

# Supplementary Material

## Long-Term Effects of the Multicomponent Program BrainProtect® on Cognitive Function: One-Year Follow-Up in Healthy Adults

**Supplementary Table 1.** Baseline demographic characteristics comparison between dropouts and continuing participants

Baseline characteristics	Dropouts (N=43)	PP-Analysis (N=88)	<i>p</i>
Member of the IG, frequency (%)	17 (39.5)	42 (47.7)	0.378
Age (y), median (IQR)	69 (62-78)	67 (63-72)	<b>0.009</b>
Female, frequency (%)	35 (81.4)	58 (65.9)	0.080
Education (y), median (IQR)	17 (13-18)	18 (13-18)	0.790
Professional degree, frequency (%)			0.992
None	3 (7.0)	10 (11.3)	
Apprenticeship	13 (30.2)	17 (19.3)	
Technical school	5 (11.6)	14 (15.9)	
University	22 (51.2)	47 (53.4)	
Employment, frequency (% yes)	11 (25.6)	23 (26.1)	0.917
Sedentary work, frequency (% yes)	28 (65.1)	65 (73.9)	0.254
Marital status, frequency (% married)	21 (48.8)	53 (60.2)	0.361
Living alone, frequency (% yes)	14 (32.6)	26 (29.5)	0.756
Previous participation in cognitive training, frequency (% yes)	8 (18.6)	8 (9.1)	0.137
Self-perception of health, mean (SD) (Indication by grades, higher values indicate worse perceived health)	3.28±2.05	2.56±1.46	<b>0.010</b>
Diagnosed memory disorder in family (% yes)	17 (39.5)	27 (30.7)	0.332
Diagnosed disease at study start (% yes)	32 (74.4)	69 (78.4)	0.528
Medication at study start (% yes)	35 (81.4)	64 (72.7)	0.527
Nutrition, frequency (%)			0.605
Omnivore	38 (88.4)	74 (84.1)	
Vegetarian	2 (4.7)	6 (6.8)	
No specification	3 (7.0)	8 (9.1)	
Regular physical activity (% yes)	39 (90.7)	68 (77.3)	0.123
Regular physical activity, frequency per week (%)			0.540
1-2x	13 (30.2)	33 (37.5)	
3-4x	16 (37.2)	28 (31.8)	
5-7x	7 (16.3)	11 (12.5)	
No specification	7 (16.3)	15 (17.0)	
Regular physical activity, duration per unit (%)			0.124
15-30 min	4 (9.3%)	5 (5.7%)	
30-60 min	14 (32.6%)	42 (47.7%)	
>60 min	14 (32.6%)	22 (25.0%)	

No specification	11 (25.6%)	18 (20.5%)	
BMI, frequency (%)			0.847
<19	2 (4.7)	2 (2.3)	
19-20	3 (7.0)	9 (10.2)	
21-22	8 (18.6)	14 (15.9)	
>23	30 (69.8)	63 (71.6)	
ADL-Score, mean (SD)	5.93±0.26	5.98±0.15	0.189
IADL-Score, mean (SD)	7.98±0.15	8±0.00	0.153
MNA-SF-Score, median (IQR)	13 (12-14)	13 (12-14)	0.716
EQ-5D-5L, mean (SD)	5.84±1.45	5.66±1.49	0.458
EQ-5D-5L health in %, mean (SD) (max. 100%, higher values indicate better perceived health)	77.42±16.49	80.81±13.48	0.455
BDI, mean (SD)	3.21±2.73	3.32±2.64	0.776
MoCA, mean (SD)	27.91±1.41	27.84±1.49	0.818
CERAD-Plus-z total score (TS2), mean (SD)	0.09±0.53	0.20±0.58	0.724
BVGT BrainProtect total, mean (SD)	43.90±9.63	45.53±8.50	0.383

