**Supplementary Table S1 Raw 3MSE scores and cognitive impairment**

European Americans:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| European  Americans | Reported education | | | | | |
| <12 years |  | 12 years |  | >12 years |  |
|  | Mean | S.D. | Mean | S.D. | Mean | S.D. |
| Age 35-49 years |  |  |  |  |  |  |
| N | 8 |  | 20 |  | 14 |  |
| 3MSE | 87.3 | 4.5 | 93.8 | 6.9 | 95.6 | 4.1 |
| Impairment (%) | NA |  | NA |  | NA |  |
|  |  |  |  |  |  |  |
| Age 50-59 years |  |  |  |  |  |  |
| N | 17 |  | 59 |  | 66 |  |
| 3MSE | 83.7 | 7.9 | 92.6 | 6.1 | 95.6 | 3.1 |
| Impairment (%) | NA |  | NA |  | NA |  |
|  |  |  |  |  |  |  |
| Age 60-71 years |  |  |  |  |  |  |
| N | 41 |  | 147 |  | 129 |  |
| 3MSE | 86.1 | 7.8 | 91.2 | 5.2 | 93.9 | 4.8 |
| Impairment (%) | 24.4 |  | 12.9 |  | 5.4 |  |
|  |  |  |  |  |  |  |
| Age 72-84 years |  |  |  |  |  |  |
| N | 37 |  | 71 |  | 61 |  |
| 3MSE | 82.5 | 7.9 | 88.6 | 7.0 | 90.3 | 7.7 |
| Impairment (%) | 35.1 |  | 16.9 |  | 16.4 |  |
|  |  |  |  |  |  |  |
| Age > 84 years |  |  |  |  |  |  |
| N | 0 |  | 7 |  | 4 |  |
| 3MSE | NA | NA | 85.7 | 6.1 | 85.0 | 12.0 |
| Impairment (%) | NA |  | NA |  | NA |  |

