria

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Poster

Global versus domain-specific scores in the measurement of cognition: A study of the differences in correlations with relevant criteria

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Abstract

Background. The study of cognition is tackled from very heterogeneous approaches in the literature, some of them regarding the way it is measured. Often, cognition is conceptualized as a global ability and operationalized as a single score. However, researchers warn against this practice given that it can obscure subtle changes due to lack of sensitivity. Instead, using cognitive domains and deriving domain-specific scores is advised. In this study, we employed a global score of cognition as well as domain-specific scores of memory, orientation, visuospatial ability and executive functioning to assess differences in the relationship of these scores with theoretically-relevant correlates of cognitive ability: satisfaction with life (SwL), social activity participation (SA), intellectual activity participation (IA), limitation with activities of daily living (ADL), limitations with instrumental activities of daily living (IADL), quality of life (QoL), depression, number of chronic disorders and educational level. Methodology. We employed data from the 9th wave of the Survey of Health, Ageing and Retirement in Europe (SHARE). We selected participants aged at least 60 years who had responded to the cognitive battery included in the survey. The final sample included 55,569 individuals from 27 European countries and Israel. Individuals were mostly female (56.8%) and had an average age of 72.07 (SD = 7.97). We derived scores of memory, orientation, visuospatial ability and executive functioning, as well as a global score made up the sum of the four domain scores. Given the ordinal nature of some of the variables and the non-normal distribution of others, we employed Spearman's correlation coefficients to estimate the relationship between global and domain-specific cognitive scores and the criteria. Correlation contrasts were performed using Fisher's Z transformation. Results. Correlations between the domain-specific scores and the criteria differed significantly ($p < .05$) from the correlations between the global cognitive score and the criteria in almost all cases. The only exceptions were the correlation of memory and SA, the correlations of memory and orientation with ADL, and the correlation between memory and educational level. Except for the correlations of memory with SwL and QoL, the correlations of domain-specific scores and the criteria were smaller than those of the global score and the criteria. Discussion. Results from this study suggest that global cognitive scores are not equivalent to single domain scores and should not be used interchangeably. In some cases, the effect sizes of the correlations were moderate/small for the global score, while they dropped to negligible/small for domain scores. Therefore, research in the cognitive arena ought to reconsider the use of global or domain-specific scores to capture cognition, as they do not behave equivalently. Future research should examine potential differences in the behavior of these scores longitudinally, in order to assess their sensitivity to detect change over time. Moreover, contrasts between correlations of the different domain-specific scores and relevant criteria ought to also be studied.

Keywords

Memory, executive functioning, cognition, association.

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