Study 1 Participant record (in-person study, part of wider project)

Applied to participate:
N = 82

*Excluded prior to participation:
N = 38

Participants included:
Young Adults (YA): N = 24
Older adults (OA): N = 24

***Completed both sessions:
Young Adults (YA): N = 22
Older adults (OA): N = 22

**Excluded following participation:
N = 4

Analysed:
Young Adults (YA): N =21
Older adults (OA): N =19
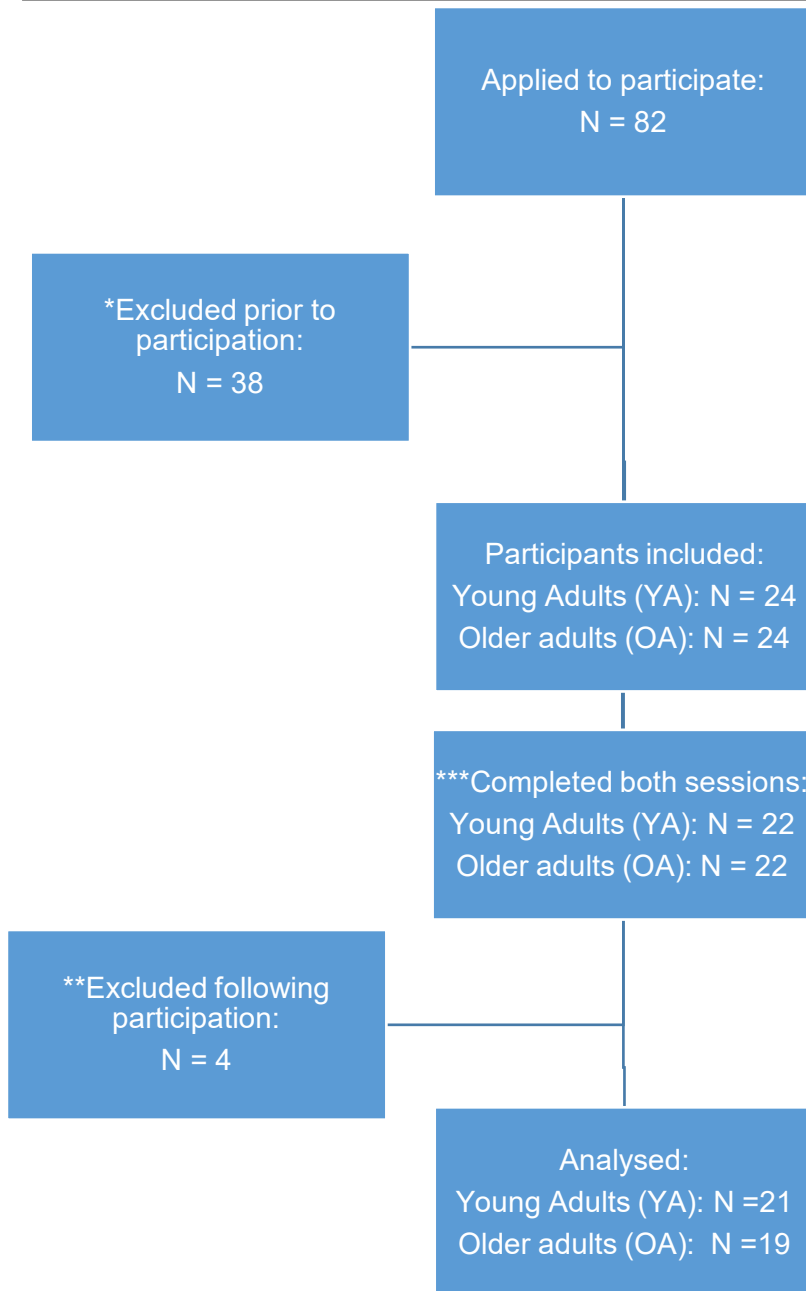
*REASONS FOR EXCLUSION:

Left-handed(n=1), retrained to be right-handed (n=2), adverse childhood experience (e.g. abuse) (n=7), mental health diagnosis (n=7), taking medications that affect central nervous system (n=11), neurological condition (n=9), medical condition (n=1).
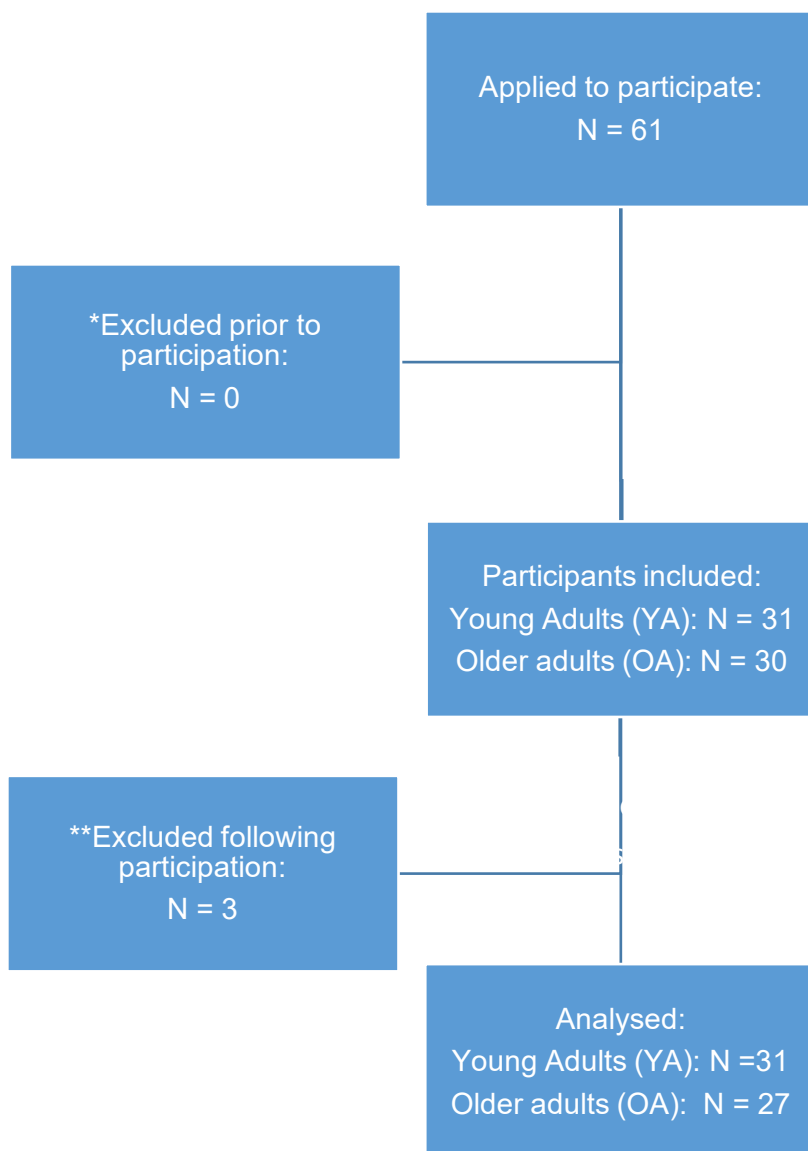
**REASONS FOR EXCLUSION:

Poor cognitive task performance due to response confusion (e.g. pressed spacebar continuously) (n=4).

***ATTRITION:

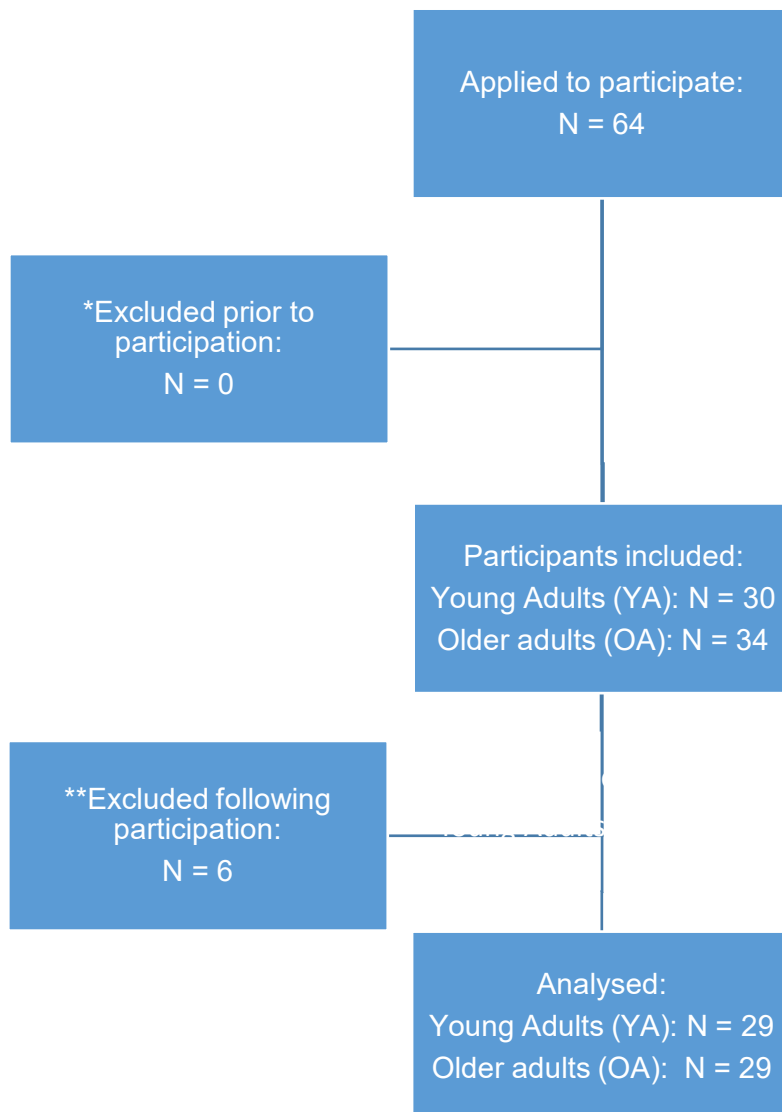4 participants did not attend session 2 because of enforced Covid19 lock-down (March 2020).

Study 2A Participant record (online only study, part of a wider project)

Applied to participate:
N = 61

*Excluded prior to participation:
N = 0

Participants included:
Young Adults (YA): N = 31
Older adults (OA): N = 30

**Excluded following participation:
N = 3

Analysed:
Young Adults (YA): N =31
Older adults (OA): N = 27

**REASONS FOR EXCLUSION:

Consumed alcohol within 12 hours of taking part in study (n=2); medications that cause drowsiness (n=1).