African Americans:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| African Americans | Reported education | | | | | |
| <12 years |  | 12 years |  | >12 years |  |
|  | Mean | S.D. | Mean | S.D. | Mean | S.D. |
| Age 35-49 years |  |  |  |  |  |  |
| N | 8 |  | 20 |  | 58 |  |
| 3MSE | 83.1 | 6.0 | 87.7 | 3.6 | 90.8 | 5.6 |
| Impairment (%) | NA |  | NA |  | NA |  |
|  |  |  |  |  |  |  |
| Age 50-59 years |  |  |  |  |  |  |
| N | 20 |  | 75 |  | 111 |  |
| 3MSE | 77.8 | 9.7 | 84.1 | 8.6 | 89.0 | 6.8 |
| Impairment (%) | NA |  | NA |  | NA |  |
|  |  |  |  |  |  |  |
| Age 60-71 years |  |  |  |  |  |  |
| N | 23 |  | 37 |  | 112 |  |
| 3MSE | 76.7 | 8.0 | 83.5 | 7.5 | 88.6 | 6.4 |
| Impairment (%) | 39.1 |  | 16.2 |  | 11.6 |  |
|  |  |  |  |  |  |  |
| Age 72-84 years |  |  |  |  |  |  |
| N | 10 |  | 9 |  | 31 |  |
| 3MSE | 75.4 | 9.0 | 75.0 | 9.6 | 82.9 | 7.9 |
| Impairment (%) | 0.0 |  | 44.4 |  | 12.9 |  |
|  |  |  |  |  |  |  |
| Age > 84 years |  |  |  |  |  |  |
| N | 0 |  | 1 |  | 0 |  |
| 3MSE | NA | NA | 77.0 | NA | NA | NA |
| Impairment (%) | NA |  | NA |  | NA |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Supplementary Table S2. Serially-adjusted cognitive testing relationships between African Americans and European Americans (initial adjustment for WRAT) | | | | |
| Variable | Model | Covariates | Relative Risk (95% CI)1 | p-value |
| 3MSE | 1 | Age, WRAT, sex, HbA1c | 0.85 (0.77,0.93) | 0.0006 |
| 3MSE | **2** | **Above + BMI, hypertension, statins, CVD, smoking, CES-D** | 0.81 (0.73,0.89) | 4.3x10-5 |
| 3MSE | **3** | **Above + MRI scanner, TICV, WMLV** | 0.82 (0.68,0.97) | 0.0219 |
| 3MSE | 4 | Above + education (replace WRAT) | 0.54 (0.46,0.63) | 2.6x10-14 |
| Digit symbol coding | 1 | Age, WRAT, sex, HbA1c | 1.01 (0.97,1.06) | 0.5227 |
| Digit symbol coding | **2** | **Above + BMI, hypertension, statins, CVD, smoking, CES-D** | 0.98 (0.94,1.03) | 0.4371 |
| Digit symbol coding | **3** | **Above + MRI scanner, TICV, WMLV** | 0.98 (0.91,1.06) | 0.6529 |
| Digit symbol coding | 4 | Above + education (replace WRAT) | 0.87 (0.82,0.93) | 3.4x10-5 |
| RAVLT delayed recall | 1 | Age, WRAT, sex, HbA1c | 0.83 (0.77,0.90) | 2.1x10-6 |
| RAVLT delayed recall | **2** | **Above + BMI, hypertension, statins, CVD, smoking, CES-D** | 0.82 (0.75,0.89) | 1.6x10-6 |
| RAVLT delayed recall | **3** | **Above + MRI scanner, TICV, WMLV** | 0.79 (0.68,0.91) | 0.0009 |
| RAVLT delayed recall | 4 | Above + education (replace WRAT) | 0.70 (0.61,0.81) | 5.1x10-7 |
| Category fluency | 1 | Age, WRAT, sex, HbA1c | 1.01 (0.97,1.06) | 0.5077 |
| Category fluency | **2** | **Above + BMI, hypertension, statins, CVD, smoking, CES-D** | 0.98 (0.93,1.02) | 0.3362 |
| Category fluency | **3** | **Above + MRI scanner, TICV, WMLV** | 0.99 (0.91,1.07) | 0.7914 |
| Category fluency | 4 | Above + education (replace WRAT) | 0.90 (0.84,0.96) | 0.0016 |
| Stroop interference | 1 | Age, WRAT, sex, HbA1c | 0.95 (0.88,1.02) | 0.1388 |
| Stroop interference | **2** | **Above + BMI, hypertension, statins, CVD, smoking, CES-D** | 0.97 (0.89,1.04) | 0.3568 |
| Stroop interference | **3** | **Above + MRI scanner, TICV, WMLV** | 0.87 (0.76,0.98) | 0.0264 |
| Stroop interference | 4 | Above + education (replace WRAT) | 0.99 (0.89,1.10) | 0.8001 |