Statistical comparison between subjects who dropped out during the trial (Dropouts) and subjects who participated in all tests (PP-analysis). Values are presented as the mean ± standard deviation or median and interquartile range or frequency with percentages. For baseline comparison between groups, p-values of Mann-Whiney-U tests, independent sample t-tests or  $\chi^2$ -tests are reported as appropriate. Variables were previously inspected visually by qq-plots and statistically by Shapiro-Wilk tests for normal distribution. BMI, body mass index; ADL, Activities of Daily Living; IADL, Instrumental Activities of Daily Living; MNA, Mini Nutritional Assessment short-form; EQ-5D-5L, descriptive system of 5 dimensions mobility, self-care, usual activities, pain and depression; EQ-5D-5L health in %, participant's self-rated health on a vertical visual analogue scale; BDI, Beck Depression Inventory; MoCA, Montreal Cognitive Assessment; CERAD, Consortium to Establish a Registry for Alzheimer's Disease; BVGT, Bundesverband Gedächtnistraining e.V. BrainProtect

**Supplementary Table 2.** ANCOVA with measurement repetition between Intervention Group (IG) and General Health Counseling (GHC) adjusted for the significant group differences (BDI total, BVGT BrainProtect total and education years)

Outcome	Intervention Group (IG)				General Health Counseling (GHC)				Time		Group		Time x Group	
	Baseline	Posttest	Follow-up 1	Follow-up 2	Baseline	Posttest	Follow-up 1	Follow-up 2	$\eta^2$	$p$	$\eta^2$	$p$	$\eta^2$	$p(p)^a$
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)						
<u>CERAD-Plus-z total score (TS2)<sup>b</sup></u> (N=88; IG=42, CG=46)	0.16 (0.54)	0.64 (0.56)	0.61 (0.62)	0.42 (0.55)	0.22 (0.62)	0.63 (0.37)	0.48 (0.61)	0.52 (0.49)	0.030	0.057	0.015	0.265	0.025	0.117
<i>Verbal fluency</i>	-0.38 (0.84)	0.37 (1.08)	0.28 (1.01)	0.21 (1.12)	-0.02 (0.87)	0.29 (0.90)	0.44 (1.06)	0.36 (0.96)	0.009	0.512	0.000	0.875	0.018	0.221
<i>Boston Naming Test (BNT)</i>	0.02 (1.04)	0.48 (0.68)	0.40 (0.83)	-0.29 (0.91)	0.38 (0.82)	0.55 (0.60)	0.14 (0.90)	0.09 (0.78)	0.010	0.483	0.010	0.357	0.042	<b>0.014</b> (0.21)
<i>Mini Mental Status Examination (MMSE)</i>	-0.62 (1.10)	0.05 (1.03)	0.07 (0.98)	-0.32 (0.91)	-0.42 (1.53)	-0.01 (0.94)	-0.45 (1.38)	-0.16 (0.98)	0.003	0.877	0.014	0.292	0.018	0.218
<i>Wordlist total</i>	0.33 (1.07)	0.78 (1.04)	0.83 (1.13)	0.88 (0.91)	0.18 (0.91)	0.73 (0.87)	0.83 (1.10)	0.97 (0.82)	0.009	0.518	0.007	0.442	0.005	0.760
