Supplemental Materials

Factor Analysis of VLS-AQ

Item analysis was conducted for the VLS-AQ in two parts. In the first part two initial measurement models were tested, based on previous factor analysis using the VLS-AQ. The first was an eleven-factor model developed by Jopp and Hertzog [1] which specified the following factors: Physical (items 1-6), Craft (items 7-10), Games (items 11-16), TV (items 17-20), Social Private (items 21-26), Social Public (items 27-29, 31), Religious (items 30, 32, 33) Travel (items 34-36), Experiential (items 37-43), Development (items 44-51) and Technology (items 52-57) (see Table S1). Using this eleven-factor structure, CFA revealed poor model fit, $\chi^2(1484) = 2775.267$, $p < 0.001$, RMSEA = 0.104, confidence interval (CI) = 0.098-0.110, IFI = 0.39, TLI = 0.30, CFI = 0.35.

Next, an alternative seven-factor model proposed by Hess et al. [2] was tested. For this solution, Hess et al. [2] justified using a modified 28-item version of the VLS-AQ, which included only the four highest factor loadings on each of the seven subscales (Physical, Games, Social, TV, Experiential, Developmental, Technical), as reported by Jopp and Hertzog [1]. Using the same seven-factor framework proposed by Hess et al. [2], CFA revealed poor model fit, $\chi^2(329) = 447.024$, $p < 0.001$, RMSEA = 0.075, CI = 0.060-0.089, IFI = 0.74, TLI = 0.67, CFI = 0.71.

The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.337, and Bartlett's test of sphericity was significant $\chi^2(1596) = 2699.65$, $p < 0.05$, indicating that the items were related, and the correlation matrix was suitable for structure detection. Nineteen factors were initially extracted using the eigenvalue criteria of 1.0, with communalities ranging from 0.46 to 0.95. There was little difference between the unrestricted promax and oblimin factor solutions, thus both solutions were examined in subsequent analyses before deciding to use a promax rotation for the final solution.

Next, each activity item was evaluated and items with poor statistical properties were removed. This data reduction process occurred sequentially, with the goal being to identify the simplest factor structure solution that provided the strongest fit for the data. Individual item frequencies revealed two items (collect stamps, coins, dolls, etc.; play an instrument) with more than 50% of the sample having reported never participating in these activities over the past two years. These items were removed due to a floor effect which positively skewed the data. Nine more items (travel out of town; travel out of state; travel abroad; read for leisure; read newspapers; garden indoors or outdoors; engage in sewing, knitting, or needlework; attend movies; prepare my own income taxes) were removed because they did not have factor loadings of 0.3 or above on any of the seven factors. Table S1 reports the factor loadings for all activity items and * denotes activity items that were removed during the reduction process. Using this reduced structure with the 21 items removed, another series of promax rotations were performed. During this next set of iterations, an additional ten items were eliminated because they failed to meet the minimum criteria of having a primary factor loading of 0.3 or above (outdoor activities; recreational sport; watch game shows on television; give a dinner for friends; eat out at a restaurant; attend club meetings; engage in prayer or meditation; write letters; read books as part of my job; attend a public lecture; go to the library). The remaining 34 items fit nearly exclusively across one of the seven factors (see bolded numerical values in Table S1 for factor loading determinations, * indicates item questions that were removed from subsequent analysis).

Table S1 7-Factor EFA factor loadings and communalities for the VLS-AQ.