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| Supplementary Table S3. Serially-adjusted cognitive testing relationships in African Americans | | | | | |
|  |  |  |  |  |  |
| Variable | Model | Covariates | Relative Risk (95% CI) p-value: WRAT vs. education (high school graduate vs. less than high school) | Relative Risk (95% CI) p-value: WRAT (more than high school vs. less than high school) | Relative Risk (95% CI) p-value for WMLV |
| 3MSE | 1 | Age, sex, HbA1c, BMI, hypertension, statins, CVD, smoking, duration of diabetes, CES-D + MRI scanner, TICV, WMLV **(with WMLV)** |  |  | 0.996  (0.992, 1.001) 0.1071 |
| 3MSE | 2 | Age, WRAT, sex, HbA1c, BMI, hypertension, statins, CVD, smoking, duration of diabetes, CES-D **(with WRAT)** | 1.73  (1.47, 2.04) <0.0001 | 2.18  (1.66, 2.88) <0.0001 |  |
| 3MSE | 3 | Above + MRI scanner, TICV, WMLV **(with WRAT and WMLV)** | 1.75  (1.48, 2.07) <0.0001 | 2.23  (1.68, 2.96) <0.0001 | 0.995  (0.991, 0.999) 0.0050 |
| 3MSE | 4 | Age, education, sex, HbA1c, BMI, hypertension, statins, CVD, smoking, duration of diabetes, CES-D **(with reported education)** | 1.26  (1.10, 1.44) 0.0006 | 1.74  (1.54, 1.96) <0.0001 |  |
| 3MSE | 5 | Above + MRI scanner, TICV, WMLV **(with reported education and WMLV)** | 1.23  (1.08, 1.40) 0.0023 | 1.72  (1.53, 1.94) <0.0001 | 0.996  (0.992, 1.000) 0.0538 |
| Digit symbol coding | 1 | Age, sex, HbA1c, BMI, hypertension, statins, CVD, smoking, duration of diabetes, CES-D + MRI scanner, TICV, WMLV **(with WMLV)** |  |  | 0.994  (0.991, 0.998) 0.0015 |
| Digit symbol coding | 2 | Age, WRAT, sex, HbA1c, BMI, hypertension, statins, CVD, smoking, duration of diabetes, CES-D **(with WRAT)** | 1.13  (1.07, 1.20) <0.0001 | 1.21  (1.11, 1.32) <0.0001 |  |
| Digit symbol coding | 3 | Above + MRI scanner, TICV, WMLV **(with WRAT and WMLV)** | 1.14  (1.08, 1.21) <0.0001 | 1.22  (1.11, 1.33) <0.0001 | 0.994  (0.991, 0.997) 0.0001 |
| Digit symbol coding | 4 | Age, education, sex, HbA1c, BMI, hypertension, statins, CVD, smoking, duration of diabetes, CES-D **(with reported education)** | 1.16  (1.05, 1.28) 0.0039 | 1.32  (1.20, 1.45) <0.0001 |  |
| Digit symbol coding | 5 | Above + MRI scanner, TICV, WMLV **(with reported education and WMLV)** | 1.14  (1.04, 1.26) 0.0041 | 1.30  (1.19, 1.41) <0.0001 | 0.995  (0.992, 0.998) 0.0006 |
| RAVLT delayed recall | 1 | Age, sex, HbA1c, BMI, hypertension, statins, CVD, smoking, duration of diabetes, CES-D + MRI scanner, TICV, WMLV **(with WMLV)** |  |  | 0.996  (0.990, 1.003) 0.2821 |