Study 2B Participant record (online only study, part of a wider project)

Applied to participate:
N = 64

*Excluded prior to participation:
N = 0

Participants included:
Young Adults (YA): N = 30
Older adults (OA): N = 34

**Excluded following participation:
N = 6

Analysed:
Young Adults (YA): N = 29
Older adults (OA): N = 29

**REASONS FOR EXCLUSION:

Consumed alcohol within 12 hours of taking part in study (n=3); poor cognitive performance due to response confusion (n=3).

S2 Table. Age Median and IQR values for Young and Older Adult participants by study

Studies	Median (IQR)	
	Young Adults	Older Adults
Study 1	19 (19-22)	69 (64-73)
Study 2A	29 (25-32)	63 (61-67)
Study 2B	29 (24-31.5)	64 (61-65)

S3 Appendix 2. Additional tasks administered during the study (description and results)

Brief Resilience Scale

We wanted to extend Marshall's study protocol by adding resilience as a factor to enhance our understanding of how cumulative stress might affect cognition, given participants' ability to recover from stressful events. To this end, we administered the Brief Resilience Scale (BRS) [65]. The BRS has good internal consistency (Cronbach α <.95 > .70) and test-retest validity (interclass correlation coefficient .69 to .62) with a range of populations [e.g. 66, 67] and was found to be well-suited to stress-related contexts [68]. Participants were asked to self-report the extent to which they agreed with 6 statements on a scale of 1 ('Strongly Disagree') to 5 ('Strongly Agree'). Three of the statements were worded positively (items 1,3,5) and 3 negatively (items 2,4,6). Scores were derived by reverse-scoring items 2, 4 and 6 and then calculating the mean of all items. A higher mean score indicates greater resilience; previous research has shown that the BRS is negatively associated with physical symptoms and negative affect (e.g. irritability and distress) [65].

Subjective Sleep Quality

We also added the Pittsburgh Sleep Quality Index (PSQI) [69] to the study protocol to assess sleep quality, asking participants to report their sleep quality over the past month. Sleep quality has been consistently linked to variability in cognitive performance, stress, anxiety and illness [69-74]. Individual items in the PSQI yielded a Cronbach α of 0.83, indicating a high degree of internal consistency. Test-retest reliability revealed coefficient of .85 and there was good discriminant validity between clinical (depressed, disorders initiating and maintaining sleep, disorders of excessive somnolence) and control groups (p < .001). We used only questions 5 and 6 to keep the experiment short to reduce fatigue. Both questions were rated on a 4-point scale (score range: 0 to 3). Question 5a, in this study,

provided an index for 'sleep latency' and was rated as: 'Not during the past month' = 0 to 'Three or more times a week' = 3. Question 5 b-j comprises 10 questions assessing 'sleep disturbances' rated as per Q5a above. These values were summed for each participant. Summed totals were grouped into one of 4 brackets: 0; 1-9; 10-18; or 19-27, then recoded as a score of 0, 1, 2 or 3, respectively. Question 6 is a single question measuring 'subjective sleep quality' rated from 'Very good' = 0 to 'Very bad' = 3.

A global score, which had a score range of 0 – 9, was computed by summing the 3 aforementioned components, namely 'sleep latency', 'sleep disturbances' and 'subjective sleep quality'. Note that these methods are adapted from the original PSQI which yields a global score of 0 – 21, based on 7 components.

Results

S3 Appendix Table 1. Descriptive statistics and p-values for self-reported resilience and sleep quality by age, by stress group for each study.

	Brief Resilience Scale				
	Young Adults		**Older Adults**		
	Low Stress[a] (n=11)	High Stress[a] (n=10)	Low Stress[a] (n=10)	High Stress[a] (n=9)	p
Study 1 (N=40)	3.58 (0.20)	3.87 (0.28)	3.90 (0.20)	3.80 (0.25)	≥0.401[b,c]
Study 2A (N=58)	3.33 (0.22)	3.61 (0.26)	3.76 (0.26)	3.27 (0.29)	≥0.242[b,c]
Study 2B (N=58)	2.99 (0.26)	3.18 (0.23)	3.87 (0.16)	3.76 (0.16)	≥0.562[b,c]

	Sleep Quality (summed components range: 0 - 9)				
	Young Adults		**Older Adults**		
	Low Stress[a] (n=11)	High Stress[a] (n=10)	Low Stress[a] (n=10)	High Stress[a] (n=9)	p
Study 1 (N=40)	3.18 (0.41)	2.6 (0.37)	2.4 (0.39)*	3.89 (0.46)*	≥0.025[b,c]
Study 2A (N=58)	2.25 (0.31)	2.87 (0.34)	2.5 (0.33)	3.54 (0.5)	≥0.091[b,c]
Study 2B (N=58)	2.60 (0.51)	3.14 (0.43)	2.53 (0.44)	3.50 (0.38)	≥0.116[b,c]

[a] Mean (SE).   Standard error obtained via BCa Bootstrap with 1000 samples.

[b] Independent samples t-test (low vs high stress) were performed by age group.

[c] Additional Mann-Whitney U test were performed with similar outcomes.

* significant at < 0.05

** significant at < 0.01

S4 Table. Percent correct and d-prime means, standard errors and univariate ANOVA F values by age group and stress group for the 3 replication studies.

		Young Adults	Older Adults	YA vs. OA	Univariate ANOVA F-values Low Stress vs. High Stress	Age Grp x Stress Grp
	Accuracy (% correct)	mean (SE)	mean (SE)	F	F	F
Study 1	Low Stress (n=21)	93.71 (0.81)	89.00 (1.98)	3.579	6.295**	0.026
	High Stress (n=19)	87.58 (3.21)	83.61 (2.79)			
Study 2A	Low Stress (n=30)	91.77 (1.78)	91.13 (1.37)	0.393	3.309	0.105
	High Stress (n=28)	88.61 (2.53)	86.60 (2.60)			
Study 2B	Low Stress (n=30)	90.72 (2.50)	89.83 (2.01)	0.963	0.309	1.960
	High Stress (n=28)	88.93 (2.52)	93.99 (0.88)			
	Accuracy (d-prime)	mean (SE)	mean (SE)	F	F	F
Study 1	Low Stress (n=21)	3.06 (0.11)	2.56 (0.2)	5.514*	4.990*	0.000
	High Stress (n=19)	2.58 (0.27)	2.07 (0.28)			
Study 2A	Low Stress (n=30)	2.96 (0.17)	2.79 (0.16)	1.290	2.790	0.102
	High Stress (n=28)	2.68 (0.23)	2.38 (0.26)			
Study 2B	Low Stress (n=30)	2.89 (0.21)	2.69 (0.19)	0.467	0.252	2.980
	High Stress (n=28)	2.66 (0.23)	3.11 (0.11)			

* significant at < 0.05 (two-tailed).

** significant at < 0.01 (two-tailed).

S5 Table. Frequency table of the total cumulative stress score for each participant in each study.

<div align="center">STUDY 1</div>

LESS total score (whole life)				*SRRS total score (whole life)*			
Total LESS score	Frequency	Percent	Cumulative Percent	Total SRRS score	Frequency	Percent	Cumulative Percent
120	1	4.8	4.8	489	1	5.3	5.3
345	1	4.8	9.5	628	1	5.3	10.5
363	1	4.8	14.3	697	1	5.3	15.8
389	1	4.8	19.0	751	1	5.3	21.1
477	1	4.8	23.8	753	1	5.3	26.3
507	1	4.8	28.6	809	1	5.3	31.6
518	1	4.8	33.3	817	1	5.3	36.8
574	1	4.8	38.1	861	1	5.3	42.1
587	1	4.8	42.9	885	1	5.3	47.4
592	2	9.5	52.4	913	1	5.3	52.6
606	1	4.8	57.1	919	1	5.3	57.9
616	1	4.8	61.9	925	2	10.5	68.4
631	1	4.8	66.7	977	1	5.3	73.7
633	1	4.8	71.4	1009	1	5.3	78.9
638	1	4.8	76.2	1014	1	5.3	84.2
641	1	4.8	81.0	1028	1	5.3	89.5
682	1	4.8	85.7	1062	1	5.3	94.7
729	1	4.8	90.5	1079	1	5.3	100.0
857	1	4.8	95.2	Total	19	100.0	
884	1	4.8	100.0				
Total	21	100.0					

STUDY 2A

Total LESS score	Frequency	Percent	Cumulative Percent	Total SRRS score	Frequency	Percent	Cumulative Percent
LESS total score (whole life)				*SRRS total score (whole life)*			
161	1	3.2	3.2	193	1	3.7	3.7
229	1	3.2	6.5	446	1	3.7	7.4
265	1	3.2	9.7	512	1	3.7	11.1
307	1	3.2	12.9	558	1	3.7	14.8
323	1	3.2	16.1	589	1	3.7	18.5
327	1	3.2	19.4	631	1	3.7	22.2
357	2	6.5	25.8	632	1	3.7	25.9
385	1	3.2	29.0	659	1	3.7	29.6
392	1	3.2	32.3	682	1	3.7	33.3
411	1	3.2	35.5	685	1	3.7	37.0
493	1	3.2	38.7	690	1	3.7	40.7
545	1	3.2	41.9	696	1	3.7	44.4
563	1	3.2	45.2	722	1	3.7	48.1
573	1	3.2	48.4	738	1	3.7	51.9
577	1	3.2	51.6	748	1	3.7	55.6
584	1	3.2	54.8	755	1	3.7	59.3
608	1	3.2	58.1	786	1	3.7	63.0
633	1	3.2	61.3	794	1	3.7	66.7
636	1	3.2	64.5	803	1	3.7	70.4
641	1	3.2	67.7	828	1	3.7	74.1
658	1	3.2	71.0	845	1	3.7	77.8
662	1	3.2	74.2	850	1	3.7	81.5
691	1	3.2	77.4	859	1	3.7	85.2
702	1	3.2	80.6	867	1	3.7	88.9
704	1	3.2	83.9	901	1	3.7	92.6
710	1	3.2	87.1	976	1	3.7	96.3
711	1	3.2	90.3	992	1	3.7	100.0
788	1	3.2	93.5	Total	27	100.0	
874	1	3.2	96.8				
951	1	3.2	100.0				
Total	31	100.0					

