The Structure of Self-Regulation and Its Psychological and Physical Health Correlates in Older Adults

Supplemental Material

Table S1: Fit indices for confirmatory factor analysis at waves 1, 3, and 5.

	χ^2	df	p	SRMSR	RMSEA	CFI	TLI
Wave 1	151.11	115 (N=149)	.013	.068	.046	.967	.961
Wave 3	157.43	115 (N=133)	.005	.066	.053	.961	.954
Wave 5	197.85	116 (N=118)	<.001	.082	.077	.912	.897

Note. SRMSR = standardized root mean squared residual; RMSEA = root mean square error of approximation; TLI = Tucker-Lewis index; CFI = comparative fit index.

Table S2: Fit indices for longitudinal confirmatory factor analysis for each factor.

	χ2	df	*p*	SRMR	RMSEA	RMSEA 90 % CI	CFI	TLI	Constraint Tenable
Subjective Self-Regulation									
Null model	3807.11	351	< .001	--	--	--	--	--	--
Configural Invariance	363.29	294	.004	.055	.040	.024-.053	.980	.976	--
Weak Invariance	378.61	310	.005	.063	.039	.023-.052	.980	.978	Yes
Strong Invariance	813.50	327	<.001	2.98	.100	.092-.109	.859	.849	No
Executive Function									
Null model	1109.87	105	< .001	--	--	--	--	--	--
Configural Invariance	102.98	72	.010	.054	.054	.027-.076	.969	.955	--
Weak Invariance	112.77	80	.009	.067	.052	.027-.074	.967	.957	Yes
Strong Invariance	128.62	88	.003	.071	.056	.033-.076	.960	.952	No
HRV									
Null model	534.45	36	<.001	--	--	--	--	--	--
Configural Invariance	39.11	15	.001	.155	.109	.068-.151	.952	.884	--
Weak Invariance	44.60	19	.001	.162	.100	.062-.138	.949	.903	Yes
Strong Invariance	46.89	23	.002	.163	.087	.051-.123	.952	.925	Yes

Note. Values are based on an appropriate null model calculated to represent no change over time. HRV = heart rate variability; SRMSR = standardized root mean squared residual; RMSEA = root mean square error of approximation; CFI = comparative fit index; TLI = Tucker-Lewis index.

Table S3: Results of multilevel models predicting repetitive thought purpose (N=147, n=1017).

	Null Model γ (SE)	Model 1 γ (SE)	Model 2 γ (SE)	Model 3 γ (SE)	Model 4 γ (SE)
Fixed effects					
Intercept	-0.003	-0.103	-0.147	-0.075	-0.294
	(0.112)	(0.198)	(0.121)	(0.115)	(0.214)
Age at study entry		0.013	0.032	0.025	0.021
		(0.025)	(0.021)	(0.020)	(0.028)
Education		0.120*	0.156*	0.118*	0.167*
		(0.051)	(0.047)	(0.046)	(0.056)
Practice effects		-0.003			0.196
		(0.282)			(0.314)
EF between		0.920			1.26
		(1.31)			(1.51)
EF within		-2.56			-1.50
		(1.42)			(2.10)
HRV between			0.065		0.131
			(0.105)		(0.123)
HRV within			-0.002		-0.046
			(0.043)		(0.067)
Subjective between				-0.003	-0.005
				(0.007)	(0.009)
Subjective within				0.008	0.006
				(0.006)	(0.015)
Random effects					
Intercept SD	1.28	1.26	1.20	1.23	1.19
Residual SD	1.37	1.30	1.35	1.37	1.37
Model fit					
LL	-1900.5	-899.1	-1167.7	-1835.9	-565.0
AIC	3807.0	1814.2	2349.4	3685.8	1153.9

Note. Higher repetitive thought purpose is more searching and less solving. EF = executive function; HRV = heart rate variability; LL = log likelihood; AIC =Akaike information criterion. *$p < .05$. ** $p < .001$.

Table S4: Results of multilevel models predicting dyadic cohesion (N=85, n=378).