<i>Wordlist recall</i>	0.28 (1.20)	0.74 (0.93)	0.84 (0.86)	0.66 (0.77)	0.05 (1.29)	0.63 (0.81)	0.70 (0.92)	0.72 (0.82)	0.020	0.181	0.012	0.327	0.003	0.831
<i>Wordlist savings</i>	0.23 (1.60)	0.25 (1.05)	0.59 (0.88)	0.30 (0.82)	0.05 (2.10)	0.27 (0.74)	0.46 (0.97)	0.34 (0.64)	0.037	0.047	0.002	0.720	0.001	0.954
<i>Wordlist recognition</i>	0.04 (0.99)	0.32 (0.53)	0.43 (0.43)	0.13 (0.73)	-0.28 (1.10)	1.23 (6.16)	0.28 (0.57)	0.19 (0.65)	0.000	0.914	0.015	0.271	0.027	0.129
<i>Constructional praxis</i>	-0.33 (1.08)	0.40 (0.70)	0.12 (1.08)	-0.19 (1.23)	-0.24 (1.16)	0.20 (0.96)	-0.36 (1.43)	-0.41 (1.29)	0.001	0.960	0.037	0.080	0.015	0.268
<i>Constructional praxis recall</i>	-0.30 (1.22)	0.83 (0.76)	0.20 (1.35)	0.38 (1.02)	-0.12 (1.39)	0.44 (1.01)	-0.33 (1.30)	-0.02 (1.30)	0.005	0.689	0.027	0.133	0.030	0.073
<i>Constructional praxis savings</i>	-0.10 (0.93)	0.49 (0.70)	0.12 (1.02)	0.49 (0.94)	0.06 (1.04)	0.27 (0.71)	0.01 (0.95)	0.26 (0.99)	0.006	0.663	0.000	0.878	0.014	0.333
<i>Trail Making Test (TMT) A</i>	0.70 (1.30)	0.62 (1.57)	1.02 (1.30)	0.70 (1.16)	0.56 (1.21)	0.94 (1.16)	0.91 (0.94)	0.92 (1.01)	0.069	0.002	0.007	0.465	0.011	0.431
<i>Trail Making Test (TMT) B</i>	0.91 (1.48)	0.98 (1.33)	1.04 (1.31)	1.06 (1.72)	0.80 (1.37)	1.17 (1.11)	1.27 (1.33)	1.40 (1.37)	0.081	<0.001	0.003	0.651	0.001	0.980
<i>Delta TMT B_A</i>	0.19 (1.02)	0.40 (1.18)	0.04 (1.03)	0.30 (1.36)	0.17 (0.92)	0.21 (1.09)	0.26 (1.03)	0.36 (0.93)	0.006	0.669	0.000	0.956	0.007	0.632
<i>S-Words</i>	0.35 (1.35)	1.04 (1.10)	1.05 (1.17)	0.86 (1.06)	0.21 (1.04)	1.01 (0.96)	0.87 (0.95)	1.01 (0.97)	0.012	0.376	0.002	0.693	0.007	0.604
<u>BVGT BrainProtect total score<sup>b</sup></u> (N=88; IG=42, CG=46)	43.0 (7.36)	51.2 (10.66)	52.6 (11.34)	44.8 (10.62)	47.6 (9.20)	52.1 (8.58)	54.3 (10.20)	48.9 (8.87)	0.032	0.046	0.026	0.137	0.029	0.063
<i>Thinking flexibility</i>	3.7 (1.61)	5.2 (1.90)	4.6 (2.13)	3.7 (1.65)	4.5 (1.86)	5.4 (1.73)	4.2 (1.74)	4.4 (1.64)	0.025	0.092	0.019	0.205	0.033	<b>0.037</b> (0.333)
<i>Concentration</i>	7.1 (1.53)	7.2 (1.91)	7.3 (1.63)	7.1 (1.97)	7.4 (2.02)	8.0 (1.67)	8.1 (2.06)	7.8 (1.66)	0.003	0.858	0.056	<b>0.029</b>	0.007	0.631
<i>Learning</i>	6.7 (1.08)	8.5 (1.31)	8.1 (1.33)	7.6 (1.59)	7.1 (1.34)	8.5 (1.06)	8.2 (1.09)	7.8 (0.92)	0.032	0.043	0.006	0.497	0.009	0.541
<i>Working memory</i>	5.2 (2.56)	5.6 (2.54)	6.9 (2.65)	5.9 (3.06)	7.1 (2.79)	6.5 (2.86)	7.2 (2.65)	7.1 (2.79)	0.002	0.940	0.060	<b>0.024</b>	0.025	0.103