		Promax Rotated Structure Matrix							
		1	2	3	4	5	6	7	Communalities
1	Weight lifting, strength or calisthenics exercises				**0.66**				0.48
2	Aerobic activities: cardio, fitness, or working out				**0.79**				0.77
3	Flexibility activities: stretching, yoga, or tai chi				**0.44**				0.27
*4**	*Outdoor activities: sailing, fishing, or backpacking*								
5	Exercise activities: jogging, bicycling, or swimming		-0.32		**0.57**				0.39
*6**	*Recreational sports: tennis, bowling, or golf*								
7	Repair a mechanical device			**0.77**					0.63
8	Do household repairs			**0.74**					0.61
9	Do woodworking or carpentry			**0.70**					0.55
10	Buy a new item requiring set-up			**0.58**		0.36			0.49
11	Play word games		**0.87**						0.83
12	Play knowledge games		**0.78**						0.67
13	Play board games	0.40	**0.55**						0.45
14	Play jigsaw puzzles								0.25
15	Do cross-word puzzles		**0.53**						0.39
16	Play card games		**0.39**						0.30
17	Watch comedy or adventure programs on television					**0.57**			0.45
*18**	*Watch game shows on television*								
19	Watch documentaries on television					**0.73**			0.59
20	Watch news programs on television					**0.53**			0.45
21	Go out with friends	**0.64**							0.44
22	Visit friends or relatives	**0.68**					0.32		0.63
23	Attend parties (e.g. birthday)	**0.59**							0.41
24	Talk to (a) friend(s) on the phone	**0.68**							0.48

*25**	*Give a dinner for friends*					
*26**	*Eat out at a restaurant*					
27	Engage in political activities	0.32			**0.34**	0.34
28	Give a public talk				**0.51**	0.41
*29**	*Attend club meetings*					
30	Attend organized social events	**0.65**			0.42	0.66
31	Volunteer	**0.50**				0.37
32	Attend church services or synagogue	**0.42**				0.25
*33**	*Engage in prayer or meditation*					
*34**	*Travel out of town*					
*35**	*Travel out of state*					
*36**	*Travel abroad*					
37	Engage in business activities not related to my job			**0.56**		0.46
*38**	*Collect stamps, coins, dolls, etc.*					
*39**	*Read for leisure*					
*40**	*Read newspapers*					
*41**	Garden indoors or outdoors					
*42**	*Write letters*					
*43**	*Engage in sewing, knitting, or needlework*					
*44**	*Read books as part of my job*					
*45**	*Attend a public lecture*					
46	Enroll in a course at a university			**0.43**		0.25
47	Engage in creative writing			**0.43**		0.26
*48**	*Go to the library*					
49	Study a foreign language			**0.62**		0.47
50	Engage in an on-the-job training program				**0.61**	0.42
*51**	*Attend movies*					
52	Use computer software		**0.39**			0.26

53	Use an electronic calculator		**00.34**	0.24
54	Do arithmetic calculations	**0.42**		0.25
55	Engage in photography		**00.36**	0.28
*56**	*Play an instrument*			
*57**	*Prepare my own income taxes*			

Notes: (*) indicates item was removed during data reduction process, 22 total items removed, items 38 and 56 were removed based on frequency distributions; items 4, 6, 18, 25, 26, 29, 33, 34, 42, 44, 45 were reduced because of indeterminate factor loadings across multiple factors; items 34, 35, 36, 39, 40, 41, 43, 51, 57 were eliminated because they dropped out of the structure and did not have any factor loadings >0.3 across at least one of the seven factors.

Next, this seven-factor (Physical, Games, Home, TV, Social, Developmental, Technical) solution was tested using CFA. The CFA revealed poor model fit, $\chi^2(507) = 748.92$, $p > 0.001$, RMSEA = 0.077, CI = 0.065-0.089, IFI = 0.68, TLI = 0.62, CFI = 0.66. Reduced solutions for six and five factor structures were subsequently explored. Exploratory analysis using principal axis factoring extraction and promax rotation was again performed, this time restricting the solution to extract only six factors from these 34 items. Table S2 lists the factor loadings and communalities for these 34 items. In this six-factor solution, Factor 1 was labeled Games, Factor 2 was labelled Social, Factor 3 signified Home activities, Factor 4 was labeled Physical, Factor 5 was labeled TV, and Factor 6 was labeled Developmental activities. These labeling classifications were kept in line with the original factors proposed by Jopp and Hertzog [1].

Table S2 6-Factor EFA factor loadings and communalities for the VLS-AQ.

