**Supplemental Material**

***Table S1.***

***Analysis of Normality and Homogeneity of Variances for all Variables***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Shapiro-Wilk Test | | Levene's Test | |
| W | *p* | W0 or χ2 | *p* |
| Descriptive Characteristics |  |  |  |  |
| Age (years) | .96 | .298 | .24 | .627 |
| Weight (kg) | .96 | .424 | .04 | .843 |
| Height (m) | .96 | .570 | 5.31 | .030 |
| Body Mass Index (kg/m2) ^ | .93 | .073 | .74 | .398 |
| Education Level(%) | .689 a |  | .56b | .453 |
| Climbing Experience (years) ^ | .93 | .060 | .30 | .590 |
| Climbing Days per Week | .99 | .965 | .01 | .920 |
| Climbing Ability | .97 | .496 | .64 | .431 |
| Working Memory Task measures |  |  |  |  |
| Working Memory Capacity (Span score) | .98 | .761 | 2.20 | .150 |
| Error Rate (Number of incorrect responses) | .94 | .124 | .91 | .349 |
| Hit Reaction Time (Milliseconds) | .95 | .159 | .33 | .570 |
| Error Reaction Time (Milliseconds) | .95 | .253 | .03 | .866 |
| Left Prefrontal Cortex (FP 1) | | | | |
| Total Hemoglobin | .94 | .091 | .32 | .579 |
| Oxygenated Hemoglobin | .96 | .334 | 1.61 | .215 |
| Deoxygenated hemoglobin | .90 | .011 | 7.10 | .013 |
| Tissue oxygenation index | .98 | .787 | 1.36 | .254 |
| Right Prefrontal Cortex (FP 2) | | | | |
| Total Hemoglobin | .95 | .260 | .09 | .760 |
| Oxygenated Hemoglobin | .97 | .522 | .76 | .392 |
| Deoxygenated hemoglobin | .94 | .135 | .30 | .588 |
| Tissue oxygenation index | .96 | .268 | 1.43 | .242 |

Note. ^ inverse square root transformed.

a Fisher´s exact test. b χ2 from Chi-square test

**Table S2.**

***Interaction Analysis of Confounding Variables Sex*, *Age, Climbing Experience, and Education Level for Different Regression Analyses***

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | β | 95%IC | | *t* | *p* | Chunk Test | |
| *LL* | *UL* | *F*(1, 24) | *p* |
| Working Memory Capacity (Span score) |  |  |  |  |  |  |  |
| Climbing ability x Sex | -.224 | -.55 | .10 | -1.43 | .65 | 2.05 | .165 |
| Climbing Ability x Age | -.0002 | -.69 | .55 | -.03 | .977 | 0 | .977 |
| Climbing Ability x Climbing Experience (years) | -.005 | -.02 | .006 | -.96 | .349 | .91 | .349 |
| Climbing Ability x Education Level | -.043 | -.28 | .19 | -.38 | .71 | .15 | .705 |
| Error Rate (Number of incorrect responses) |  |  |  |  |  |  |  |
| Climbing ability x Sex | .090 | -.26 | .44 | .52 | .606 | .27 | .606 |
| Climbing Ability x Age | -.011 | -.03 | .01 | -1.01 | .323 | 1.02 | .323 |
| Climbing Ability x Climbing Experience (years) | -.008 | -.02 | .006 | -1.15 | .261 | 1.33 | .261 |
| Climbing Ability x Education Level | .053 | -.27 | .38 | .34 | .740 | .11 | .740 |
| Error Reaction Time (Milliseconds) |  |  |  |  |  |  |  |
| Climbing ability x Sex | 26.68 | -50.46 | 103.84 | .71 | .482 | .51 | .482 |
| Climbing Ability x Age | -2.06 | -5.57 | 1.45 | -1.21 | .239 | 1.46 | .239 |
| Climbing Ability x Climbing Experience (years) | .14 | -2.07 | 2.34 | .13 | .896 | .02 | .896 |
| Climbing Ability x Education Level | 12.34 | -40.73 | 65.41 | .48 | .635 | .23 | .635 |
| Hit Reaction Time (Milliseconds) |  |  |  |  |  |  |  |
| Climbing ability x Sex | 13.21 | -39.98 | 66.40 | .51 | .613 | .26 | .612 |
| Climbing Ability x Age | -.77 | -3.24 | 1.68 | -.65 | .521 | .42 | .521 |
| Climbing Ability x Climbing Experience (years) | .05 | -1.54 | 1.65 | .07 | .943 | .01 | .943 |
| Climbing Ability x Education Level | 21.04 | -14.85 | 56.93 | 1.21 | .238 | 1.47 | .238 |