| RAVLT delayed recall | 2 | Age, WRAT, sex, HbA1c, BMI, hypertension, statins, CVD, smoking, duration of diabetes, CES-D **(WRAT only)** | 1.30  (1.16, 1.45) <0.0001 | 1.39  (1.20, 1.61) <0.0001 |  |
| RAVLT delayed recall | 3 | Above + MRI scanner, TICV, WMLV **(with WRAT and WMLV)** | 1.31  (1.17, 1.46) <0.0001 | 1.43  (1.23, 1.66) <0.0001 | 0.996  (0.991, 1.002) 0.1913 |
| RAVLT delayed recall | 4 | Age, education, sex, HbA1c, BMI, hypertension, statins, CVD, smoking, duration of diabetes, CES-D **(with reported education)** | 1.26  (1.02, 1.56) 0.0296 | 1.43  (1.17, 1.73) 0.0004 |  |
| RAVLT delayed recall | 5 | Above + MRI scanner, TICV, WMLV **(with reported education and WMLV)** | 1.27  (1.04, 1.57) 0.0218 | 1.47  (1.21, 1.78) <0.0001 | 0.996  (0.990, 1.003) 0.2700 |
| Category fluency | 1 | Age, sex, HbA1c, BMI, hypertension, statins, CVD, smoking, duration of diabetes, CES-D + MRI scanner, TICV, WMLV **(with WMLV)** |  |  | 0.999  (0.999, 1.001) 0.2765 |
| Category fluency | 2 | Age, WRAT, sex, HbA1c, BMI, hypertension, statins, CVD, smoking, duration of diabetes, CES-D **(with WRAT)** | 1.12  (1.04, 1.20) 0.0026 | 1.13  (1.05, 1.21) 0.0008 |  |
| Category fluency | 3 | Above + MRI scanner, TICV, WMLV **(with WRAT and WMLV)** | 1.12  (1.05, 1.21) 0.0015 | 1.13  (1.05, 1.21) 0.0010 | 0.999  (0.999, 1.000) 0.2291 |
| Category fluency | 4 | Age, education, sex, HbA1c, BMI, hypertension, statins, CVD, smoking, duration of diabetes, CES-D **(with reported education)** | 1.10  (1.02, 1.19) 0.0165 | 1.20  (1.11, 1.29) <0.0001 |  |
| Category fluency | 5 | Above + MRI scanner, TICV, WMLV **(with reported education and WMLV)** | 0.91  (0.84, 0.99) 0.0322 | 0.84  (0.78, 0.90) <0.0001 | 0.999  (0.999, 1.000) 0.2557 |
| Stroop interference | 1 | Age, sex, HbA1c, BMI, hypertension, statins, CVD, smoking, duration of diabetes, CES-D + MRI scanner, TICV, WMLV **(with WMLV)** |  |  | 1.003  (0.999, 1.008) 0.1375 |
| Stroop interference | 2 | Age, WRAT, sex, HbA1c, BMI, hypertension, statins, CVD, smoking, duration of diabetes, CES-D **(with WRAT)** | 0.90  (0.81, 1.00) 0.0410 | 0.84  (0.76, 0.93) 0.0010 |  |
| Stroop interference | 3 | Above + MRI scanner, TICV, WMLV **(with WRAT and WMLV)** | 0.89  (0.81, 0.98) 0.0180 | 0.82  (0.73, 0.92) 0.0011 | 1.004  (1.000, 1.008) 0.0606 |
| Stroop interference | 4 | Age, education, sex, HbA1c, BMI, hypertension, statins, CVD, smoking, duration of diabetes, CES-D **(with reported education)** | 0.97  (0.84, 1.12) 0.6760 | 0.96  (0.85, 1.10) 0.5810 |  |
| Stroop interference | 5 | Above + MRI scanner, TICV, WMLV **(with reported education and WMLV)** | 0.99  (0.86, 1.14) 0.8572 | 0.97  (0.85, 1.10) 0.6073 | 1.003  (0.999, 1.008) 0.1365 |

