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Reporting Summary

Nature Research wishes to improve the reproducibility of the work that we publish. This form provides structure for consistency and transparency in reporting. For further information on Nature Research policies, see our Editorial Policies and the Editorial Policy Checklist.

Statistics

For all statistical analyses, confirm that the following items are present in the figure legend, table legend, main text, or Methods section.

n/a	Confirmed	
☐	☒	The exact sample size (*n*) for each experimental group/condition, given as a discrete number and unit of measurement
☐	☒	A statement on whether measurements were taken from distinct samples or whether the same sample was measured repeatedly
☐	☒	The statistical test(s) used AND whether they are one- or two-sided *Only common tests should be described solely by name; describe more complex techniques in the Methods section.*
☐	☒	A description of all covariates tested
☐	☒	A description of any assumptions or corrections, such as tests of normality and adjustment for multiple comparisons
☐	☒	A full description of the statistical parameters including central tendency (e.g. means) or other basic estimates (e.g. regression coefficient) AND variation (e.g. standard deviation) or associated estimates of uncertainty (e.g. confidence intervals)
☐	☒	For null hypothesis testing, the test statistic (e.g. *F*, *t*, *r*) with confidence intervals, effect sizes, degrees of freedom and *P* value noted *Give P values as exact values whenever suitable.*
☐	☒	For Bayesian analysis, information on the choice of priors and Markov chain Monte Carlo settings
☐	☒	For hierarchical and complex designs, identification of the appropriate level for tests and full reporting of outcomes
☐	☒	Estimates of effect sizes (e.g. Cohen's *d*, Pearson's *r*), indicating how they were calculated

Our web collection on statistics for biologists contains articles on many of the points above.

Software and code

Policy information about availability of computer code

Data collection	E-Prime (version 2.0)
Data analysis	R (version 3.6.3), lme4 package (version 1.1-25), blme package (version 1.0-4). Our commented analysis code has been uploaded to Open Science Foundation, at https://osf.io/59er2/.

For manuscripts utilizing custom algorithms or software that are central to the research but not yet described in published literature, software must be made available to editors and reviewers. We strongly encourage code deposition in a community repository (e.g. GitHub). See the Nature Research guidelines for submitting code & software for further information.

Data

Policy information about availability of data

All manuscripts must include a data availability statement. This statement should provide the following information, where applicable:

- Accession codes, unique identifiers, or web links for publicly available datasets
- A list of figures that have associated raw data
- A description of any restrictions on data availability

The anonymized data (with accompanying documentation) has been uploaded to Open Science Foundation, at https://osf.io/59er2/.

Field-specific reporting

Please select the one below that is the best fit for your research. If you are not sure, read the appropriate sections before making your selection.

☐ Life sciences ☒ Behavioural & social sciences ☐ Ecological, evolutionary & environmental sciences

For a reference copy of the document with all sections, see nature.com/documents/nr-reporting-summary-flat.pdf

Behavioural & social sciences study design

All studies must disclose on these points even when the disclosure is negative.

Study description	This was a quantitative experimental study, employing a cross-sectional continuous age design.
Research sample	This study was part of the Social Environment and Biomarkers of Aging Study (SEBAS), conducted in Taiwan. SEBAS was in turn part of the Taiwan Longitudinal Study of Aging, which examines a nationally representative sample of middle-aged and older adults in Taiwan. During (only) the 2011 SEBAS collection wave, the Attention Network Test (ANT) reported here was included. It was given to all available consenting participants of the health examination component of SEBAS. The main analyses reported here were based on data from 702 participants (323 female), with a mean age of 67.69 years, and mean years of education of 7.76.
Sampling strategy	As indicated above, we tested all available consenting participants from the health examination component of SEBAS in the 2011 collection wave. The sample size was considered to provide adequate statistical power, as it was far larger than previous ANT studies that have reported age effects.
Data collection	The task was presented on a Windows XP laptop with E-Prime Version 2.0. Participants responded on a response box (SRBOX, Psychology Software Tools). Participants were tested in the presence of a single experimenter. Both the participants and the experimenters were blind to the aims of the study, in particular the examination of age effects on the efficiency of each attentional network. Informed consent was obtained from all participants.
Timing	Participants were tested between October 24 2011 and May 6 2012.
Data exclusions	Subject and trial exclusions proceeded in four steps. First, the ANT was given to all available consenting individuals of the health examination component of SEBAS, which excluded respondents if they lived in an institution, were seriously ill, or had some other health conditions that precluded examination. This yielded a sample size of 948 participants. Second, of these participants 92 were excluded owing to: participant identifier coding errors (3 participants), not performing the full task (18 participants), or a diagnosis of a neurological, psychiatric, learning, cognitive, or other brain-related disorder (71 participants). Third, an additional 154 participants were excluded because of low accuracy on the ANT (lower than 75%). The same pattern of significance in the findings was obtained in a sensitivity analysis with a more stringent inclusion criterion of at least 90% accuracy (213 participants excluded, rather than 154), as well as in another sensitivity analysis with a more lenient inclusion criterion of at least 50% accuracy (122 participants excluded). Fourth, prior to analyses, trials with timeouts (1.08% of all trials), presses of inappropriate response box buttons (0.02%), and incorrect responses (1.62%) were excluded. Extremely fast responses (below 100ms) were discarded (0.009% of the remaining data) because they are likely to constitute 'short outliers'. Responses to double cue trials were additionally excluded, owing to their redundancy with central cue trials; this enabled the calculation of the alerting and orienting effects within a single statistical model by comparing no cue and spatial cue trials against the same baseline (central cue trials). A sensitivity analysis including both central and double cue trials yielded the same pattern of results.
Non-participation	18 of the 948 participants did not complete the task (see just above).
Randomization	Participants were not allocated into experimental groups.

Reporting for specific materials, systems and methods

We require information from authors about some types of materials, experimental systems and methods used in many studies. Here, indicate whether each material, system or method listed is relevant to your study. If you are not sure if a list item applies to your research, read the appropriate section before selecting a response.

Materials & experimental systems

n/a	Involved in the study
☒	☐ Antibodies
☒	☐ Eukaryotic cell lines
☒	☐ Palaeontology and archaeology
☒	☐ Animals and other organisms
☐	☒ Human research participants
☒	☐ Clinical data
☒	☐ Dual use research of concern

Methods

n/a	Involved in the study
☒	☐ ChIP-seq
☒	☐ Flow cytometry
☒	☐ MRI-based neuroimaging

Human research participants

Policy information about studies involving human research participants

Population characteristics	See above for age, sex, and education population characteristics. In order to control for the possible confounding effects of sex and education, both of which were significantly associated with age, these variables were included as covariates in the main analysis; the same pattern of results was obtained in a sensitivity analysis without these covariates included.
Recruitment	We tested all available consenting participants from the health examination component of SEBAS in the 2011 collection wave; see above. The pattern of results does not appear to be explained by survivor effects or the self-selection of fitter adults in old age; see second paragraph of Discussion.
Ethics oversight	This study complied with all relevant ethical regulations, and was approved by the Institutional Review Boards at Georgetown University, Princeton University, and the Ministry of Health in Taiwan.

Note that full information on the approval of the study protocol must also be provided in the manuscript.