STUDY 2B

LESS total score (whole life)				SRRS total score (whole life)			
Total LESS score	Frequency	Percent	Cumulative Percent	Total SRRS score	Frequency	Percent	Cumulative Percent
223	1	3.4	3.4	308	1	3.4	3.4
273	1	3.4	6.9	473	1	3.4	6.9
289	1	3.4	10.3	553	1	3.4	10.3
291	1	3.4	13.8	576	1	3.4	13.8
318	1	3.4	17.2	590	1	3.4	17.2
327	1	3.4	20.7	627	1	3.4	20.7
334	1	3.4	24.1	683	1	3.4	24.1
362	1	3.4	27.6	686	1	3.4	27.6
382	1	3.4	31.0	700	1	3.4	31.0
392	1	3.4	34.5	712	1	3.4	34.5
408	1	3.4	37.9	715	1	3.4	37.9
409	1	3.4	41.4	738	1	3.4	41.4
423	1	3.4	44.8	760	1	3.4	44.8
435	1	3.4	48.3	763	1	3.4	48.3
516	1	3.4	51.7	766	1	3.4	51.7
540	1	3.4	55.2	771	1	3.4	55.2
547	1	3.4	58.6	796	1	3.4	58.6
585	1	3.4	62.1	798	1	3.4	62.1
595	1	3.4	65.5	801	1	3.4	65.5
614	1	3.4	69.0	806	1	3.4	69.0
623	1	3.4	72.4	845	1	3.4	72.4
651	1	3.4	75.9	849	1	3.4	75.9
733	1	3.4	79.3	850	1	3.4	79.3
768	1	3.4	82.8	861	1	3.4	82.8
795	1	3.4	86.2	873	1	3.4	86.2
833	1	3.4	89.7	922	1	3.4	89.7
847	1	3.4	93.1	952	1	3.4	93.1
861	1	3.4	96.6	956	1	3.4	96.6
894	1	3.4	100.0	972	1	3.4	100.0
Total	29	100.0		Total	29	100.0	

S6 Appendix 3

Workbook contains:

Power Analysis using G*Power [Faul, F., Erdfelder, E., Lang, A.-G.,

Traditional (frequentist) meta-analysis for 3 replication studies.

Forest Plots provide a visual representation.

Draper Plots are a useful complimentary visual representation.

Effect size breakdowns.

meta-analysis conducted with these R libraries:

```
library(dmetar)
library(meta)
```

Power Calculation using G*Power based on Marshall et al. (2015) age x stress group interaction effect.

G-power [reference: Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. Behavior research methods, 39(2), 175-191. doi:10.3758/BF03193146]
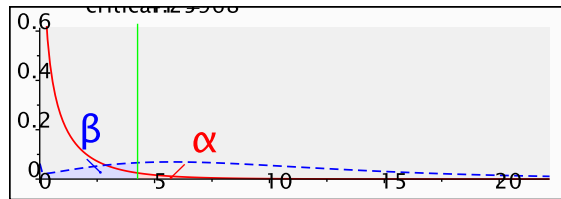
$(YA_{LS}-YA_{HS})-(OA_{LS}-OA_{HS})$

	MeanDiff	seMeanDiff
Marshall Study	-12.55	2.85

Sample Parameters

age group	stress group	n
Young adults	Low Stress	15
Young adults	High Stres	15
Older adults	Low Stress	15
Older adults	High Stres	15
N		60

Calculation input values:

Partial eta squared	0.234
Effect size:	0.55
Alpha:	0.05
Requested power:	0.80
Numerator df	1.00
Number of groups (cells)	4.00

Output given

power	0.99

Demoninator DF	24
Total Sample Size	28

Total sample required to detect an interaction effect at a power set to .80 = 28
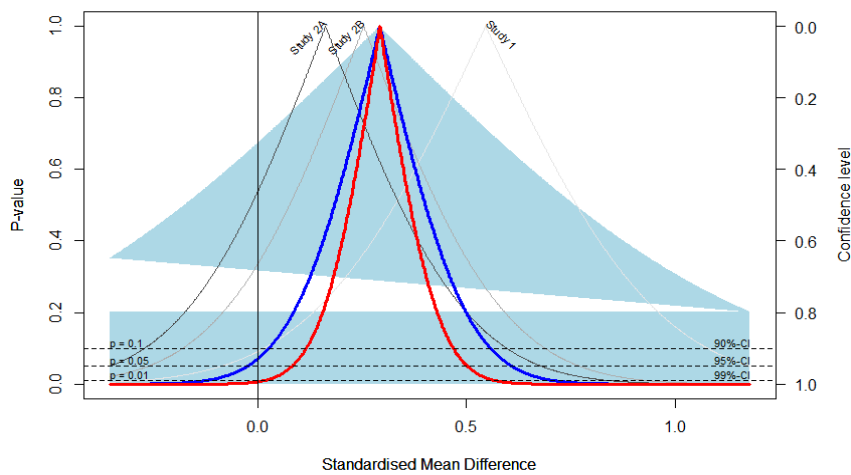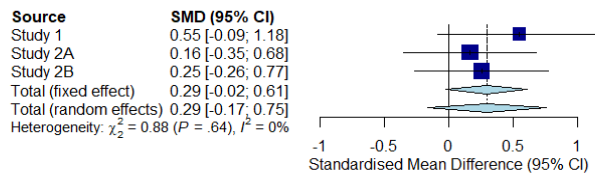
nBack 3 Studies overall age difference Percent Correct

Number of studies combined	k	3
Number of observations	N	156

	SMD	95%-CI lower	95%-CI upper	z|t	p-value
Common effect model	0.29	-0.02	0.61	1.81	0.070
Random effects model	0.29	-0.17	0.75	2.73	0.112

Quantifying heterogeneity:	value	95%-CI lower	95%-CI upper	Q	df	p-value
tau^2	0	0.00	1.4933	0.88	2	0.644
tau	0	0.00	1.222			
I^2	0.00%	0.00%	89.60%			
H	1	1.00	3.10			

Details on meta-analytical method:
- Inverse variance method
- Restricted maximum-likelihood estimator for tau^2
- Q-profile method for confidence interval of tau^2 and tau
- Hartung-Knapp adjustment for random effects model
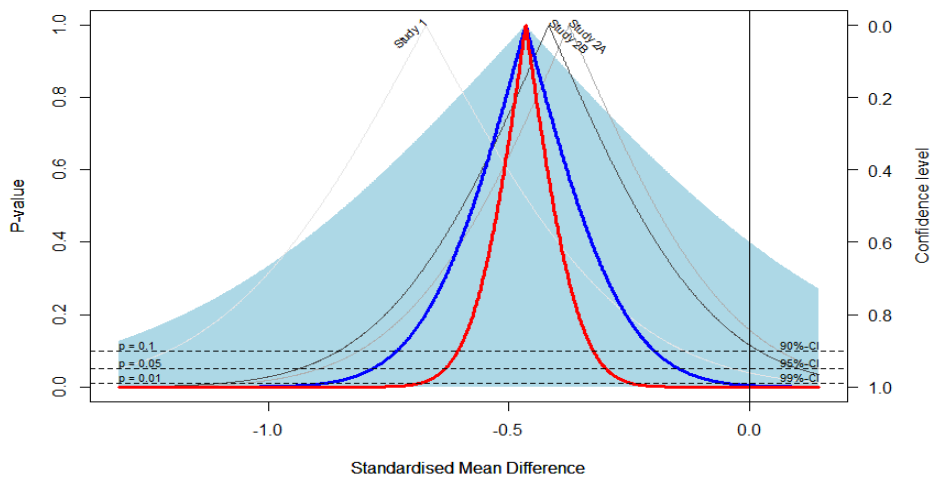- Hedges' g (bias corrected standardised mean difference; using exact

nBack 3 Studies overall age difference REACTION TIME

	k	3
Number of studies combined		
Number of observations	N	156

	SMD	95%-CI lower	95%-CI upper	z|t	p-value
Common effect model	-0.46	-0.78	-0.15	-2.86	0.004
Random effects model	-0.46	-0.83	-0.10	-5.43	0.032

Quantifying heterogeneity:	value	95%-CI lower	95%-CI upper	Q	df	p-value
tau^2	0.00	0.00	0.93	0.55	2	0.759
tau	0.00	0.00	0.96			
I^2	0.00%	0.00%	89.60%			
H	1.00	1.00	3.10			

Source	SMD (95% CI)
Study 1	-0.67 [-1.31; -0.03]
Study 2A	-0.37 [-0.90; 0.15]
Study 2B	-0.42 [-0.94; 0.10]
Total (fixed effect)	-0.46 [-0.78; -0.15]
Total (random effects)	-0.46 [-0.83; -0.10]

Heterogeneity: $\chi^2_2 = 0.55$ (P = .76), $I^2 = 0\%$

Standardised Mean Difference (95% CI)

P-value / Confidence level

Standardised Mean Difference

nBack 3 Studies overall stress difference Percent Correct

Number of studies combined	k	3
Number of observations	N	156

	SMD	95%-CI lower	95%-CI upper	z|t	p-value
Common effect model	0.31	-0.01	0.63	1.90	0.058
Random effects model	0.34	-0.82	1.51	1.27	0.333

Quantifying heterogeneity:	value	95%-CI lower	95%-CI upper	Q	df	p-value
tau^2	0.14	0.00	8.68	5.40	2	0.067
tau	0.37	0.00	2.95			
I^2	62.9%	0.0%	89.4%			
H	1.64	1.00	3.07			

Details on meta-analytical method:
- Inverse variance method
- Restricted maximum-likelihood estimator for tau^2
- Q-profile method for confidence interval of tau^2 and tau
- Hartung-Knapp adjustment for random effects model
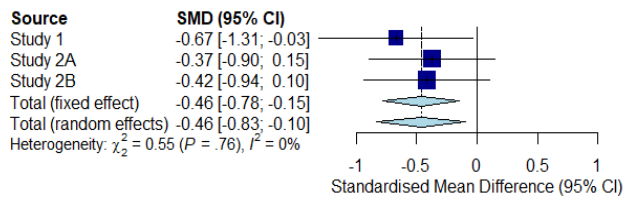- Hedges' g (bias corrected standardised mean difference; using exact