<i>Perception</i>	4.7 (1.84)	6.0 (2.18)	6.9 (2.11)	3.8 (2.09)	5.3 (1.92)	6.0 (2.01)	7.4 (2.11)	3.8 (1.79)	0.024	0.105	0.009	0.394	0.011	0.410
<i>Logical reasoning</i>	5.2 (1.74)	6.2 (2.04)	8.3 (2.10)	6.2 (2.90)	5.4 (1.56)	5.6 (2.13)	7.4 (2.74)	6.5 (2.44)	0.034	0.036	0.010	0.371	0.041	<b>0.015</b> (0.135)
<i>Imagination</i>	2.7 (1.68)	4.1 (2.10)	3.2 (2.01)	3.0 (2.00)	3.3 (1.72)	3.9 (1.83)	3.6 (2.00)	3.4 (1.81)	0.036	0.029	0.008	0.416	0.021	0.152
<i>Structured thinking</i>	7.7 (2.79)	8.3 (2.86)	7.3 (3.48)	7.4 (3.59)	7.4 (3.32)	8.3 (3.12)	8.2 (3.44)	8.1 (3.20)	0.007	0.599	0.004	0.564	0.010	0.352
<u>MoCA<sup>b</sup></u> (N=88; IG=42, CG=46)	27.8 (1.59)	-	-	26.6 (2.48)	27.9 (1.43)	-	-	27.1 (1.92)	0.088	0.006	0.002	0.676	0.002	0.700
<u>BDI<sup>c</sup></u> (N=88; IG=42, CG=46)	3.7 (2.50)	-	-	2.2 (2.64)	3.0 (2.78)	-	-	2.3 (2.88)	0.026	0.139	0.001	0.729	0.010	0.358
<u>EQ-5D-5L<sup>b</sup></u> (N=88; IG=42, CG=46)	5.7 (1.54)	6.0 (1.91)	5.8 (1.48)	6.0 (1.57)	5.7 (1.48)	6.1 (1.71)	6.1 (1.58)	5.8 (1.29)	0.007	0.623	0.005	0.533	0.010	0.463
<i>Health in %<sup>b</sup></i>	79.5 (14.75)	80.9 (13.61)	80.7 (13.91)	80.3 (10.75)	81.4 (12.15)	78.8 (11.97)	78.7 (14.63)	77.2 (12.51)	0.016	0.274	0.028	0.131	0.013	0.370

Data are indicated as mean standardized z-scores (CERAD Plus) or raw scores and standard deviations (SD). Following covariates were used for the CERAD-Plus subtests, MoCA and EQ-5D-5L: BVGT Total, BDI Total and education years. Following covariates were used for the BVGT subtests: BDI Total and education years. Following covariates were used for the BDI: BVGT Total and education years. CERAD, Consortium to Establish a Registry for Alzheimer's Disease; BVGT, Bundesverband Gedächtnistraining e.V. BrainProtect; MoCA, Montreal Cognitive Assessment; BDI, Beck Depression Inventory; EQ-5D-5L, descriptive system of 5 dimensions mobility, self-care, usual activities, pain and depression; EQ-5D-5L health in %, participant's self-rated health on a vertical visual analogue scale (p)<sup>a</sup>, p after adjusting the significant results for multiple testing using the Bonferroni correction. <sup>b</sup>Higher values indicate better performance; <sup>c</sup>lower scores indicate better performance.