	Null Model	Model 1	Model 2	Model 3	Model 4
	γ (SE)	γ (SE)	γ (SE)	γ (SE)	γ (SE)
Fixed effects					
Intercept	12.28**	12.42**	12.13**	12.21**	11.96**
	(0.296)	(0.588)	(0.329)	(0.319)	(0.596)
Age at study entry		-0.048	0.003	0.002	-0.013
		(0.075)	(0.057)	(0.056)	(0.079)
Education		0.042	0.194	0.075	0.123
		(0.157)	(0.130)	(0.129)	(0.162)
Practice effects		0.006			0.922
		(0.810)			(0.839)
EF between		-3.34			-2.40
		(3.76)			(3.96)
EF within		-2.68			-6.11
		(4.23)			(4.89)
HRV between			0.029		-0.088
			(0.278)		(0.354)
HRV within			-0.048		0.12
			(0.149)		(0.168)
Subjective between				0.016	0.038
				(0.019)	(0.027)
Subjective within				0.006	-0.006
				(0.017)	(0.037)
Random effects					
Intercept SD	2.42	2.58	2.33	2.39	2.37
HRV within SD	-	-	0.59	-	-
Residual SD	2.34	1.97	2.26	2.35	1.92
Model fit					
LL	-928.2	-375.4	-716.4	-908.1	-282.5
AIC	1862.4	766.7	1450.8	1830.1	589.0

Note. EF = executive function; HRV = heart rate variability; LL = log likelihood; AIC =Akaike information criterion.

p < .05. ** *p* < .001.

Table S5: Results of multilevel models predicting waist circumference (N=149, n=901).

	Null Model	Model 1	Model 2	Model 3	Model 4
	γ (SE)	γ (SE)	γ (SE)	γ (SE)	γ (SE)
Fixed effects					
Intercept	96.62**	115.94**	115.83**	116.92**	115.81**
	(1.14)	(3.98)	(3.79)	(3.57)	(4.61)
Gender		-12.61**	-12.07**	-12.66**	-12.89**
		(2.18)	(2.27)	(2.15)	(2.52)
Age at study entry		-0.271	-0.144	-0.115	-0.171
		(0.208)	(0.190)	(0.181)	(0.238)
Education		-0.556	-0.558	-0.608	-0.425
		(0.439)	(0.441)	(0.427)	(0.482)
Practice effects		1.02			2.21
		(2.37)			(2.69)
EF between		-12.15			-12.15
		(11.11)			(13.15)
EF within		-3.04			-3.54
		(6.75)			(11.04)
HRV between			0.534		0.769
			(0.944)		(1.03)
HRV within			-0.193		-0.209
			(0.196)		(0.335)
Subjective between				-0.055	-0.059
				(0.061)	(0.076)
Subjective within				0.026	0.080
				(0.034)	(0.071)
Random effects					
Intercept SD	13.62	11.78	12.32	12.17	12.11
Subjective within SD	-	-	-	0.17	-
Residual SD	6.21	5.53	5.58	5.99	5.52
Model fit					
LL	-3167.6	-1484.7	-1883.2	-3025.1	-925.5
AIC	6341.2	2987.4	3782.4	6070.2	1876.9

Note. Gender is coded 1= males, 2= females. EF = executive function; HRV = heart rate variability; LL = log likelihood; AIC =Akaike information criterion.
*$p < .05$. ** $p < .001$.

Table S6: Results of multilevel models predicting mean arterial pressure (N=149, n=1009).

	Null Model	Model 1	Model 2	Model 3	Model 4
	γ (SE)	γ (SE)	γ (SE)	γ (SE)	γ (SE)
Fixed effects					
Intercept	97.32**	99.58**	100.43**	98.93**	104.68**
	(0.732)	(3.81)	(3.32)	(2.99)	(4.17)
Blood pressure		-2.38	-3.36*	-3.16*	-3.03
medication		(1.87)	(1.63)	(1.43)	(2.05)
Gender		0.717	0.359	0.869	-1.49
		(1.88)	(1.77)	(1.59)	(2.05)
Age at study		-0.078	-0.008	-0.006	-0.263
entry		(0.178)	(0.147)	(0.133)	(0.199)
Education		-0.573	-0.317	-0.413	-0.708
		(0.377)	(0.341)	(0.314)	(0.390)
Practice effects		-0.231			-1.34
		(2.06)			(2.24)
EF between		-1.14			-0.071
		(9.53)			(0.060)
EF within		3.99			-0.019
		(11.94)			(0.112)
HRV between			0.178		1.24
			(0.740)		(0.844)
HRV within			0.296		0.242
			(0.356)		(0.547)
Subjective				0.024	9.165
between				(0.045)	(10.71)
Subjective				0.031	25.88
within				(0.047)	(17.33)
Random effects					
Intercept SD	7.94	8.43	8.17	7.85	7.51
Residual SD	9.54	9.56	9.31	9.63	9.01
Model fit					
LL	-3831.7	-1545.3	-1942.3	-3083.2	-903.9
AIC	7669.4	3110.7	3902.5	6184.4	1835.7