Source	SMD (95% CI)
Study 1	0.78 [0.13; 1.42]
Study 2A	0.47 [-0.05; 0.99]
Study 2B	-0.15 [-0.66; 0.37]
Total (fixed effect)	0.31 [-0.01; 0.63]
Total (random effects)	0.34 [-0.82; 1.51]
Heterogeneity: $\chi^2_2 = 5.40$ (P = .07), $I^2 = 63\%$	

Standardised Mean Difference (95% CI)

Standardised Mean Difference
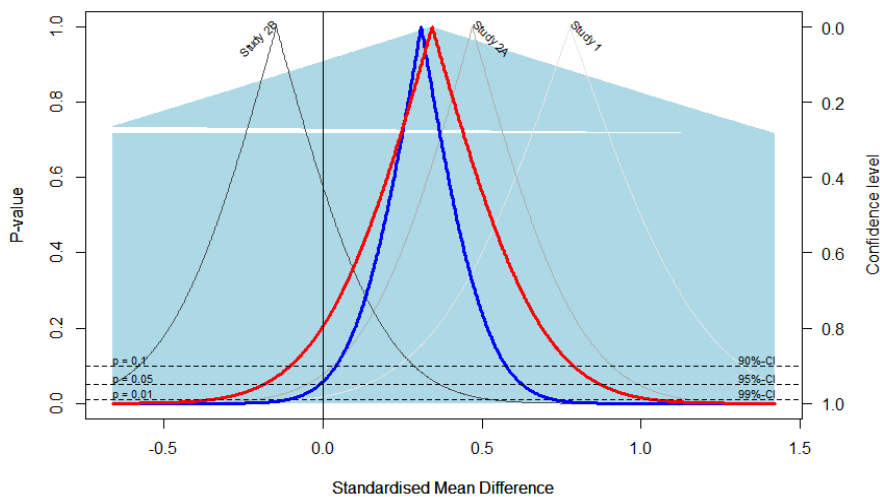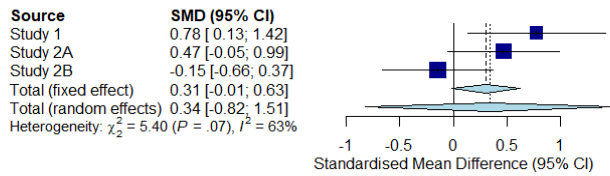
nBack 3 Studies overall stress difference REACTION TIME

Number of studies combined	k	3
Number of observations	N	156

	SMD	95%-CI lower	95%-CI upper	z|t	p-value
Common effect model	-0.05	-0.37	0.27	-0.32	0.753
Random effects model	-0.09	-1.22	1.05	-0.34	0.769

Quantifying heterogeneity:	value	95%-CI lower	95%-CI upper	Q	df	p-value
tau^2	0.12	0.00	8.64	4.83	2	0.089
tau	0.34	0.00	2.94			
I^2	58.6%	0.0%	88.2%			
H	1.55	1.00	2.91			

Source	SMD (95% CI)
Study 1	-0.64 [-1.28; 0.00]
Study 2A	0.27 [-0.25; 0.79]
Study 2B	0.01 [-0.50; 0.53]
Total (fixed effect)	-0.05 [-0.37; 0.27]
Total (random effects)	-0.09 [-1.22; 1.05]

Heterogeneity: $\chi^2_2 = 4.83$ ($P = .09$), $I^2 = 59\%$

Standardised Mean Difference (95% CI)

nBack 3 Studies ageXstress interaction Percent Correct

Number of studies combined	k	3
Number of observations	N	156

	SMD	95%-CI lower	95%-CI upper	z|t	p-value
Common effect model	0.26	-0.06	0.58	1.58	0.114
Random effects model	0.26	-0.96	1.49	0.92	0.453

Quantifying heterogeneity:	value	95%-CI lower	95%-CI upper	Q	df	p-value
tau^2	0.17	0.00	9.18	6.47	2	0.039
tau	0.41	0.00	3.03			
I^2	69.1%	0.0%	91.0%			
H	1.80	1.00	3.33			

Details on meta-analytical method:
- Inverse variance method
- Restricted maximum-likelihood estimator for tau^2
- Q-profile method for confidence interval of tau^2 and tau
- Hartung-Knapp adjustment for random effects model
- Hedges' g (bias corrected standardised mean difference; using exact
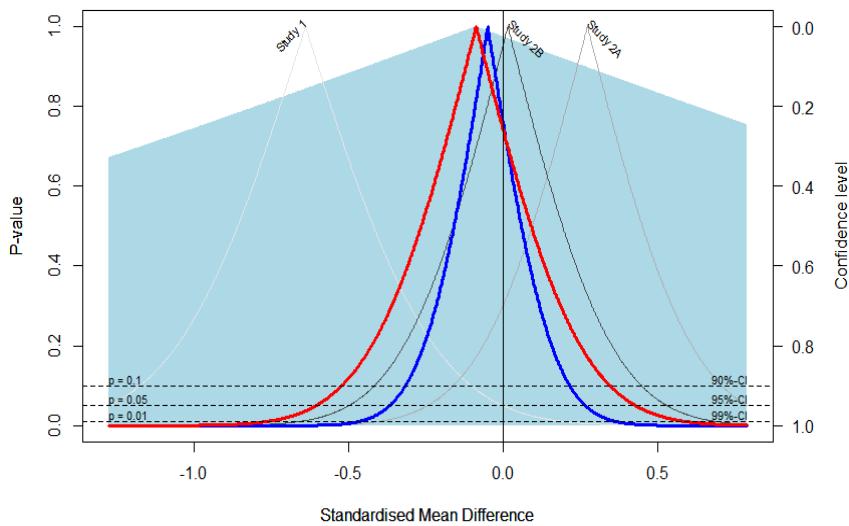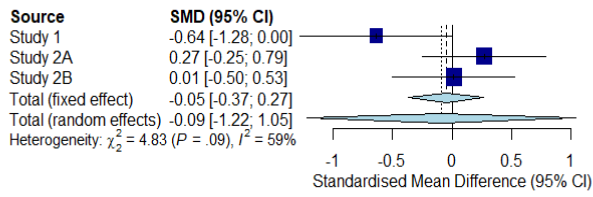
Source	SMD (95% CI)
Study 1	0.21 [-0.41; 0.83]
Study 2A	-0.19 [-0.71; 0.33]
Study 2B	0.77 [0.24; 1.31]
Total (fixed effect)	0.26 [-0.06; 0.58]
Total (random effects)	0.26 [-0.96; 1.49]
Heterogeneity: $\chi_2^2 = 6.47$ (P = .04), $I^2 = 69\%$	

Standardised Mean Difference (95% CI)
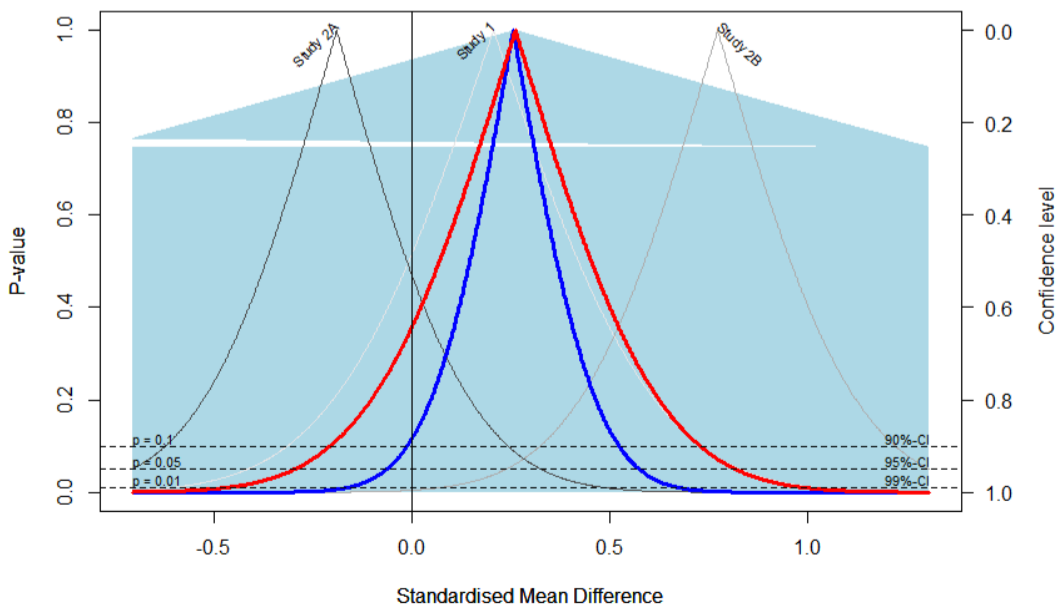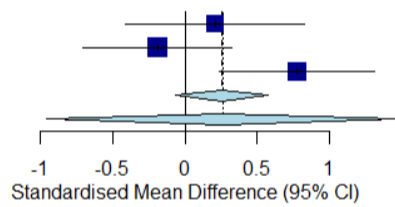
nBack 3 Studies ageXstress interaction REACTION TIME

	k	3
Number of studies combined		
Number of observations	N	156

	SMD	95%-CI lower	95%-CI upper	z|t	p-value
Common effect model	0.22	-0.09	0.54	1.39	0.165
Random effects model	0.23	-0.55	1.01	1.27	0.331

Quantifying heterogeneity:	value	95%-CI lower	95%-CI upper	Q	df	p-value
tau^2	0.02	0.00	3.69	2.50	2	0.286
tau	0.15	0.00	1.92			
I^2	20.2%	0.0%	91.7%			
H	1.12	1.00	3.47			

Source	SMD (95% CI)
Study 1	0.47 [-0.16; 1.10]
Study 2A	0.39 [-0.13; 0.91]
Study 2B	-0.10 [-0.62; 0.41]
Total (fixed effect)	0.22 [-0.09; 0.54]
Total (random effects)	0.23 [-0.55; 1.01]
Heterogeneity: $\chi^2_2 = 2.50$ (P = .29), $I^2 = 20\%$	

Standardised Mean Difference (95% CI)