**Supplementary Table 3. Linear regression of potential influencing factors of the delta follow-up 2 - pretest (GHC)**

Outcome Delta follow-up 2 - pretest	Standardized $\beta$ -coefficients of predictors ( $p$ -value)													
	Baseline level	Sex	Age	Educa-tion in years	Employed	Sedentary work	Married	Divorced /sepa-rated	Single	Living alone	Diagnosed memory disorder in family	Vegetarian	Former CT participation	Physical activity
CERAD-Plus-z total score (TS2) <sup>a</sup> F(14,27)=4.021, $p=0.001$ , adjusted R <sup>2</sup> =0.508	<b>-0.862</b> ( <b>≤0.001</b> )	-0.202 (0.185)	0.032 (0.872)	-0.157 (0.224)	-0.042 (0.836)	-0.055 (0.681)	-0.118 (0.414)	-0.194 (0.188)	0.092 (0.536)	0.200 (0.220)	-0.047 (0.716)	0.034 (0.795)	0.044 (0.740)	-0.049 (0.717)
BVGT BrainProtect total score <sup>a</sup> F(14,27)=1.458, $p=0.194$ , adjusted R <sup>2</sup> =0.135	-0.542 (0.007)	0.086 (0.662)	-0.095 (0.730)	0.220 (0.201)	-0.063 (0.812)	-0.017 (0.925)	-0.239 (0.216)	-0.131 (0.505)	0.104 (0.589)	0.131 (0.535)	-0.088 (0.614)	-0.120 (0.467)	0.105 (0.530)	0.168 (0.345)
Thinking flexibility F(14,52)=3.124, $p=0.001$ , adjusted R <sup>2</sup> =0.311	<b>-0.627</b> ( <b>≤0.001</b> )	-0.204 (0.106)	-0.283 (0.096)	-0.065 (0.575)	0.005 (0.976)	0.093 (0.475)	-0.082 (0.512)	0.053 (0.685)	0.058 (0.636)	0.082 (0.575)	-0.101 (0.376)	0.169 (0.127)	0.124 (0.292)	-0.210 (0.095)
Concentration F(14,52)=1.994, $p=0.037$ , adjusted R <sup>2</sup> =0.174	-0.131 (0.353)	<b>-0.274</b> ( <b>0.049</b> )	-0.269 (0.146)	<b>-0.317</b> ( <b>0.021</b> )	-0.107 (0.527)	-0.176 (0.229)	-0.185 (0.187)	-0.026 (0.856)	0.178 (0.188)	0.246 (0.136)	-0.202 (0.106)	0.043 (0.723)	-0.118 (0.391)	-0.163 (0.235)
Learning F(14,52)=1.146, $p=0.344$ , adjusted R <sup>2</sup> =0.030	-0.153 (0.274)	-0.244 (0.106)	-0.329 (0.106)	-0.225 (0.103)	-0.112 (0.540)	-0.034 (0.825)	-0.123 (0.404)	-0.013 (0.933)	0.185 (0.204)	0.147 (0.400)	-0.172 (0.214)	-0.080 (0.542)	0.043 (0.759)	-0.194 (0.192)
Working memory F(14,52)=1.870, $p=0.052$ , adjusted R <sup>2</sup> =0.156	-0.447 (0.003)	-0.296 (0.040)	-0.201 (0.309)	-0.149 (0.247)	-0.075 (0.669)	-0.114 (0.432)	-0.134 (0.330)	-0.097 (0.507)	0.152 (0.264)	0.168 (0.304)	-0.199 (0.118)	-0.064 (0.605)	0.055 (0.679)	-0.011 (0.938)