Note. Blood pressure medication is coded 1 = taking antihypertensive medication, 0 = not taking antihypertensive medication. Gender is coded 1= males, 2 = females. EF = executive function; HRV = heart rate variability; LL = log likelihood; AIC =Akaike information criterion.
*$p < .05$. ** $p < .001$.

Table S7: Exploratory models: Effects of conscientiousness on executive function and subjective self-regulation components.

	Conscientiousness:		
	γ (SE)	*t* (df)	*p*
Executive Function			
Trail Making Test A-B	0.027 (.025)	1.10 (145)	.27
Controlled Oral Word Association Test Total	0.013 (.026)	0.510 (146)	.61
Letter Number Sequencing Total	0.037 (.021)	1.74 (144)	.083
Digit Span Backward	-0.007 (0.029)	-0.25 (145)	.81
Digit Span Sequencing	0.030 (0.021)	1.46 (145)	.15
Subjective Self-Regulation			
Inhibit	1.67 (0.321)	5.20 (145)	< .001
Shift	1.49 (0.322)	4.62 (145)	< .001
Emotional Control	1.86 (0.537)	3.46 (145)	< .001
Self-Monitor	1.11 (0.290)	3.84 (145)	< .001
Initiate	3.03 (0.347)	8.74 (145)	< .001
Working Memory	2.74 (0.395)	6.93 (145)	< .001
Plan	4.48 (0.453)	9.89 (145)	< .001
Task Monitor	2.01 (0.271)	7.43 (145)	< .001
Organize	2.59 (0.394)	6.57 (145)	< .001

Note. Higher executive function test scores indicate better executive function. Higher subjective self-regulation subscale scores indicate better self-regulation.

Table S8: Exploratory models: Effects of executive function components on psychological and physical health between people.

	Trail Making Test A-B score	Controlled Oral Word Association Test total	Letter Number Sequencing total	Digit Span Backward	Digit Span Sequencing
	γ (SE)	γ (SE)	γ (SE)	γ (SE)	γ (SE)
Rep. Thought Valence	-0.74 (1.08)	**-3.03** **(0.89)**	0.089 (1.24)	-0.37 (0.90)	-1.22 (1.22)
Rep. Thought Purpose	0.22 (0.95)	-0.51 (0.81)	1.47 (1.09)	0.20 (0.79)	0.66 (1.07)
Rep. Thought Total	-4.6 (2.4)	-1.67 (2.16)	-1.09 (2.76)	**-6.18** **(1.94)**	**-8.35** **(2.60)**
Reappraisal	-0.14 (0.48)	-0.12 (0.42)	0.21 (0.52)	-0.50 (0.37)	0.06 (0.51)
Suppression	**-1.61** **(0.60)**	**-1.91** **(0.52)**	-1.06 (0.69)	-1.13 (0.51)	-1.62 (0.68)
Dyadic Cohesion	-3.96 (2.94)	-1.17 (2.16)	-4.60 (2.78)	-2.45 (2.07)	-3.99 (2.79)
Physical Activity	2.24 (1.33)	-0.43 (1.13)	1.73 (1.56)	-0.60 (1.14)	1.65 (1.53)
BMI	0.07 (0.12)	-0.23 (0.10)	0.07 (0.13)	0.04 (0.10)	0.08 (0.13)
Waist Circum.	-2.90 (8.56)	-17.86 (7.27)	-11.58 (9.25)	0.96 (6.82)	-7.93 (9.02)
Mean Arterial Pressure	-3.13 (6.57)	-3.24 (5.38)	-2.48 (7.86)	0.20 (5.68)	11.53 (7.48)
Self-Rated Health	0.95 (0.45)	0.62 (0.41)	0.67 (0.51)	0.05 (0.38)	0.88 (0.50)