		Promax Rotated Structure Matrix						
		1	2	3	4	5	6	Communalities
1	Weight lifting, strength or calisthenics exercises				**0.69**			0.47
2	Aerobic activities: cardio, fitness, or working out				**0.82**			0.72
3	Flexibility activities: stretching, yoga, or tai chi				**0.40**			0.21
5	Exercise activities: jogging, bicycling, or swimming				**0.57**			0.39
7	Repair a mechanical device			**0.76**				0.60
8	Do household repairs			**0.76**				0.63
9	Do woodworking or carpentry			**0.66**				0.48
10	Buy a new item requiring set-up			**0.58**				0.44
11	Play word games	**0.91**						0.86
12	Play knowledge games	**0.74**						0.61
13	Play board games	**0.57**	0.41					0.42
14	Play jigsaw puzzles	**0.32**						0.17
15	Do cross-word puzzles	**0.55**						0.41
16	Play card games	**0.42**						0.29
17	Watch comedy or adventure programs on television					**0.67**		0.50
19	Watch documentaries on television					**0.71**		0.58
20	Watch news programs on television					**0.55**		0.40
21	Go out with friends		**0.61**					0.42
22	Visit friends or relatives		**0.69**					0.53
23	Attend parties (e.g. birthday)		**0.60**					0.38
24	Talk to (a) friend(s) on the phone		**0.70**					0.50
*27**	*Engage in political activities*							
*28**	*Give a public talk*							
*30**	*Attend organized social events*							

31	Volunteer		**0.47**		0.33
32	Attend church services or synagogue		**0.41**		0.23
37	Engage in business activities not related to my job			**0.60**	0.47
*46**	*Enroll in a course at a university*				
47	Engage in creative writing			**0.52**	0.28
49	Study a foreign language			**0.62**	0.44
*50**	*Engage in an on-the-job training program*				
52	Use computer software	**0.38**			0.23
53	Use an electronic calculator			**0.32**	0.18
54	Do arithmetic calculations	**0.39**			0.25
*55**	*Engage in photography*				

Notes: * indicates item was removed during data reduction process. Bolding indicates factor determinations based on highest loading values.

The remaining 28 items had primary loadings of 0.3 or above on at least one of the six factors, accounting for 55.64% of the total variance. Next, using these 28 items, a six-factor (Physical, Games, Home, TV, Social, Developmental) solution was tested using CFA. The CFA revealed poor model fit $\chi^2(309) = 423.82$, $p > 0.001$, RMSEA = 0.068, CI = 0.051-0.084, IFI = 0.79, TLI = 0.75, CFI = 0.77. Returning to exploratory analysis the same extraction and rotation procedures were performed again, this time restricting the solution to extract only five factors. In doing so, three TV items were excluded (watch comedy or adventure programs on television; watch documentaries on television; watch news programs on television) because they did not have a primary factor loading of 0.3 or above. Two additional items were removed because they also did not have a primary factor loading of 0.3 or above (use an electronic calculator, play board games), and one item (exercise activities: jogging, bicycling, or swimming) was eliminated because it had cross-loadings of >0.3 on multiple factors. This five-factor solution accounted for 53.21% of the variance and included 23 items. Table S3 displays the factor loadings for these items. The factor labels for this solution were: Factor 1: Games, Factor 2: Social, Factor 3: Home, Factor 4: Physical, Factor 5: Developmental.

Table S3 5-Factor EFA factor loadings and communalities for the VLS-AQ.