Perception F(14,52)=5.957, $p≤0.001$ , adjusted R <sup>2</sup> =0.513	<b>-0.626</b> ( <b>≤0.001</b> )	-0.152 (0.158)	<b>-0.309</b> ( <b>0.031</b> )	-0.100 (0.309)	-0.028 (0.835)	-0.117 (0.293)	-0.127 (0.226)	0.039 (0.722)	0.088 (0.391)	0.187 (0.134)	<b>-0.306</b> ( <b>0.002</b> )	-0.019 (0.835)	0.081 (0.414)	<b>-0.251</b> ( <b>0.021</b> )
Logical reasoning F(14,52)=1.109, $p=0.373$ , adjusted R <sup>2</sup> =0.023	-0.117 (0.413)	-0.287 (0.058)	-0.273 (0.175)	-0.146 (0.294)	0.118 (0.522)	-0.121 (0.443)	-0.188 (0.208)	-0.047 (0.762)	0.137 (0.349)	0.139 (0.427)	-0.155 (0.252)	-0.077 (0.556)	0.066 (0.638)	-0.178 (0.230)
Imagination F(14,52)=1.814, $p=0.061$ , adjusted R <sup>2</sup> =0.147	-0.489 ( <b>≤0.001</b> )	-0.184 (0.188)	-0.250 (0.200)	-0.074 (0.565)	0.010 (0.957)	0.109 (0.457)	-0.136 (0.324)	-0.057 (0.697)	0.071 (0.607)	0.172 (0.299)	-0.164 (0.199)	0.082 (0.509)	0.071 (0.587)	-0.296 (0.040)
Structured thinking F(14,52)=3.044, $p=0.002$ , adjusted R <sup>2</sup> =0.302	<b>-0.653</b> ( <b>≤0.001</b> )	0.010 (0.937)	-0.217 (0.206)	-0.118 (0.315)	-0.119 (0.457)	0.013 (0.921)	-0.043 (0.729)	-0.016 (0.904)	0.103 (0.408)	-0.010 (0.944)	-0.088 (0.443)	-0.101 (0.360)	-0.032 (0.786)	-0.009 (0.944)
MoCA <sup>a</sup> F(14,27)=1.612, $p=0.139$ , adjusted R <sup>2</sup> =0.173	-0.440 (0.018)	0.375 (0.062)	-0.100 (0.707)	0.007 (0.965)	-0.004 (0.987)	0.152 (0.385)	-0.256 (0.199)	-0.037 (0.844)	-0.078 (0.677)	0.104 (0.613)	0.122 (0.473)	-0.016 (0.917)	0.014 (0.933)	0.202 (0.247)
BDI <sup>b</sup> F(14,27)=2.705, $p=0.013$ , adjusted R <sup>2</sup> =0.368	<b>-0.734</b> ( <b>≤0.001</b> )	-0.041 (0.809)	-0.127 (0.568)	-0.126 (0.386)	-0.156 (0.493)	0.010 (0.949)	-0.096 (0.562)	-0.236 (0.158)	0.041 (0.804)	<b>0.374</b> ( <b>0.045</b> )	-0.256 (0.100)	0.157 (0.261)	-0.162 (0.261)	-0.043 (0.773)
EQ-5D-5L <sup>a</sup> F(14,27)=3.368, $p=0.003$ , adjusted R <sup>2</sup> =0.447	<b>-0.861</b> ( <b>≤0.001</b> )	-0.322 (0.051)	-0.212 (0.311)	-0.104 (0.440)	-0.061 (0.775)	-0.002 (0.987)	0.124 (0.417)	0.105 (0.502)	0.268 (0.090)	0.086 (0.637)	<b>-0.308</b> ( <b>0.033</b> )	0.267 (0.076)	-0.082 (0.548)	-0.225 (0.123)