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| Supplementary Table S4. Associations between European American and African American race with brain volumes on cerebral MRI, using calibrated WMLV | | | |
| Variable | Covariate | β (95% CI)1 | p-value |
| White Matter Lesion Volume (calibrated) | TICV, MRI scanner | 2.24 (-0.51,4.98) | 0.1101 |
| White Matter Lesion Volume (calibrated) | Above + age, sex, diabetes duration | 3.81 (1.16,6.45) | 0.0048 |
| White Matter Lesion Volume (calibrated) | Above + BMI, HbA1c | 3.84 (1.12,6.57) | 0.0058 |
| White Matter Lesion Volume (calibrated) | Above + statins, CVD, smoking, hypertension | 4.11 (1.39,6.83) | 0.0031 |

\* WMLV has been calibrated using the pilot study with 15 individuals. A regression method was used to replace 3T WMLV with newly calibrated 1.5T WMLV.

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| Supplementary Table S5. Serially-adjusted cognitive testing relationships between African Americans and European Americans, using calibrated WMLV | | | |
| Variable | Covariates | Relative Risk (95% CI)1 | p-value |
| 3MSE | Age, education, sex, HbA1c, BMI, hypertension, statins, CVD, smoking, CES-D, MRI scanner, TICV, WMLV (calibrated) | 0.54 (0.46,0.64) | 5.9x10-14 |
| 3MSE | Above + WRAT (replace education) | 0.82 (0.69,0.98) | 0.0284 |
| Digit symbol coding | Age, education, sex, HbA1c, BMI, hypertension, statins, CVD, smoking, CES-D, MRI scanner, TICV, WMLV (calibrated) | 0.87 (0.82,0.93) | 4.5x10-5 |
| Digit symbol coding | Above + WRAT (replace education) | 0.99 (0.92,1.06) | 0.7226 |
| RAVLT delayed recall | Age, education, sex, HbA1c, BMI, hypertension, statins, CVD, smoking, CES-D, MRI scanner, TICV, WMLV (calibrated) | 0.70 (0.61,0.81) | 6.4x10-7 |
| RAVLT delayed recall | Above + WRAT (replace education) | 0.79 (0.69,0.91) | 0.0011 |
| Category fluency | Age, education, sex, HbA1c, BMI, hypertension, statins, CVD, smoking, CES-D, MRI scanner, TICV, WMLV (calibrated) | 0.90 (0.84,0.96) | 0.0021 |
| Category fluency | Above + WRAT (replace education) | 0.99 (0.92,1.08) | 0.8562 |
| Stroop interference | Age, education, sex, HbA1c, BMI, hypertension, statins, CVD, smoking, CES-D, MRI scanner, TICV, WMLV (calibrated) | 0.98 (0.88,1.09) | 0.7457 |
| Stroop interference | Above + WRAT (replace education) | 0.86 (0.76,0.98) | 0.0227 |

\* WMLV has been calibrated using the pilot study with 15 individuals. A regression method was used to replace 3T WMLV with newly calibrated 1.5T WMLV.

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| --- | --- | --- | --- |
| Supplementary Table S6. Associations between European American and African American race with brain volumes on cerebral MRI in the subset of participants who were on the 1.5 T scanner | | | |
| Variable | Covariate | β (95% CI)1 | p-value |
| White Matter Lesion Volume | TICV, MRI scanner | 2.20 (-0.58,4.97) | 0.1206 |
| White Matter Lesion Volume | Above + age, sex, diabetes duration | 3.82 (1.10,6.55) | 0.0060 |
| White Matter Lesion Volume | Above + BMI, HbA1c | 4.03 (1.22,6.84) | 0.0049 |
| White Matter Lesion Volume | Above + statins, CVD, smoking, hypertension | 4.27 (1.49,7.05) | 0.0026 |

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| --- | --- | --- | --- |
| Supplementary Table S7. Serially-adjusted cognitive testing relationships between African Americans and European Americans in the subset of participants who were on the 1.5 T scanner | | | |
| Variable | Covariates | Relative Risk (95% CI)1 | p-value |
| 3MSE | Age, education, sex, HbA1c, BMI, hypertension, statins, CVD, smoking, CES-D, MRI scanner, TICV, WMLV | 0.53 (0.45,0.62) | 3.8x10-15 |
| 3MSE | Above + WRAT (replace education) | 0.76 (0.63,0.91) | 0.0032 |
| Digit symbol coding | Age, education, sex, HbA1c, BMI, hypertension, statins, CVD, smoking, CES-D, MRI scanner, TICV, WMLV | 0.88 (0.82,0.94) | 8.5x10-5 |
| Digit symbol coding | Above + WRAT (replace education) | 1.01 (0.93,1.09) | 0.8589 |
| RAVLT delayed recall | Age, education, sex, HbA1c, BMI, hypertension, statins, CVD, smoking, CES-D, MRI scanner, TICV, WMLV | 0.70 (0.61,0.81) | 6.4x10-7 |
| RAVLT delayed recall | Above + WRAT (replace education) | 0.77 (0.66,0.89) | 0.0007 |
| Category fluency | Age, education, sex, HbA1c, BMI, hypertension, statins, CVD, smoking, CES-D, MRI scanner, TICV, WMLV | 0.90 (0.85,0.97) | 0.0032 |
| Category fluency | Above + WRAT (replace education) | 1.00 (0.91,1.09) | 0.9556 |
| Stroop interference | Age, education, sex, HbA1c, BMI, hypertension, statins, CVD, smoking, CES-D, MRI scanner, TICV, WMLV | 0.97 (0.87,1.08) | 0.6153 |
| Stroop interference | Above + WRAT (replace education) | 0.86 (0.74,0.99) | 0.0308 |