P-value

Confidence level

Standardised Mean Difference
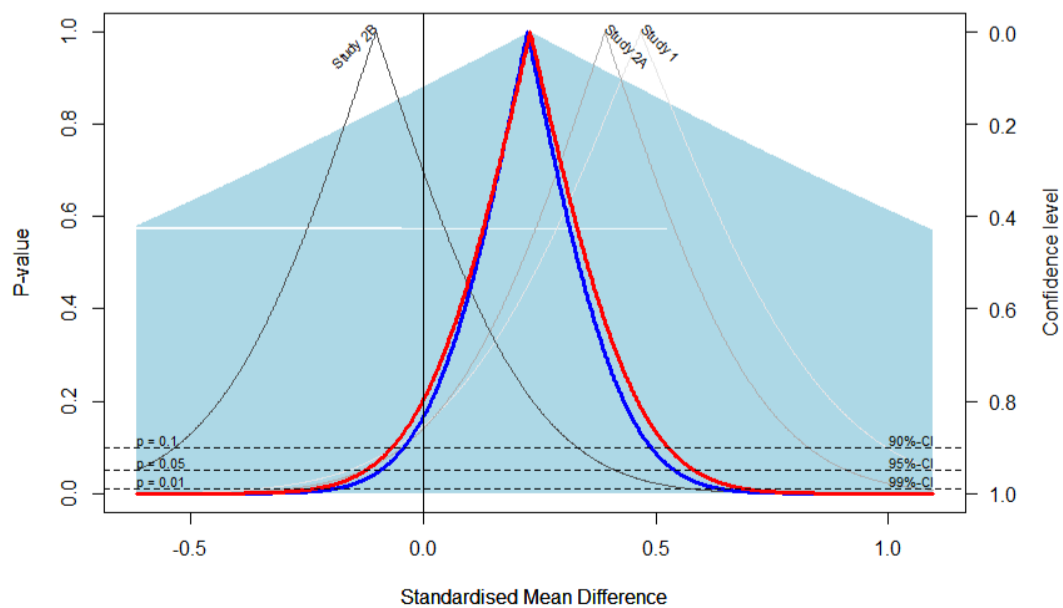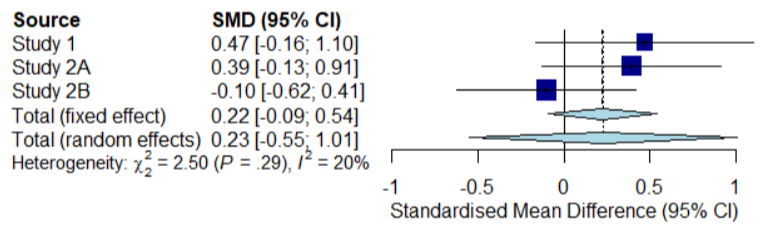
PERCENT CORRECT DATA

AGE

Studies	es	weight	sample.size	se	var	ci.lo	ci.hi	measure	pooled_effect
Study 1	0.55	9.60	40	0.32	0.10	-0.09	1.18	g	
Study 2A	0.16	14.38	58	0.26	0.07	-0.35	0.68	g	
Study 2B	0.25	14.38	58	0.26	0.07	-0.26	0.77	g	
All studies									0.29

STRESS

Studies	es	weight	sample.size	se	var	ci.lo	ci.hi	measure	pooled_effect
Study 1	0.78	9.25	40	0.33	0.11	0.13	1.42	g	
Study 2A	0.47	14.08	58	0.27	0.07	-0.05	0.99	g	
Study 2B	-0.15	14.44	58	0.26	0.07	-0.66	0.37	g	
All studies									0.31

INTERACTION

Studies	es	weight	sample.size	se	var	ci.lo	ci.hi	measure	pooled_effect
Study 1	0.21	9.92	40	0.32	0.10	-0.41	0.83	g	
Study 2A	-0.19	14.42	58	0.26	0.07	-0.71	0.33	g	
Study 2B	0.77	13.45	58	0.27	0.07	0.24	1.31	g	
All studies									0.26

REACTION TIME DATA

AGE

Studies	es	weight	sample.size	se	var	ci.lo	ci.hi	measure	pooled_effect
Study 1	-0.67	9.42	40	0.33	0.11	-1.31	-0.03	g	
Study 2A	-0.37	14.18	58	0.27	0.07	-0.90	0.15	g	
Study 2B	-0.42	14.18	58	0.27	0.07	-0.94	0.10	g	
All studies									-0.46

STRESS

Studies	es	weight	sample.size	se	var	ci.lo	ci.hi	measure	pooled_effect
Study 1	-0.64	9.47	40	0.32	0.11	-1.28	0.00	g	
Study 2A	0.27	14.35	58	0.26	0.07	-0.25	0.79	g	
Study 2B	0.01	14.48	58	0.26	0.07	-0.50	0.53	g	
All studies									-0.05

INTERACTION

Studies	es	weight	sample.size	se	var	ci.lo	ci.hi	measure	pooled_effect
Study 1	0.47	9.70	40	0.32	0.10	-0.16	1.10	g	
Study 2A	0.39	14.20	58	0.27	0.07	-0.13	0.91	g	
Study 2B	-0.10	14.46	58	0.26	0.07	-0.62	0.41	g	
All studies									0.22

S7 Appendix 4.

Study 1 Test Design and Procedure

Participants attended 2 sessions at least a week apart, at the same time of day. Participants received both sham and active stimulation. Order of treatment and task version was counter-balanced and randomised within age group. The Bayesian meta-analysis included session 1 data only. A univariate analysis of variance (ANOVA) was conducted on these data with age group, stress group and stimulation order as factors to evaluate the impact of the transcranial alternating current stimulation treatment on cognitive performance given that half of the participants received active stimulation in session 1 ($YA_n=10;OA_n=9$). The ANOVA results revealed a main effect for stress group only ($F_{(1, 32)}$ 6.789, $p = 0.014$). All other main effects and interaction effects were not statistically significant ($p\text{'s} \geq 0.106$), indicating that stimulation did not have a significant impact on performance overall nor did it affect age or stress groups in a systematic way.

Session 1 only:

- Medical screening
- Procedure and nature of tasks briefly explained
- Informed consent
- All tasks to be administered fully explained
- Self-report measures (as detailed for Studies 2A and 2B overleaf)

Procedure for <u>both</u> sessions:

Pre-stimulation (offline)

Task	Duration
N-back practice (1-back, 2-back)	5 min
Head measurement and electrode placement	10 min
tACS comfort/phosphene assessment	30 s
Comfort Visual Analogue – time 1	30 s

During 20 min transcranial alternating current stimulation (online): 1500 µA (peak-to-peak)

Task	Duration
Comfort Visual Analogue – time 2	30 s
Watch nature video (habituation)	4 min 30 s
Picture Free Recall Task (encoding phase)	2 min
2-back task	7 min
Picture Free Recall Task (recall phase)	2 min
Comfort Visual Analogue – time 3	30 s

Post-stimulation (offline)

Task	Duration
Comfort Visual Analogue – time 4	30 s
Electrode removal	5 min

Session 2 only:

- On/off judgement for sessions 1 and 2

S7 Appendix 4.

Study 2A & 2B Test Design and Procedure

Participants signed up via the Prolific participant recruitment platform. Following self-assessment for eligibility they completed one test session, which was held in the morning for older participants and in the afternoon for young participants, which was roughly in line with time of day Study 1 participants participated. We also excluded for handedness and most of the same exclusion criteria to be consistent with the sample for Study 1.

Procedure

Study 2A and Study 2B

- Welcome screen
- Information Sheet
- Exclusion Criteria
- Informed Consent
- Biodemographic Information questionnaire
- Health and lifestyle questionnaire
- Life Events Questionnaire:
  - Life Events Scale for Students (LESS): 18-35 yrs
  - Social Readjustment Rating Scale (SRRS): 60 – 85 yrs
- Pittsburgh Sleep Quality Index
- Perceived Stress Scale (PSS-10)
- Brief Resilience Scale (BRS)
- STAI-S
- STAI-T

Cognitive Task: n-back

Study 2A

- 1-BACK Practice:
  - Block 1 [20 trials]
- 2-BACK Practice:
  - Block 1 [20 trials]
- 2-BACK Experimental Trials:
  - Block 1 [40 trials]
  - Block 2 [40 trials]
  - Block 3 [40 trials]

Study 2B

- 1-BACK Practice:
  - Block 1 [20 trials]
- 1-BACK Experimental Trials:
  - Block 1 [40 trials]
  - Block 2 [40 trials]
  - Block 3 [40 trials]

- 2-BACK Practice:
  - Block 1 [20 trials]
- 2-BACK Experimental Trials:
  - Block 1 [40 trials]
  - Block 2 [40 trials]
  - Block 3 [40 trials]

S8 Table. Median split value with inter-quartile range by study and combined.

Study	n	LESS (n=81) median (IQR)	SRRS (n=75) median (IQR)
Study 1	40	592 (492.00 - 639.50)	913 (753.00 - 1009.00)
Study 2A	58	577 (357.00 - 691.00)	738 (632.00 - 845.00)
Study 2B	58	516 (348.00 - 692.00)	766 (684.50 - 849.50)
Study 1, 2A, 2B combined	**156**	**577 (383.50 - 660.00)**	**786 (685.00 - 873.00)**

S9 Table. Sensitivity analysis: A comparison using a single median split.

Table 1. Means, standard errors and Univariate ANOVA F values by age group and stress group for the 3 replication studies.

		Young Adults	Older Adults	YA vs. OA	Low Stress vs. High Stress	Age Grp x Stress Grp
	Accuracy (% correct)	*mean (SE)*	*mean (SE)*	F	F	F
Study 1	*Low Stress (n=13)*	93.96 (0.98)	87.83 (4.06)	2.976	1.789	0.382
	High Stress (n = 27)	88.85 (2.53)	85.95 (1.98)			
Study 2A	*Low Stress (n=33)*	91.77 (1.77)	90.44 (1.55)	0.663	2.756	0.040
	High Stress (n = 25)	88.61 (2.41)	86.42 (3.04)			
Study 2B	*Low Stress (n=33)*	91.27 (2.26)	90.42 (1.91)	1.299	0.004	2.371
	High Stress (n = 25)	87.85 (2.89)	93.59 (0.84)			
	Reaction time (ms)					
Study 1	*Low Stress (n=13)*	698.43 (46.00)	804.99 (45.19)	2.953	8.423**	0.061
	High Stress (n = 27)	890.76 (83.57)	1033.24 (46.72)			
Study 2A	*Low Stress (n=33)*	698.19 (67.02)	726.37 (52.30)	2.088	0.866	0.998
	High Stress (n = 25)	576.26 (48.36)	730.71 (87.81)			
Study 2B	*Low Stress (n=33)*	712.57 (43.71)	780.15 (52.79)	2.510	0.122	0.041
	High Stress (n = 25)	685.55 (51.98)	772.97 (43.96)			

Univariate ANOVA F-values (spanning the last three columns)

* significant at < 0.05 (two-tailed)
** significant at < 0.01 (two-tailed)

Table 2. Age group percent correct and RT mean differences, standard errors and Bayes Factors for all studies using a single median split.