Dependent variables are defined as delta follow-up 2 minus pretest of the named outcomes; all regression models are presented; for each regression model, standardized regression coefficients are reported for predictors irrespective of reaching statistical significance; regression models that reached statistical significance at  $p < 0.05$  are presented bold printed; CERAD, Consortium to Establish a Registry for Alzheimer's Disease; BVGT, Bundesverband Gedächtnistraining e.V. BrainProtect; MoCA, Montreal Cognitive Assessment; BDI, Beck Depression Inventory; EQ-5D-5L, descriptive system of 5 dimensions mobility, self-care, usual activities, pain and depression. <sup>a</sup>Higher values indicate better performance; <sup>b</sup>lower scores indicate better performance

**Supplementary Table 4.** Linear regression of changes during study period surveyed by the final questionnaire

**A) Social changes**

Outcome Delta follow-up 2 - pretest	Standardized $\beta$ -coefficients of predictors ( $p$ -value)			
	Baseline level	Group	Sum score	Group x Sum score
CERAD-Plus-z total score (TS2) <sup>a</sup>	<b>-0.674</b>	0.248	0.605	-0.668
F(4,44)=10,570, $p \leq 0.001$ , adj. R <sup>2</sup> =0.444	( $\leq 0.001$ )	(0.096)	(0.105)	(0.093)
BVGT BrainProtect total score <sup>a</sup>	0.014	0.003	-0.031	-0.105
F(4,44)=0.201, $p=0.937$ , adj. R <sup>2</sup> =-0.071	(0.927)	(0.989)	(0.951)	(0.847)
MoCA <sup>a</sup>	-0.268	-0.123	-0.331	0.500
F(4,44)=1.430, $p=0.240$ , adj. R <sup>2</sup> =0.035	(0.073)	(0.538)	(0.500)	(0.341)
BDI <sup>b</sup>	<b>-0.607</b>	-0.048	-0.505	0.516
F(4,43)=7.399, $p \leq 0.001$ , adj. R <sup>2</sup> =0.353	( $\leq 0.001$ )	(0.769)	(0.220)	(0.240)
EQ-5D-5L <sup>a</sup>	<b>-0.466</b>	-0.207	-0.346	0.321
F(4,44)=3.461, $p=0.015$ , adj. R <sup>2</sup> =0.170	(0.002)	(0.260)	(0.444)	(0.510)

**B) Psychological changes**

Outcome Delta follow-up 2 - pretest	Standardized $\beta$ -coefficients of predictors ( $p$ -value)			
	Baseline level	Group	Sum score	Group x Sum score
CERAD-Plus-z total score (TS2) <sup>a</sup>	<b>-0.660</b>	-0.253	-0.263	0.559
F(4,40)=9.256, $p \leq 0.001$ , adj. R <sup>2</sup> =0.429	( $\leq 0.001$ )	(0.462)	(0.548)	(0.317)
BVGT BrainProtect total score <sup>a</sup>	-0.078	-0.219	-0.304	0.481
F(4,40)=0.217, $p=0.928$ , adj. R <sup>2</sup> =-0.077	(0.631)	(0.644)	(0.613)	(0.528)
MoCA <sup>a</sup>	-0.253	0.137	0.246	-0.174
F(4,40)=0.807, $p=0.528$ , adj. R <sup>2</sup> =-0.018	(0.118)	(0.765)	(0.676)	(0.816)
BDI <sup>b</sup>	<b>-0.560</b>	0.021	0.076	0.201
F(4,39)=11.694, $p \leq 0.001$ , adj. R <sup>2</sup> =0.499	( $\leq 0.001$ )	(0.948)	(0.859)	(0.705)
EQ-5D-5L <sup>a</sup>	<b>-0.456</b>	-0.109	0.119	0.018
F(4,40)=3.101, $p=0.026$ , adj. R <sup>2</sup> =0.160	(0.002)	(0.796)	(0.825)	(0.978)

**C) Physical changes**

Outcome Delta follow-up 2 - pretest	Standardized $\beta$ -coefficients of predictors ( $p$ -value)			
	Baseline level	Group	Sum score	Group x Sum score
CERAD-Plus-z total score (TS2) <sup>a</sup>	<b>-0.699</b>	0.169	0.076	-0.284
F(4,45)=11.200, $p \leq 0.001$ , adjusted R <sup>2</sup> =0.454	( $\leq 0.001$ )	(0.254)	(0.834)	(0.468)
BVGT BrainProtect total score <sup>a</sup>	0.045	-0.203	-0.562	0.605
F(4,45)=0.336, $p=0.852$ , adjusted R <sup>2</sup> =-0.057	(0.781)	(0.350)	(0.273)	(0.280)
MoCA <sup>a</sup>	-0.308	0.048	-0.133	-0.033
F(4,45)=1.341, $p=0.269$ , adjusted R <sup>2</sup> =0.027	(0.039)	(0.809)	(0.785)	(0.950)
BDI <sup>b</sup>	<b>-0.675</b>	-0.016	0.037	0.150
F(4,44)=8.691, $p \leq 0.001$ , adjusted R <sup>2</sup> =0.391	( $\leq 0.001$ )	(0.919)	(0.925)	(0.720)
EQ-5D-5L <sup>a</sup>	<b>-0.462</b>	-0.086	0.066	-0.097
F(4,45)=3.306, $p=0.019$ , adjusted R <sup>2</sup> =0.158	(0.001)	(0.643)	(0.884)	(0.843)