		Promax Rotated Structure Matrix					
		1	2	3	4	5	Communalities
1	Weight lifting, strength or calisthenics exercises				**0.68**		0.48
2	Aerobic activities: cardio, fitness, or working out				**0.87**		0.77
3	Flexibility activities: stretching, yoga, or tai chi				**0.40**		0.19
*5**	Exercise activities: jogging, bicycling, or swimming	-0.31			**0.53**		
7	Repair a mechanical device			**0.74**			0.56
8	Do household repairs			**0.79**			0.66
9	Do woodworking or carpentry			**0.69**			0.51
10	Buy a new item requiring set-up			**0.55**			0.35
11	Play word games	**0.92**					0.86
12	Play knowledge games	**0.73**					0.61
*13**	*Play board games*						
14	Play jigsaw puzzles	**0.33**					0.18
15	Do cross-word puzzles	**0.59**					0.43
16	Play card games	**0.43**					0.27
*17**	*Watch comedy or adventure programs on television*						
*19**	*Watch documentaries on television*						
*20**	*Watch news programs on television*						
21	Go out with friends		**0.64**				0.43
22	Visit friends or relatives		**0.70**				0.54
23	Attend parties (e.g. birthday)		**0.57**				0.33
24	Talk to (a) friend(s) on the phone		**0.68**				0.48
31	Go out with friends		**0.50**				0.33
32	Visit friends or relatives		**0.38**				0.20
37	Engage in business activities not related to my job					**0.61**	0.42

47	Engage in creative writing		**0.46**	0.26
49	Study a foreign language		**0.65**	0.48
52	Use computer software	**0.32**		0.18
*53**	*Use an electronic calculator*			
54	Do arithmetic calculations	**0.39**		0.25

Notes: (*) indicates item was removed during data reduction process, bolding indicates primary factor loading preference.

Eventually, a five-factor solution was identified. CFA was performed using this five-factor solution. The results indicated adequate model fit, $\chi^2(220) = 284.80$ $p = 0.002$, RMSEA = 0.061, CI = 0.038-0.080, IFI = 0.86, TLI = 0.82, CFI = 0.85. The standardized loading coefficients from this CFA are reported in Table S4. The standardized factor loadings from this CFA were all significant ($p < 0.05$). However, the correlations between the latent factors were low and showed substantial variation, according to the CFA latent variable correlations which ranged from -0.01 between Home and Developmental to 0.23 between Home and Social.

Table S4 Final 5-Factor EFA factor loadings and communalities for the VLS-AQ.

		VLS-AQ Activity Factors				
Item		Physical	Games	Home	Social	Developmental
1	Weight lifting, strength or calisthenics exercises	0.75				
2	Aerobic activities: cardio, fitness	0.85				
3	Flexibility activities: stretching, yoga	0.43				
7	Repair a mechanical device			0.71		
8	Do household repairs			0.83		
9	Do woodworking or carpentry			0.66		
10	Buy a new item requiring set-up			0.54		
11	Play word games		0.92			
12	Play knowledge games		0.71			
14	Play jigsaw puzzles		0.34			
15	Do cross-word puzzles		0.62			
16	Play card games		0.43			
21	Go out with friends				0.68	
22	Visit friends or relatives				0.73	
23	Attend parties (e.g. birthday)				0.57	
24	Talk to (a) friend(s) on the phone				0.68	
31	Go out with friends				0.44	
32	Visit friends or relatives				0.32	
37	Engage in business activities not related to my job					0.45
47	Engage in creative writing					0.46
49	Study a foreign language					0.88
52	Use computer software		0.29			
54	Do arithmetic calculations		0.33			

Internal consistency was examined using Cronbach's alpha. The alphas were moderate: Factor 1: Physical α = 0.70; Factor 2: Games α = 0.73; Factor 3: Home α = 0.77; Factor 4: Social α = 0.70; Factor 5: Developmental α = 0.59. No substantial increases in Cronbach's alpha for any of the factors could have been achieved by removing any of the items. Next, composite scores were created for each of the five factors, based on the mean of the items which had their primary loadings on each factor, with higher scores representing greater frequency of activity engagement. Although a promax rotation was used, only small correlations between each of the composite scores existed. Table S5 displays the correlation matrix for the factor composite scores. Overall, these analyses indicate that five distinct factors underlie the VLS-AQ in our sample and that these factors scales were moderately internally consistent. Only 23 of the 57 items comprised the final solution, thus a significantly reduced and modified version of the original factor structure proposed by Jopp and Hertzog [1] was used for remaining present analyses.

Table S5 Correlation matrix of Activity factor composite scores.