Note. Higher executive function test scores indicate better executive function. Higher repetitive thought valence is more negative and less positive content. Higher repetitive thought purpose is more searching and less solving. Higher self-rated health values indicate better self-rated health. Given the exploratory nature of these analyses, we applied a Bonferroni correction of $p=.01$ (.05/5 predictors). Between-person associations in boldface are statistically significant at the Bonferroni-corrected level. Within-person associations are not displayed (none are statistically significant). BMI = body mass index.

Table S9: Exploratory models: Effects of subjective self-regulation components on psychological and physical health between people.

	Inhibit	Shift	Emotional Control	Self-Monitor	Initiate	Working Memory	Plan	Task Monitor	Organize Materials
	γ (SE)	γ (SE)	γ (SE)	γ (SE)	γ (SE)	γ (SE)	γ (SE)	γ (SE)	γ (SE)
Rep. Thought Valence	**-0.29**	**-0.38**	**-0.23**	**-0.36**	**-0.33**	**-0.27**	**-0.19**	**-0.33**	-0.13
	(0.06)	**(0.06)**	**(0.04)**	**(0.07)**	**(0.05)**	**(0.05)**	**(0.04)**	**(0.07)**	(0.05)
Rep. Thought Purpose	0.01	0.02	-0.06	-0.01	-0.03	0.005	0.0001	0.009	-0.03
	(0.06)	(0.06)	(0.04)	(0.07)	(0.05)	(0.05)	(0.04)	(0.07)	(0.05)
Rep. Thought Total	**-0.47**	**-0.87**	**-0.56**	**-0.54**	**-0.47**	**-0.53**	**-0.34**	**-0.65**	**-0.38**
	(0.16)	**(0.15)**	**(0.09)**	**(0.18)**	**(0.13)**	**(0.12)**	**(0.09)**	**(0.17)**	**(0.12)**
Reappraisal	0.004	0.005	0.02	0.03	0.02	0.003	0.002	0.02	-0.02
	(0.03)	(0.03)	(0.02)	(0.04)	(0.03)	(0.02)	(0.02)	(0.03)	(0.02)
Suppression	-0.02	-0.11	0.01	0.02	-0.09	-0.05	-0.04	-0.07	0.02
	(0.04)	(0.04)	(0.03)	(0.05)	(0.03)	(0.03)	(0.02)	(0.04)	(0.03)
Dyadic Cohesion	-0.07	0.20	0.19	0.14	0.08	0.21	0.01	0.02	0.02
	(0.17)	(0.17)	(0.11)	(0.19)	(0.14)	(0.14)	(0.10)	(0.19)	(0.13)
Physical Activity	0.13	0.12	0.04	0.12	**0.22**	0.14	0.13	0.23	0.12
	(0.08)	(0.08)	(0.05)	(0.09)	**(0.07)**	(0.06)	(0.05)	(0.09)	(0.06)
BMI	-0.008	0.002	-0.007	**-0.02**	**-0.02**	0.003	-0.005	-0.01	-0.02
	(0.008)	(0.008)	(0.005)	**(0.009)**	**(0.006)**	(0.006)	(0.005)	(0.009)	(0.006)
Waist Circum.	0.04	0.45	-0.25	-1.23	-1.11	0.34	-0.18	-0.26	-0.93
	(0.55)	(0.55)	(0.34)	(0.62)	(0.44)	(0.42)	(0.33)	(0.60)	(0.42)
Mean Arterial Pressure	0.48	0.57	0.19	0.36	-0.02	0.28	0.11	0.37	-0.43
	(0.39)	(0.41)	(0.25)	(0.45)	(0.33)	(0.30)	(0.24)	(0.43)	(0.31)
Self-Rated Health	0.07	**0.11**	**0.06**	**0.11**	**0.14**	**0.09**	**0.08**	**0.16**	**0.09**
	(0.03)	**(0.03)**	**(0.02)**	**(0.03)**	**(0.02)**	**(0.02)**	**(0.02)**	**(0.03)**	**(0.02)**

Note. Higher subjective self-regulation components indicate better self-regulation. Higher repetitive thought valence is more negative and less positive content. Higher repetitive thought purpose is more searching and less solving. Higher self-rated health values indicate better self-rated health. Given the exploratory nature of these analyses, we applied a Bonferroni correction of $p=.006$ (.05/9 predictors). Between-person associations in boldface are statistically significant at the Bonferroni-corrected level. BMI = body mass index.

