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Number skills are maintained in healthy ageing.

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Summary: Numerical skills have been extensively studied in terms of their development and pathological decline, but whether they change in healthy ageing is not well known. Longer exposure to numbers and quantity-related problems may progressively refine numerical skills, similar to what happens to other cognitive abilities like verbal memory. Alternatively, number skills may be sensitive to ageing, reflecting either a decline of number processing itself or of more auxiliary cognitive abilities that are involved in number tasks. To distinguish between these possibilities we tested 30 older and 30 younger participants on an established numerosity discrimination task requiring to judge which of two sets of items is more numerous, and on arithmetical tasks. Older participants were remarkably accurate in performing arithmetical tasks although their numerosity discrimination (also known as number acuity) was impaired. Further analyses indicate that this impairment was limited to numerosity trials requiring inhibiting information incongruent to numerosity (e.g., fewer but larger items), and that this also correlated with poor inhibitory processes measured by standard tests. Therefore, rather than a numerical impairment, poor numerosity discrimination is likely to reflect elderly's impoverished inhibitory processes. This conclusion is supported by simulations with a recent neuro-computational model of numerosity perception, where only the specific degradation of inhibitory processes produced a pattern that closely resembled older participants' performance. Numeracy seems therefore resilient to ageing but it is influenced by the decline of inhibitory processes supporting number performance, consistent with the inhibitory deficit theory.

Classification: C30 F20 F30

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