		Young vs. Older Adults				
Accuracy (% correct)		*Prior*	*Likelihood*	*Posterior*		
	N: Incremental Increase	*mean Difference (SE)*	*mean Difference (SE)*	*mean Difference (SE)*	95% credible interval[a]	BF
Marshall et al. (N=60)	**60**	5.00[a]	4.83 (1.64)			15.99[†]
Study 1 (N=40)	**100**	4.83 (1.64)	4.35 (2.42)	4.68 (1.36)	2.02, 7.34	1.59
Study 2A (N=58)	**158**	4.68 (1.36)	1.29 (2.12)	3.70 (1.14)	1.46, 5.94	0.58
Study 2B (N=58)	**216**	3.70 (1.14)	-1.98 (2.06)	2.37 (1.00)	0.41, 4.33	0.78
Reaction Time (ms)			*mean Difference (SE)*		95% credible interval[a]	BF
Marshall et al. (N=46)	**46**	50.00[a]	-441.28 (109.07)			3.77[†]
Study 1 (N=40)	**86**	-441.28 (109.07)	-155.69 (71.44)	-241.43 (59.76)	-358.56, -124.30	2.64
Study 2A (N=58)	**144**	-241.43 (59.76)	-88.79 (60.04)	-165.46 (42.35)	-248.47, -82.44	1.22
Study 2B (N=58)	**202**	-165.46 (42.35)	-75.54 (46.79)	-124.96 (31.40)	-186.50, -63.42	1.33

[a] In the first iteration, an estimated maximum performance difference of 10% was assumed. Half of this value was used as a vague prior. This prior was used to calculate the BF for Marshall et al. (2015)'s result.

[†] evidence favours H1

[‡] evidence favours H0

Table 3. Cumulative stress percent correct and RT mean differences, standard errors and Bayes Factors for all studies using a single median split.

Accuracy (% correct)		Low Stress vs. High Stress				
		Prior	Likelihood	Posterior		
	N: Incremental Increase	mean Difference (SE)	mean Difference (SE)	mean Difference (SE)	95% credible interval[a]	BF
Marshall et al. (N=60)	**60**	5.00[a]	3.50 (1.62)			2.54
Study 1 (N=40)	**100**	3.5 (1.62)	4.26 (2.35)	3.74 (1.33)	1.13, 6.36	1.44
Study 2A (N=58)	**158**	3.74 (1.33)	3.35 (2.24)	3.64 (1.15)	1.39, 5.89	1.22
Study 2B (N=58)	**216**	3.64 (1.15)	0.03 (2.16)	2.85 (1.01)	0.86, 4.83	0.59
Reaction Time (ms)		mean Difference (SE)	mean Difference (SE)	mean Difference (SE)	95% credible interval[a]	BF
Marshall et al. (N=46)	**46**	50.00[a]	62.33 (158.09)			0.96
Study 1 (N=40)	**86**	62.33 (158.09)	-225.23 (62.27)	-186.6 (57.94)	-300.16, -73.04	3.32[†]
Study 2A (N=58)	**144**	-186.6 (57.94)	74.67 (63.98)	-68.88 (42.95)	-153.06, 15.29	1.03
Study 2B (N=58)	**202**	-68.88 (42.95)	14.32 (46.76)	-30.81 (31.63)	-92.8, 31.19	0.99

[a] In the first iteration, an estimated maximum performance difference of 10% was assumed. Half of this value was used as a vague prior. This prior was used to calculate the BF for Marshall et al. (2015)'s result.

[†] evidence favours H1

[‡] evidence favours H0

Table 4. Percent correct and RT mean differences, standard errors and Bayes Factors for young low and high stress groups by older low and high stress groups interaction effect for all studies using a single median split.

		Age by Stress Group Interaction				
		Prior	*Likelihood*	*Posterior*		
Accuracy (% correct)	N: Incremental Increase	*mean Difference (SE)*	*mean Difference (SE)*	*mean Difference (SE)*	95% credible interval[a]	BF
Marshall et al. (N=60)	**60**	2.50[a]	-12.55 (2.85)			50.86[†]
Study 1 (N=40)	**100**	-12.55 (2.85)	4.23 (4.73)	-8.08 (2.44)	-12.86, -3.29	0.78
Study 2A (N=58)	**158**	-8.08 (2.44)	-0.93 (4.36)	-6.37 (2.13)	-10.55, -2.20	0.94
Study 2B (N=58)	**216**	-6.37 (2.13)	7.26 (4.22)	-3.60 (1.90)	-7.33, 0.13	1.06
Reaction Time (ms)	*N: Incremental Increase*	*mean Difference (SE)*	*mean Difference (SE)*	*mean Difference (SE)*	95% credible interval[a]	BF
Marshall et al. (N=46)	**46**	25.50[a]	-47.75 (254.72)			1.00
Study 1 (N=40)	**86**	-47.75 (254.72)	83.49 (119.97)	59.66 (108.53)	-153.07, 272.39	0.99
Study 2A (N=58)	**144**	59.66 (108.53)	64.79 (125.86)	61.85 (82.19)	-99.25, 222.95	0.70
Study 2B (N=58)	**202**	61.85 (82.19)	48.72 (95.88)	56.29 (62.40)	-66.02, 178.60	0.68

[a] In the first iteration, an estimated maximum performance difference of 10% was assumed. Half of this value was used as a vague prior. This prior was used to calculate the BF for Marshall et al. (2015)'s result.

[†] evidence favours H1

[‡] evidence favours H0

Table 5a. YA percent correct and RT mean differences, standard errors and Bayes Factors by stress group within age group for all studies using a single median split.

		YA: Low vs. High Stress				
		Prior	*Likelihood*	*Posterior*		
Accuracy (% correct)	N: Incremental Increase	*mean Difference (SE)*	*mean Difference (SE)*	*mean Difference (SE)*	95% credible Interval[a]	BF
Marshall et al. (N=60)	**60**	5.00[a]	-2.39 (1.88)			0.71
Study 1 (N=40)	**100**	-2.39 (1.88)	5.11 (2.70)	0.05 (1.54)	-2.97, 3.08	1.23
Study 2A (N=58)	**158**	0.05 (1.54)	3.16 (2.93)	0.73 (1.36)	-1.95, 3.40	1.00
Study 2B (N=58)	**216**	0.73 (1.36)	3.43 (3.58)	1.07 (1.27)	-1.43, 3.57	0.98
Reaction Time (ms)	*Sample Size Increase*	*mean Difference (SE)*	*mean Difference (SE)*	*mean Difference (SE)*	95% credible Interval[a]	BF
Marshall et al. (N=46)	**46**	12.50[a]	-87.32 (78.59)			1
Study 1 (N=40)	**86**	-87.32 (78.59)	-192.33 (93.47)	-130.81 (60.16)	-248.71, -12.91	1.32
Study 2A (N=58)	**144**	-130.81 (60.16)	121.94 (81.12)	-41.14 (48.32)	-135.84, 53.57	1.00
Study 2B (N=58)	**202**	-41.14 (48.32)	27.01 (68.67)	-18.57 (39.52)	-96.02, 58.88	0.81

[a] In the first iteration, an estimated maximum performance difference of 10% was assumed. Half of this value was used as a vague prior. This prior was used to calculate the BF for Marshall et al. (2015)'s result.

[†] evidence favours H1 (> 3)

[‡] evidence favours H0 (< ⅓)

Table 5b. OA percent correct and RT mean differences, standard errors and Bayes Factors by stress group within age group for all studies using a single median split.

		OA: Low vs. High Stress				
		Prior	*Likelihood*	*Posterior*		
Accuracy (% correct)	N: Incremental Increase	*mean Difference (SE)*	*mean Difference (SE)*	*mean Difference (SE)*	95% credible Interval[a]	BF
Marshall et al. (N=60)	**60**	12.50[a]	9.39 (2.01)			>100[†]
Study 1 (N=40)	**100**	9.39 (2.01)	1.88 (4.49)	8.13 (1.84)	4.53, 11.74	0.72
Study 2A (N=58)	**158**	8.13 (1.84)	4.02 (3.34)	7.18 (1.61)	4.02, 10.34	0.86
Study 2B (N=58)	**216**	7.18 (1.61)	-3.17 (2.09)	3.33 (1.28)	0.83, 5.83	1.01
Reaction Time (ms)	*Sample Size Increase*	*mean Difference (SE)*	*mean Difference (SE)*	*mean Difference (SE)*	95% credible Interval[a]	BF
Marshall et al. (N=46)	**46**	37.50[a]	102.87 (209.13)			0.99
Study 1 (N=40)	**86**	102.87 (209.13)	-228.25 (64.86)	-199.20 (61.95)	-320.62, -77.79	8.56[†]
Study 2A (N=58)	**144**	-199.20 (61.95)	-4.33 (100.57)	-145.60 (52.74)	-248.98, -42.22	0.79
Study 2B (N=58)	**202**	-145.60 (52.74)	7.18 (66.46)	-86.56 (41.31)	-167.54, -5.59	0.85

[a] In the first iteration, an estimated maximum performance difference of 10% was assumed. Half of this value was used as a vague prior. This prior was used to calculate the BF for Marshall et al. (2015)'s result.

[†] evidence favours H1 (> 3)

[‡] evidence favours H0 (< ⅓)

These sheets calculate Bayesian meta analysis for percent correct data and reaction time data.

Prior distribution	normal (which represents a scale factor of 2 SD)
Prior estimated effect size	A subjective estimate of maximum expected difference between groups. To calculate the prior, this maximum value was divided by 2 to provide one standard deviation (with mean set to zero) e.g. a maximum difference between groups of 10% yields a prior of 5%.
Likelihood data	Marshall et al. (2015) These data were fed into the meta analysis iteratively to obtain a final effect size which is the posterior of Study 2B.
	Study 1
	Study 2A
	Study 2B

All means and standard errors used are given in the tables.