	Physical	Games	Home	Social	Developmental
Physical	1	0.02	-0.12	0.13	0.12
Games	0.02	1	0.05	0.08	-0.01
Home	-0.12	0.05	1	0.10	0.01
Social	0.13	0.08	0.10	1	0.14
Developmental	0.12	-0.01	0.01	0.14	1

Note: The correlation matrix shown above reports the factor composite score correlations which were created by combining the means of all items with primary loadings together for each of the five factors.

Factor Analysis of EMAS

Item analysis was conducted for the EMAS in two parts. The initial measurement model [3] specified two components of the EMAS: Social-Experiential Component (SEC) and Personal Competence Component (PCC). According to this structure, items 1-5 represented the PCC and items 6-12 represented the SEC component. Using this factor structure, CFA revealed $\chi^2(54) = 95.17$, $p < 0.001$, RMSEA = 0.098, CI = 0.064-0.129, IFI = 0.86, TLI = 0.83, CFI = 0.86. As the χ^2 chi-square statistic was significant, the RMSEA was >0.05 and the CFI was below the 0.90 recommendation [4], this model was an adequate but not good fit for the data.

Next, EFA was conducted using principal components with an eigenvalue of 1.0 set for item extraction. The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.84, above the recommended value of 0.6, and Bartlett's test of sphericity was significant $\chi^2(66) = 335.13$, $p < 0.05$. In search for simple structure, varimax and promax rotations were utilized. Structure coefficients (>0.30 to identify substantial loadings) were used to guide interpretation. A three-factor, varimax rotation, CFA revealed poor model fit, $\chi^2(54) = 132.145$, $p = 0.000$, RMSEA = 0.134, CI = 0.106-0.164, IFI = 0.74, TLI = 0.67, CFI = 0.73. However, when a promax rotation was applied to the three latent structures, the CFA revealed significantly better model fit, $\chi^2(51) = 66.33$, $p = 0.073$, RMSEA = 0.061, CI = 0.000-0.100, IFI = 0.95, TLI = 0.93, CFI = 0.95. Standardized regression weights (factor loadings) for each item based on the results of the CFA are reported in Table S6. All factor loadings were

significant. There were moderate significant correlations between each of the latent factors: Factors 1 & 2 (r = 0.64, p < 0.05); Factors 2 & 3 (r = 0.75, p < 0.05); and Factors 1 & 3 (r = 0. 73, p < 0.05).

Table S6 CFA Standardized Regression Weights for the EMAS Factors.

	Factor 1: Self-Expression & Caring	Factor 2: Personal Experiential	Factor 3: Social Value & Competence
Take care of self	0.66		
Reflect the person I am	0.63		
Express my creativity	0.67		
Help others	0.44		
Sense of accomplishment		0.73	
Give me pleasure		0.78	
Sense of satisfaction		0.82	
Right amount of challenge		0.48	
Feel competent			0.73
Valued by others			0.65
Feeling of control			0.32
Express personal values			0.78

Both EFAs resulted in a three-structure factor solution that explained 60.7% of the variance in the EMAS; communality values ranged from 0.29 to 0.77. The varimax rotation first used to identify the simple structure resulted in half of the EMAS items having structure coefficients (ranging from 0.31 to 0.75) loading across all three factors. The promax (correlated components) rotation was then employed resulting in half of the items having structure coefficients (ranging from 0.32 to 0.87) loading across all three factors. Upon examination, there was little difference between the three-factor varimax and promax solutions (see Table S7). Factor 1 accounted for 39.04% of the variance and contained items 1, 2, 3, 7. Factor 2 accounted for 12.32% of the EMAS variance and contained items 4, 8, 11, 12. Factor 3 accounted for 9.34% of the EMAS Variance and contained items 5, 6, 9, 10.

Table S7 EFA and item analysis coefficients for the EMAS.