**D) Nutritional changes**

Outcome Delta follow-up 2 - pretest	Standardized $\beta$ -coefficients of predictors ( $p$ -value)			
	Baseline level	Group	Sum score	Group x Sum score
CERAD-Plus-z total score (TS2) <sup>a</sup>	<b>-0.678</b>	0.461	0.273	-0.475
F(4,37)=7.839, $p \leq 0.001$ , adjusted R <sup>2</sup> =0.400	( $\leq 0.001$ )	(0.362)	(0.468)	(0.436)
BVGT BrainProtect total score <sup>a</sup>	-0.070	0.308	0.160	-0.408
F(4,37)=0.140, $p=0.966$ , adjusted R <sup>2</sup> =-0.092	(0.687)	(0.653)	(0.747)	(0.618)
MoCA <sup>a</sup>	-0.268	-0.141	-0.059	0.232
F(4,37)=1.082, $p=0.379$ , adjusted R <sup>2</sup> =0.008	(0.115)	.826)	(0.954)	(0.764)
BDI <sup>b</sup>	<b>-0.618</b>	-0.097	-0.286	0.274
F(4,36)=6.628, $p \leq 0.001$ , adjusted R <sup>2</sup> =0.360	( $\leq 0.001$ )	(0.860)	(0.477)	(0.678)
EQ-5D-5L <sup>a</sup>	<b>-0.465</b>	0.466	0.283	-0.669
F(4,37)=3.438, $p=0.017$ , adjusted R <sup>2</sup> =0.192	(0.003)	(0.435)	(0.518)	(0.352)

Dependent variables are defined as delta follow-up 2 minus pretest of the named outcomes; all regression models are presented; for each significant regression model, standardized regression coefficients are reported for predictors irrespective of reaching statistical significance; regression models that reached statistical significance at  $p < 0.05$  are presented bold printed; CERAD, Consortium to Establish a Registry for Alzheimer's Disease; BVGT, Bundesverband Gedächtnistraining e.V. BrainProtect; MoCA, Montreal Cognitive Assessment; BDI, Beck Depression Inventory; EQ-5D-5L, descriptive system of 5 dimensions mobility, self-care, usual activities, pain and depression. <sup>a</sup>Higher values indicate better performance; <sup>b</sup>lower scores indicate better performance

### **Detailed description of the final questionnaire and the calculation of the used sum score**

The purpose of the final questionnaire was the examination whether features from the domains of illness, social change, cognitive/psychological change, functional change and nutritional change during the trial positively or negatively influenced intervention's success at the end of the study.

Using the questionnaire, the presence of numerous changes during the study period was inquired by yes or no answers. A total of 21 questions were grouped into four main categories, with a particular focus on social, psychological, physical and nutritional changes. Answering 'yes' to the questions leads to a higher score and thus to more changes in the study period, whereas answering 'no' results in a lower score and thus to less changes in the study period.

The category of social changes includes a removal during the study period, the pursuit of social activities as well as biographical changes such as separations or the absence of relatives.

Psychological changes were assessed by mental illness or depressive mood during the study period as well as by cognitive training in leisure time and sleep behavior.

The category of physical changes included questions about notification of a serious diagnosis during the study period, whether there was any hospitalization, or any changes to medications reported at baseline. Furthermore, questions about the achievement of a degree of care or socioeconomic support in everyday life since the beginning of the study were asked. Fall events were also taken into consideration. In addition, participants were asked whether they had decreased physical activity over a longer period of one month since the start of the study.

Nutritional changes referred to a vegetarian diet and a Mediterranean diet during the study period. This included questions about the amount of daily drinking, the consumption of fish versus meat, the intake of whole grains or wheat products as well as plant or livestock oils and fats. The participants were also asked about the consumption of carbohydrates in the evening and whether regular fasting took place during the study period.