***Table S3.***

***Multiple Lineal Regression Coefficients Examining the Relationship of Working Memory and Climbing Ability for Male* (*n* = 23).**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | b | | β | | 95%IC | | |  |  | *p* | *R*2 | Adj *R2* |
| *LL* | | *UL* | *t* | ***F*** |
| Working Memory Capacity (Span score) |  | |  | |  | |  |  |  |  |  |  |
| Model 1. Unadjusted | -.584 | | -.165 | | -.27 | | -.06 | -3.30 | 10.87 | .003\*\* | .341 | .310 |
| Model 2. Adjusted for age | -.536 | | -.151 | | -.26 | | -.04 | -2.88 | 5.76 | .009\*\* | .366 | .302 |
| Model 3. Adjusted for climbing experience (years) | -.559 | | -.165 | | -.28 | | -.05 | -2.98 | 5.30 | .008\*\* | .358 | .291 |
| Model 4. Adjusted for education level | -.524 | | -.145 | | -.25 | | -.03 | -2.76 | 4.38 | .012\* | .316 | .244 |
| Error Rate (Number of incorrect responses) |  | | |  | |
| Model 1. Unadjusted | -.369 | | -.109 | | -.23 | | .02 | -1.82 | 3.31 | .083 | .136 | .095 |
| Model 2. Adjusted for age | -.390 | | -.115 | | -.25 | | .02 | -1.80 | 1.64 | .087 | .141 | .055 |
| Model 3. Adjusted for climbing experience (years) | -.319 | | -.096 | | -.24 | | .04 | -1.44 | 1.05 | .368 | .099 | .005 |
| Model 4. Adjusted for education level | -.485 | | -.146 | | -.27 | | -.02 | -2.42 | 2.96 | .026\* | .238 | .157 |
| Error Reaction Time (Milliseconds) |  | |  | |  | |  |  |  |  |  |  |
| Model 1. Unadjusted | .483 | | 34.527 | | 6.11 | | 62.95 | 2.53 | 6.38 | .020\* | .233 | .197 |
| Model 2. Adjusted for age | .474 | | 33.929 | | 3.39 | | 64.47 | 2.32 | 3.05 | .031\* | .234 | .157 |
| Model 3. Adjusted for climbing experience (years) | .620 | | 44.973 | | 16.98 | | 72.96 | 3.36 | 5.81 | .003\*\* | .379 | .314 |
| Model 4. Adjusted for education level | .430 | | 31.090 | | .16 | | 62.02 | 2.10 | 2.49 | .049\* | .208 | .124 |
| Hit Reaction Time (Milliseconds)  Model 1. Unadjusted | .114 | | 4.966 | | -14.64 | | - 24.57 | .53 | .28 | .604 | .013 | -.034 |
| Model 2. Adjusted for age | .095 | | 4.144 | | -16.90 | | 25.18 | .41 | .17 | .686 | .017 | - .082 |
| Model 3. Adjusted for climbing experience (years) | .258 | 11.102 | | | -9.29 | | 31.50 | 1.14 | .65 | .269 | .064 | - .034 |
| Model 4. Adjusted for education level | .141 | 6.446 | | | -15.02 | | 27.91 | .63 | .39 | .537 | .040 | - .062 |

*Note.* Data are presented as standardized regression coefficient (b), unstandardized regression coefficient (β), 95% confidence interval (95% CI), lower confidence interval (LL), upper confidence interval (UL) and P-value (*p*).

\* *p* < .05. \*\**p* < .01. \*\*\**p* < .001indicating statistically significant associations.

1.  B)   
   C) D)

<H2> ***Figure S1.***

***Analysis of Residuals from the Regression Models (A) Model 1. Adjusted for Sex, (B) Model 2. Adjusted for Sex and Age. (C) Model 3. Adjusted by Sex and Climbing Experience, (D) Model 4. Adjusted by Sex and Education Level.***



**   
<H2> ***Figure S2***

***De-Oxygenated Changes in Left and Right Prefrontal Cortex of Expert- Elite and Male-Female Climbers after Completing the WM Task***