PERCENT CORRECT: YA vs. OA	N	YA_n	OA_n	MeanDiff	seMeanDiff	YAmean	YAse	OAmean	OAse
Marshall Study(prior)	60	30	30	4.83	1.64	92.19	0.94	87.36	1.34
Study 1	40	21	19	4.35	2.42	90.79	1.66	86.45	1.73
Study 2A	58	31	27	1.29	2.12	90.24	1.48	88.95	1.47
Study 2B	58	29	29	-1.98	2.06	89.86	1.73	91.84	1.12

PERCENT CORRECT: LS vs. HS	N	LS_n	HS_n	MeanDiff	seMeanDiff	LSmean	LSse	HSmean	HSse
Marshall Study (prior)	60	30	30	3.50	1.62	91.53	0.93	88.03	1.37
Study 1	40	21	19	5.77	2.35	91.47	1.15	85.70	2.06
Study 2A	58	31	27	3.79	2.20	91.47	1.13	87.68	1.80
Study 2B	58	29	29	-1.18	2.07	90.28	1.52	91.46	1.40

PERCENT CORRECT: Age*Stress interacti	N	LS_n	HS_n	MeanDiff	seMeanDiff	$(YA_{LS}-YA_{HS})$	$(OA_{LS}-OA_{HS})$	$(YA_{LS}-YA_{HS})-(OA_{LS}-OA_{HS})$	SE_{diff}	YA_LSmean	YA_LSse	YA_HSmean	YA_HSse	OA_LSmean	OA_LSse	OA_HSmean	OA_HSse
Marshall Study (prior)	60	30	30	-12.55	2.85	-2.70	9.85	-12.55	2.85	90.55	1.64	93.25	0.95	91.89	1.04	82.03	1.85
Study 1	40	21	19	1.53	4.65	7.18	5.64	1.53	4.65	93.64	0.81	86.47	3.17	88.54	2.05	82.90	2.72
Study 2A	58	30	28	-1.54	4.23	3.66	5.20	-1.54	4.23	91.24	1.75	87.57	2.50	90.84	1.40	85.64	2.61
Study 2B	58	30	28	6.39	4.23	1.69	-4.70	6.39	4.23	89.47	2.56	87.77	2.58	89.18	1.94	93.88	0.88

PERCENT CORRECT: Young Adults (LS v	N	LS_n	HS_n	MeanDiff	seMeanDiff	LSmean	LSse	HSmean	HSse
Marshall Study (prior)	30	15	15	-2.39	1.88	91.00	1.61	93.39	0.93
Study 1	21	11	10	6.13	3.12	93.71	0.81	87.58	3.06
Study 2A	31	16	15	3.16	3.06	91.77	1.78	88.61	2.38
Study 2B	29	15	14	1.79	3.60	90.72	2.53	88.93	1.99

PERCENT CORRECT: Older Adults (LS vs	N	LS_n	HS_n	MeanDiff	seMeanDiff	LSmean	LSse	HSmean	HSse
Marshall Study (prior)	30	15	15	9.39	2.01	92.06	1.00	82.67	1.80
Study 1	19	10	9	5.39	3.26	89.00	1.94	83.61	2.71
Study 2A	27	14	13	4.53	2.83	91.13	1.40	86.60	2.51
Study 2B	29	15	14	-4.15	2.14	89.83	1.99	93.99	0.91

TABLE 2: Percent Correct Bayesian Meta Analysis values for all priors, likelihoods and posterior outputs.

	Prior		Likelihood		Posterior			
	mean	SE	mean	SE	mean	SD	CI - lower	CI - upper
Study 1	4.83	1.64	4.35	2.42	4.68	1.36	2.02	7.34
Study 2A	4.68	1.36	1.29	2.12	3.70	1.14	1.46	5.94
Study 2B	3.70	1.14	-1.98	2.06	2.37	1.00	0.41	4.33

	Prior		Likelihood		Posterior			
	mean	SE	mean	SE	mean	SD	CI - lower	CI - upper
Study 1	3.50	1.62	5.77	2.35	4.23	1.33	1.62	6.85
Study 2A	4.23	1.33	3.79	2.20	4.11	1.14	1.88	6.35
Study 2B	4.11	1.14	-1.18	2.07	2.88	1.00	0.93	4.84

	Prior		Likelihood		Posterior			
	mean	SE	mean	SE	mean	SD	CI - lower	CI - upper
Study 1	-12.55	2.85	1.53	4.65	-8.70	2.43	-13.47	-3.94
Study 2A	-8.70	2.43	-1.54	4.23	-6.92	2.11	-11.05	-2.79
Study 2B	-6.92	2.11	6.39	4.23	-4.28	1.89	-7.98	-0.58

	Prior		Likelihood		Posterior			
	mean	SE	mean	SE	mean	SD	CI - lower	CI - upper
Study 1	-2.39	1.88	6.13	3.12	-0.13	1.61	-3.28	3.03
Study 2A	-0.13	1.61	3.16	3.06	0.59	1.42	-2.21	3.38
Study 2B	0.59	1.42	1.79	3.60	0.75	1.32	-1.85	3.34

	Prior		Likelihood		Posterior			
	mean	SE	mean	SE	mean	SD	CI - lower	CI - upper
Study 1	9.39	2.01	5.39	3.26	8.29	1.71	4.93	11.64
Study 2A	8.29	1.71	4.53	2.83	7.28	1.47	4.40	10.15
Study 2B	7.28	1.47	-4.15	2.14	3.62	1.21	1.25	5.99

These values were entered into the calculator provided by Dienes (http://www.lifesci.sussex.ac.uk/home/Zoltan_Dienes/inference/bayes_normalposterior.swf) found in http://www.lifesci.sussex.ac.uk/home/Zoltan_Dienes/inference/Bayes.htm which gave a posterior mean and standard deviation plus 95% credible intervals.

Values were entered to 4 d.p.

Values in yellow represent the first effect sizes entered into the iterative meta analysis.

REACTION TIME: YA vs. OA	N	YA_n	OA_n	MeanDiff	seMeanDiff	YAmean	YAse	OAmean	OAse
Marshall Study(prior)	46	16	30	-441.28	109.07	532.69	42.13	973.97	102.69
Study 1	40	21	19	-155.69	71.44	817.49	56.44	973.18	42.50
Study 2A	58	31	27	-88.79	60.04	639.19	41.73	727.98	45.24
Study 2B	58	29	29	-75.54	46.79	701.39	31.89	776.93	34.44

REACTION TIME: LS vs. HS	N	LS_n	HS_n	MeanDiff	seMeanDiff	LSmean	LSse	HSmean	HSse
Marshall Study (prior)	46	22	24	62.33	158.09	853.00	124.70	790.67	94.15
Study 1	40	21	19	-146.53	72.13	821.84	43.30	968.37	57.31
Study 2A	58	30	28	64.12	59.29	711.48	43.40	647.35	43.06
Study 2B	58	30	28	2.63	48.69	740.43	36.37	737.80	31.78

REACTION TIME: Age*Stress interaction	N	LS_n	HS_n	MeanDiff	seMeanDiff	YALS-YAHS	OALS-OAHS	(YALS-YAHS)-(OALS...	DiffSE	YA_LSmean	YA_LSse	YA_HSmean	YA_HSse	OA_LSmean	OA_LSse	OA_HSmean	OA_HSse
Marshall Study (prior)	46	22	24	-47.75	254.72	-59.87	-12.12	-47.75	254.72	459.00	46.76	518.87	63.45	719.06	166.15	731.19	136.76
Study 1	40	21	19	104.80	138.22	-75.54	-180.34	104.80	138.22	715.64	71.10	791.19	88.97	862.91	49.83	1043.25	59.12
Study 2A	58	30	28	93.36	123.58	91.27	-2.09	93.36	123.58	622.32	65.66	531.06	48.97	655.17	64.56	657.26	66.87
Study 2B	58	30	28	-19.04	96.41	-20.10	-1.05	-19.04	96.41	648.85	46.77	668.95	48.71	733.09	54.49	734.15	41.60

REACTION TIME: Young Adults (LS vs.	N	LS_n	HS_n	MeanDiff	seMeanDiff	LSmean	LSse	HSmean	HSse
Marshall Study (prior)	16	7	9	-87.32	78.59	483.57	46.81	570.89	63.67
Study 1	21	11	10	-111.89	109.76	764.21	68.79	876.10	88.14
Study 2A	31	16	15	121.94	82.12	698.19	66.76	576.26	48.46
Study 2B	29	15	14	-25.33	65.47	689.16	45.05	714.49	48.00

REACTION TIME: Older Adults (LS vs. H	N	LS_n	HS_n	MeanDiff	seMeanDiff	LSmean	LSse	HSmean	HSse
Marshall Study (prior)	30	15	15	102.87	209.13	1025.40	159.84	922.53	133.36
Study 1	19	10	9	-185.66	75.62	885.23	48.47	1070.89	59.15
Study 2A	27	14	13	-2.73	93.16	726.66	64.14	729.39	65.24
Study 2B	29	15	14	30.59	69.27	791.70	55.59	761.11	39.97

TABLE 4: Reaction Time Bayesian Meta Analysis values for all priors, likelihoods and posterior outputs.