		Varimax Factor				Communalities			
Item	Statement	1	2	3	Communalities	1	2	3	Communalities
1	Take care of self	**0.69**			0.55	**0.73**	0.42		0.55
2	Reflect the person I am	**0.76**			0.58	**0.75**			0.58
3	Express my creativity	**0.71**			0.56	**0.73**		0.37	0.56
4	Sense of accomplishment	0.45	**0.51**	0.37	0.60	0.61	**0.66**	0.56	0.60
5	Feel competent	0.46		**0.58**	0.60	0.59	0.43	**0.69**	0.60
6	Valued by others	0.32		**0.71**	0.62	0.46	0.32	**0.77**	0.62
7	Help others	**0.50**			**0.29**	**0.53**			0.29
8	Give me pleasure	0.42	**0.73**		0.74	0.57	**0.81**	0.34	0.74
9	Feeling of control	-0.33		**0.77**	0.74			**0.72**	0.74
10	Express personal values	0.51		**0.60**	0.65	0.64	0.41	**0.71**	0.65
11	Sense of satisfaction		**0.80**	0.32	0.77	0.38	**0.87**	0.52	0.77
12	Right amount of challenge		**0.76**		0.58		**0.74**		0.58

The decision to use the correlated (promax) rotation as the final solution was based on model fit indices between the two CFAs reported below; the first used uncorrelated (varimax) components and the second allowed components to be correlated (promax).

Factor labels proposed by Eakman et al. [3] were referenced and an additional label was created to account for all three factors. Factor 1 was labeled Self-Expression & Caring, and included items with activity meanings related to self-care, expressing creativity, and helping behaviors. Factor 2 was labeled Personal Experiential and included three items with activity meanings related to personal experiences and sensations (e.g., pleasure, accomplishment, and satisfaction). Factor 3 was labelled Social Value & Competence, and included items related to social value and personal self-control.

Internal consistency for each of the scales was examined using Cronbach's alpha. The alphas were moderate: for Self-Expression & Caring $\alpha = 0.68$; for Personal Experiential $\alpha = 0.78$; for Social Value & Competence $\alpha = 0.72$. All components consisted of 4 items. No substantial increases in alpha for any of the scales could have been achieved by removing any items. Overall, these analyses indicated that three distinct factors underlie the EMAS in our sample and that these factors scales were moderately internally consistent. Composite scores were created for each of the three factors, based on the mean of the items which had their primary loadings on each factor, with higher scores representing more frequent engagement in meaningful activity. All three factor composite scores were significantly ($p < 0.001$) and positively correlated: $r = 0.51$ between Factor 1 and Factor 2; $r = 0.56$ between Factor 2 and 3; $r = 0.47$ between Factor 1 and Factor 3. An approximately normal distribution was evident for the composite score data; thus, the data was well suited for parametric statistical analyses.

Factor Analysis of Cognitive Ability

EFA was performed to reduce and categorize the number of cognitive ability variables. EFA was conducted using principal axis factoring with an eigenvalue of 1.0 set for item extraction of seven cognitive variables. The Kaiser-Meyer Olkin measure of sampling adequacy was 0.76, greater than the recommended value of 0.6, and Bartlett's test of sphericity was significant, $\chi^2(21) = 96.48$, $p < 0.05$. In search for simple structure, varimax (orthogonal-uncorrelated components) and promax (oblique-correlated components) rotations were utilized. Structure coefficients (>0.30 to identify substantial loadings) were used to guide interpretation. Then, CFA was used to compare model fit between the uncorrelated and correlated structures.

Both EFAs resulted in two factors that explained 54.85% of the variance in the cognitive ability variables; communality values ranged from 0.19 to 0.69. The varimax rotation first used to identify the simple structure resulted in four of the cognitive variables items having structure coefficients (ranging from 0.39 to 0.55) loading across both factors. The promax rotation was then employed resulting in three of the items having structure coefficients (ranging from 0.43 to 0.66) loading across both factors. Factor 1 accounted for 37.09% of the variance and contained coding-symbol digit, opposites, and explicit memory. The second factor accounted for 17.77% of the variance and contained letter sets, letter number sequencing, TMT difference score, and visual puzzles. There were moderate correlations between the factors, $r = 0.44$. The rotated coefficient factor scores are listed in Table S8 for both varimax and promax rotations, along with the corrected item-total correlation for each cognitive variable. Upon examination, there was little difference between the

two-factor varimax and promax rotations, thus an additional CFA were performed using both the uncorrelated and correlated structures to compare model fit.