Table S10: Exploratory models: Effects of subjective self-regulation components on psychological and physical health within people.

	Inhibit	Shift	Emotional Control	Self-Monitor	Initiate	Working Memory	Plan	Task Monitor	Organize Materials
	γ (SE)	γ (SE)	γ (SE)	γ (SE)	γ (SE)	γ (SE)	γ (SE)	γ (SE)	γ (SE)
Rep. Thought Valence	-0.08 (0.04)	**-0.18** **(0.04)**	**-0.09** **(0.03)**	-0.07 (0.04)	-0.08 (0.04)	**-0.14** **(0.03)**	**-0.12** **(0.03)**	**-0.16** **(0.04)**	**-0.17** **(0.04)**
Rep. Thought Purpose	0.02 (0.04)	0.04 (0.04)	0.02 (0.03)	0.03 (0.04)	0.03 (0.03)	0.04 (0.03)	0.04 (0.03)	0.07 (0.04)	0.04 (0.03)
Rep. Thought Total	-0.16 (0.06)	-0.12 (0.07)	-0.04 (0.05)	-0.18 (0.07)	-0.04 (0.06)	-0.11 (0.05)	-0.02 (0.04)	-0.01 (0.07)	-0.01 (0.06)
Reappraisal	0.007 (0.02)	0.03 (0.02)	0.02 (0.01)	-0.006 (0.02)	0.02 (0.02)	0.009 (0.01)	0.03 (0.01)	0.02 (0.02)	**0.04** **(0.01)**
Suppression	0.01 (0.02)	0.0002 (0.02)	0.007 (0.01)	0.02 (0.02)	-0.004 (0.02)	0.001 (0.02)	-0.005 (0.01)	0.008 (0.02)	0.00003 (0.016)
Dyadic Cohesion	0.16 (0.11)	-0.16 (0.11)	0.01 (0.07)	0.04 (0.11)	-0.01 (0.11)	0.21 (0.09)	0.01 (0.08)	-0.15 (0.12)	-0.04 (0.09)
Physical Activity	0.01 (0.05)	0.10 (0.05)	-0.05 (0.04)	0.12 (0.05)	0.006 (0.05)	0.03 (0.04)	0.07 (0.04)	0.09 (0.06)	0.07 (0.05)
BMI	0.002 (0.001)	0.003 (0.001)	0.002 (0.001)	0.001 (0.001)	0.002 (0.001)	0.002 (0.001)	**0.003** **(0.0007)**	0.002 (0.001)	0.002 (0.0009)
Waist Circum.	0.14 (0.18)	0.22 (0.18)	0.05 (0.13)	0.31 (0.19)	0.24 (0.17)	0.18 (0.16)	0.33 (0.13)	**0.58** **(0.20)**	-0.05 (0.16)
Mean Arterial Pressure	0.22 (0.29)	0.49 (0.30)	0.03 (0.21)	0.12 (0.30)	0.30 (0.27)	0.05 (0.25)	0.10 (0.20)	0.12 (0.32)	-0.1 (0.26)
Self-Rated Health	0.005 (0.014)	0.028 (0.014)	0.011 (0.010)	0.008 (0.014)	**0.04** **(0.01)**	0.01 (0.01)	0.007 (0.010)	-0.004 (0.015)	0.02 (0.012)

Note. Higher subjective self-regulation components indicate better self-regulation. Higher repetitive thought valence is more negative and less positive content. Higher repetitive thought purpose is more searching and less solving. Higher self-rated health values indicate better self-rated health. Given the exploratory nature of these analyses, we applied a Bonferroni correction of $p=.006$ (.05/9 predictors). Within-person associations in boldface are statistically significant at the Bonferroni-corrected level. BMI = body mass index.