	Prior		Likelihood		Posterior			
	mean	SE	mean	SE	mean	SD	CI - lower	CI - upper
Study 1	-441.28	109.07	-155.69	71.44	-241.43	59.76	-358.56	-124.30
Study 2A	-241.43	59.76	-88.79	60.04	-165.46	42.35	-248.47	-82.44
Study 2B	-165.46	42.35	-75.54	46.79	-124.96	31.40	-186.50	-63.42

	Prior		Likelihood		Posterior			
	mean	SE	mean	SE	mean	SD	CI - lower	CI - upper
Study 1	62.33	158.09	-146.53	72.13	-110.54	65.62	-239.16	18.08
Study 2A	-110.54	65.62	64.12	59.29	-14.38	43.99	-100.61	71.85
Study 2B	-14.38	43.99	2.63	48.69	-6.73	32.64	-70.72	57.25

	Prior		Likelihood		Posterior			
	mean	SE	mean	SE	mean	SD	CI - lower	CI - upper
Study 1	-47.75	254.72	104.80	138.22	70.10	121.49	-168.01	308.22
Study 2A	70.10	121.49	93.36	123.58	81.53	86.64	-88.27	251.33
Study 2B	81.53	86.64	-19.04	96.41	36.60	64.44	-89.70	162.90

	Prior		Likelihood		Posterior			
	mean	SE	mean	SE	mean	SD	CI - lower	CI - upper
Study 1	-87.32	78.59	-111.89	109.76	-95.65	63.90	-220.89	29.60
Study 2A	-95.65	63.90	121.94	82.12	-13.59	50.43	-112.44	85.26
Study 2B	-13.59	50.43	-25.33	65.47	-17.96	39.95	-96.27	60.35

	Prior		Likelihood		Posterior			
	mean	SE	mean	SE	mean	SD	CI - lower	CI - upper
Study 1	102.87	209.13	-185.66	75.62	-152.30	71.11	-291.68	-12.92
Study 2A	-152.30	71.11	-2.73	93.16	-97.23	56.53	-208.03	13.56
Study 2B	-97.23	56.53	30.59	69.27	-46.14	43.79	-131.98	39.70

These values were entered into the calculator provided by Dienes (http://www.lifesci.sussex.ac.uk/home/Zoltan_Dienes/inference/bayes_normalposterior.swf) found in http://www.lifesci.sussex.ac.uk/home/Zoltan_Dienes/inference/Bayes.htm which gave a posterior mean and standard deviation plus 95% credible intervals.

Values were entered to 4 d.p.

Values in yellow represent the first effect sizes entered into the iterative meta analysis.

Prior values		Age		Cumulative stress		Age * Stress		YA		OA	
		ACCURACY	REACTION TIME	ACCURACY	REACTION TIME	ACCURACY	REACTION TIME	ACCURACY	REACTION TIME	ACCURACY	REACTION TIME
		meanDiff	meanDiff	meanDiff	meanDiff	meanDiff	meanDiff	meanDiff	meanDiff	meanDiff	meanDiff
Estimated maximum difference		10.00	100.00	10.00	100.00	5.00	50.00	10.00	25.00	25.00	75.00
	SD	5	50	5	50	2.5	25	5	12.5	12.5	37.5

PERCENT CORRECT: YA vs. OA

		Prior			Likelihood		BF	Robustness checks		
		Max Difference	1 SD		meanDiff	meanDiffSE	BF	Normal Dist	Student's t (2df)	Cauchy
Marshall BF	Estimated max effect size	10.00	5.00		4.83	1.64	15.99	15.99	13.30	11.96
BF1	Marshall meanDiff	4.83	2.42	Study 1	4.35	2.42	1.59	1.59	1.51	1.43
BF2	Study 1 posterior upper CI	7.34	3.67	Study 2A	1.29	2.12	0.58	0.58	0.50	0.46
BF3	Study 2A posterior upper CI	5.94	2.97	Study 2B	-1.98	2.06	0.78	0.78	0.67	0.62

PERCENT CORRECT: LS vs. HS

		Prior			Likelihood		BF	Robustness checks		
		Max Difference	1 SD		meanDiff	meanDiffSE	BF	Normal Dist	Student's t (2df)	Cauchy
Marshall BF	Estimated max effect size	10.00	5.00		3.50	1.62	2.54	2.54	2.14	1.95
BF1	Marshall meanDiff	3.50	1.75	Study 1	5.77	2.35	2.36	2.36	3.08	3.28
BF2	Study 1 posterior upper CI	6.85	3.42	Study 2A	3.79	2.20	1.55	1.55	1.35	1.24
BF3	Study 2A posterior upper CI	6.35	3.17	Study 2B	-1.18	2.07	0.61	0.61	0.53	0.49

PERCENT CORRECT: Age*Stress interaction

		Prior			Likelihood		BF	Robustness checks		
		Max Difference	1 SD		meanDiff	meanDiffSE	BF	Normal Dist	Student's t (2df)	Cauchy
Marshall BF	Estimated max effect size	5.00	2.50		-12.55	2.85	50.86	50.86	455.25	724.11
BF1	Marshall meanDiff	-12.55	-6.28	Study 1	1.53	4.65	0.62	0.62	0.53	0.49
BF2	Study 1 posterior upper CI	-3.94	-1.97	Study 2A	-1.54	4.23	0.92	0.92	0.84	0.79
BF3	Study 2A posterior upper CI	-2.79	-1.40	Study 2B	6.39	4.23	1.06	1.06	1.11	1.13

PERCENT CORRECT: Young Adults (LS vs. HS)

		Prior			Likelihood		BF	Robustness checks		
		Max Difference	1 SD		meanDiff	meanDiffSE	BF	Normal Dist	Student's t (2df)	Cauchy
Marshall BF	Estimated max effect size	10.00	5.00		-2.39	1.88	0.71	0.71	0.62	0.57
BF1	Marshall meanDiff	-2.39	-1.19	Study 1	6.13	3.12	1.20	1.20	1.39	1.50
BF2	Study 1 posterior upper CI	3.03	1.51	Study 2A	3.16	3.06	1.00	1.00	0.95	0.91
BF3	Study 2A posterior upper CI	3.38	1.69	Study 2B	1.79	3.60	0.93	0.93	0.85	0.81

PERCENT CORRECT: Older Adults (LS vs. HS)

		Prior			Likelihood		BF	Robustness checks		
		Max Difference	1 SD		meanDiff	meanDiffSE	BF	Normal Dist	Student's t (2df)	Cauchy
Marshall BF	Estimated max effect size	25.00	12.50		9.39	2.01	6374.86	6374.86	5274.71	4738.60
BF1	Marshall meanDiff	9.39	4.69	Study 1	5.39	3.26	1.43	1.43	1.25	1.15
BF2	Study 1 posterior upper CI	11.64	5.82	Study 2A	4.53	2.83	1.23	1.23	1.05	0.96
BF3	Study 2A posterior upper CI	10.15	5.07	Study 2B	-4.15	2.14	1.94	1.94	1.64	1.49

Prior values		Age		Cumulative stress		Age * Stress		YA		OA	
		ACCURACY	REACTION TIME	ACCURACY	REACTION TIME	ACCURACY	REACTION TIME	ACCURACY	REACTION TIME	ACCURACY	REACTION TIME
		meanDiff	meanDiff	meanDiff	meanDiff	meanDiff	meanDiff	meanDiff	meanDiff	meanDiff	meanDiff
Estimated maximum difference		10.00	100.00	10.00	100.00	5.00	50.00	10.00	25.00	25.00	75.00
SD		5	50	5	50	2.5	25	5	12.5	12.5	37.5

PERCENT CORRECT: YA vs. OA

		Prior			Likelihood			BF	Robustness checks		
		Max Difference	1 SD		meanDiff	meanDiffSE			Normal Dist	Student's t (2df)	Cauchy
Marshall BF	Estimated max effect size	100.00	50.00		-441.28	109.07		3.77	3.77	32.89	64.15
BF1	Marshall meanDiff	-441.2792	-220.6396	Study 1	-155.69	71.44		2.64	2.64	2.23	2.03
BF2	Study 1 posterior upper CI	-124.2960	-62.1480	Study 2A	-88.79	60.04		1.22	1.22	1.11	1.04
BF3	Study 2A posterior upper CI	-82.4428	-41.2214	Study 2B	-75.54	46.79		1.33	1.33	1.26	1.20

PERCENT CORRECT: LS vs. HS

		Prior			Likelihood			BF	Robustness checks		
		Max Difference	1 SD		meanDiff	meanDiffSE			Normal Dist	Student's t (2df)	Cauchy
Marshall BF	Estimated max effect size	100.00	50.00		62.33	158.09		0.96	0.96	0.91	0.87
BF1	Marshall meanDiff	62.3333	31.1667	Study 1	-146.53	72.13		1.27	1.27	3.08	3.28
BF2	Study 1 posterior upper CI	18.0817	9.0409	Study 2A	64.12	59.29		1.00	1.00	1.00	1.00
BF3	Study 2A posterior upper CI	71.8503	35.9252	Study 2B	2.63	48.69		0.81	0.81	0.71	0.66

PERCENT CORRECT: Age*Stress interaction

		Prior			Likelihood			BF	Robustness checks		
		Max Difference	1 SD		meanDiff	meanDiffSE			Normal Dist	Student's t (2df)	Cauchy
Marshall BF	Estimated max effect size	50.00	25.00		-47.75	254.72		1.00	1.00	0.99	0.98
BF1	Marshall meanDiff	-47.7479	-23.8739	Study 1	104.80	138.22		0.99	0.99	0.98	0.97
BF2	Study 1 posterior upper CI	308.2152	154.1076	Study 2A	93.36	123.58		0.74	0.74	0.64	0.60
BF3	Study 2A posterior upper CI	251.3348	125.6674	Study 2B	-19.04	96.41		0.62	0.62	1.11	1.13

PERCENT CORRECT: Young Adults (LS vs. HS)

		Prior			Likelihood			BF	Robustness checks		
		Max Difference	1 SD		meanDiff	meanDiffSE			Normal Dist	Student's t (2df)	Cauchy
Marshall BF	Estimated max effect size	25.00	12.50		-87.32	78.59		1.00	1.00	1.01	1.01
BF1	Marshall meanDiff	-87.3175	-43.6587	Study 1	-111.89	109.76		1.00	1.00	0.97	0.94
BF2	Study 1 posterior upper CI	29.5998	14.7999	Study 2A	121.94	82.12		1.02	1.02	1.05	1.07
BF3	Study 2A posterior upper CI	85.2554	42.6277	Study 2B	-25.33	65.47		0.86	0.86	0.76	0.71

PERCENT CORRECT: Older Adults (LS vs. HS)

		Prior			Likelihood			BF	Robustness checks		
		Max Difference	1 SD		meanDiff	meanDiffSE			Normal Dist	Student's t (2df)	Cauchy
Marshall BF	Estimated max effect size	75.00	37.50		102.87	209.13		0.99	0.99	0.97	0.95
BF1	Marshall meanDiff	102.8667	51.4333	Study 1	-185.66	75.62		2.15	2.15	2.89	3.16
BF2	Study 1 posterior upper CI	-12.9210	-6.4605	Study 2A	-2.73	93.16		1.00	1.00	0.99	0.99
BF3	Study 2A posterior upper CI	13.5557	6.7779	Study 2B	30.59	69.27		0.98	0.98	1.64	1.49