Table S8 EFA and Item Analysis for Cognitive Ability Factors.

	Varimax Factor		Communalities	Promax Factor		Communalities
	1	2		1	2	
Coding Symbol Digit	**0.83**		0.69	**0.81**		0.69
Letter Sets	0.48	**0.55**	0.53	0.58	**0.66**	0.53
Opposites	**0.40**		0.19	**0.43**		0.19
Letter Number Sequence	0.38	**0.55**	0.44	0.48	**0.64**	0.44
TMT Difference Score		**0.45**	0.22		**0.40**	0.22
Visual Puzzles		**0.39**	0.19		**0.43**	0.19
Explicit Memory	**0.64**		0.43	**0.65**	0.34	0.43

Using a two-factor uncorrelated structure, CFA revealed poor model fit, $\chi^2(14) = 26.85$, $p = 0.020$, RMSEA = 0.107, CI = 0.041-0.168, IFI = 0.85, TLI = 0.76, CFI = 0.84. However, when the two-factors were correlated the CFA revealed excellent model fit, $\chi^2(13) = 7.495$, $p = 0.875$, RMSEA = 0.00, CI = 0.000-0.056, IFI = 1.063, TLI = 1.11, CFI = 1.00. The standardized factor loadings from this CFA listed in Table S9 were all significant, except for TMT Difference ($p = 0.127$).

Table S9 CFA Standardized Regression Weights (Factor Loading) Cognitive Ability.

	Factor 1: Fluid-Memory	Factor 2: Reasoning-Executive Functioning
Coding Symbol Digit	0.72	
Opposites	0.46	
Explicit Memory	0.72	
Letter Sets		0.79
Letter Number Sequencing		0.65
TMT Difference		0.22
Visual Puzzles		0.40

Factor 1 (Fluid-Memory) was represented by three items: coding symbol digit, a measure of processing speed; opposites, a measure of verbal fluency; explicit memory, which required both working memory and visual attention. Factor 2 (Reasoning-Executive Functioning) included four items: Letter Sets, which measured reasoning ability; Letter Number Sequencing, a task that involves attention and executive functioning; TMT Difference Score, which measured executive functioning (task-switching and attention) and was distinct from spatial processing because it was calculated using both parts A and B of the TMT; Visual Puzzles, a task involving nonverbal reasoning and an ability to analyze and synthesize visual stimuli (i.e., executive functioning). Scores on these tasks were first converted into t-scores and then combined to create a mean composite score for each cognitive factor. Internal consistency for each of the factors was examined using Cronbach's alpha. The alphas were moderate: for Fluid-Memory (Factor 1) $\alpha = 0.65$; for Reasoning-Executive Functioning (Factor 2) $\alpha = 0.72$.

Interestingly, Letter Number Sequencing (LNS) and Explicit Memory (EM), both involving working memory requiring participants to recall verbal information, were factored separately. LNS not only requires recall working memory but also the organization of verbally presented information, as participants not only had to recall letters and numbers sequentially but to do so following sequential rules (i.e., repeating sequence back starting with the numbers first, followed by the letters in alphabetical order), whereas EM only required verbal recall of visually presented information. In the EM task a computer PowerPoint presented words one at a time on the screen and then the participants were asked to recall the words in any order. The LNS seems to involve more complex executive functions (e.g., attention, task-switching), above and beyond just recalling visually presented information.

Other research has distinguished between similar executive functioning and working memory tasks [5], suggesting that LNS and EM activate different cognitive skills. This differentiation has been described in the physical activity literature, which has identified attention, processing speed, executive function, memory, and working memory all as separate areas of interest [5]. However, a

test that is described as a memory test in some papers can be classified as executive function in others; for example, working memory tests are often grouped within the executive function domain [6] rather than within memory domains. Therefore, even though both tasks can serve as indicators of working memory, LNS was grouped along with the other more complex executive functioning tasks.

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