Totcog

model0 = lm(Total\_cog ~ X2\_min + Age\_yrs + Gender + BMI

+ walk\_pace + Education\_yrs + EstimatedTotalIntraCranialVol, data)

modelm = lm(mean\_greymatter ~ X2\_min + Age\_yrs + Gender + BMI

+ walk\_pace + Education\_yrs + EstimatedTotalIntraCranialVol, data)

modely = lm(Total\_cog ~ X2\_min + mean\_greymatter + Age\_yrs + Gender + BMI

+ walk\_pace + Education\_yrs + EstimatedTotalIntraCranialVol, data)

No filter (look at the data directly)

| ROI\_lvl2 | r1 | r2 | direct | indirect | total |
| --- | --- | --- | --- | --- | --- |
| lh\_temporal | 0.0181\*\*\* | 1.4543\*\*\* | 0.2279\*\*\* | 0.0263\*\*\* | 0.2542\*\*\* |
| rh\_temporal | 0.0193\*\*\* | 1.3268\*\*\* | 0.2286\*\*\* | 0.0256\*\*\* | 0.2542\*\*\* |
| lh\_occipital | 0.0186\*\*\* | 1.0367\*\* | 0.2349\*\*\* | 0.0193\*\*\* | 0.2542\*\*\* |
| rh\_occipital | 0.0216\*\*\* | 0.7994\* | 0.2370\*\*\* | 0.0173\* | 0.2542\*\*\* |
| lh\_parietal | 0.0150\*\* | 0.7393\* | 0.2431\*\*\* | 0.0111\* | 0.2542\*\*\* |
| rh\_parietal | 0.0153\*\* | 0.6066 | 0.2449\*\*\* | 0.0093 | 0.2542\*\*\* |
| lh\_frontal | 0.0057 | 0.2987 | 0.2525\*\*\* | 0.0017 | 0.2542\*\*\* |
| lh\_subcortical | 0.0056 | 0.3137 | 0.2525\*\*\* | 0.0017 | 0.2542\*\*\* |
| rh\_subcortical | 0.0038 | 0.3368 | 0.2529\*\*\* | 0.0013 | 0.2542\*\*\* |
| rh\_frontal | 0.0045 | 0.1742 | 0.2534\*\*\* | 0.0008 | 0.2542\*\*\* |

Level 1 only filter@0.95

| ROI\_lvl2 | r1 | r2 | direct | indirect | total |
| --- | --- | --- | --- | --- | --- |
| lh\_temporal | 0.0181\*\*\* | 1.4543\*\*\* | 0.2279\*\*\* | 0.0263\*\*\* | 0.2542\*\*\* |
| rh\_temporal | 0.0193\*\*\* | 1.3268\*\*\* | 0.2286\*\*\* | 0.0256\*\*\* | 0.2542\*\*\* |
| lh\_occipital | 0.0186\*\*\* | 1.0367\*\* | 0.2349\*\*\* | 0.0193\*\* | 0.2542\*\*\* |
| rh\_occipital | 0.0216\*\*\* | 0.7994\* | 0.2370\*\*\* | 0.0173\*\* | 0.2542\*\*\* |
| lh\_parietal | 0.0150\*\* | 0.7393\* | 0.2431\*\*\* | 0.0111. | 0.2542\*\*\* |
| rh\_parietal | 0.0153\*\* | 0.6066 | 0.2449\*\*\* | 0.0093 | 0.2542\*\*\* |
| lh\_frontal | 0.0057 | 0.2987 | 0.2525\*\*\* | 0.0017 | 0.2542\*\*\* |
| lh\_subcortical | 0.0056 | 0.3137 | 0.2525\*\*\* | 0.0017 | 0.2542\*\*\* |
| rh\_subcortical | 0.0038 | 0.3368 | 0.2529\*\*\* | 0.0013 | 0.2542\*\*\* |
| rh\_frontal | 0.0045 | 0.1742 | 0.2534\*\*\* | 0.0008 | 0.2542\*\*\* |

Hierarchical level 2 filtered@0.95

| ROI\_lvl2 | r1 | r2 | direct | indirect | total |
| --- | --- | --- | --- | --- | --- |
| lh\_temporal | 0.0181\*\*\* | 1.4543\*\*\* | 0.2279\*\*\* | 0.0263\*\* | 0.2542\*\*\* |
| rh\_temporal | 0.0193\*\*\* | 1.3268\*\*\* | 0.2286\*\*\* | 0.0256\*\* | 0.2542\*\*\* |
| lh\_occipital | 0.0186\*\*\* | 1.0367\*\* | 0.2349\*\*\* | 0.0193\*\* | 0.2542\*\*\* |
| rh\_occipital | 0.0216\*\*\* | 0.7994\* | 0.2370\*\*\* | 0.0173\* | 0.2542\*\*\* |
| lh\_parietal | 0.0150\*\* | 0.7393\* | 0.2431\*\*\* | 0.0111. | 0.2542\*\*\* |
| rh\_parietal | 0.0153\*\* | 0.6066 | 0.2449\*\*\* | 0.0093 | 0.2542\*\*\* |

Hierarchical level 1 filtered@0.95

| ROI\_lvl2 | r1 | r2 | direct | indirect | total |
| --- | --- | --- | --- | --- | --- |
| lh\_temporal | 0.0181\*\*\* | 1.4543\*\*\* | 0.2279\*\*\* | 0.0263\*\*\* | 0.2542\*\*\* |
| rh\_temporal | 0.0193\*\*\* | 1.3268\*\*\* | 0.2286\*\*\* | 0.0256\*\*\* | 0.2542\*\*\* |
| lh\_occipital | 0.0186\*\*\* | 1.0367\*\* | 0.2349\*\*\* | 0.0193\*\* | 0.2542\*\*\* |
| rh\_occipital | 0.0216\*\*\* | 0.7994\* | 0.2370\*\*\* | 0.0173\* | 0.2542\*\*\* |
| rh\_frontal | 0.0159\*\* | 0.8558\*\* | 0.2406\*\*\* | 0.0136\* | 0.2542\*\*\* |
| lh\_parietal | 0.0151\*\* | 0.8864\* | 0.2408\*\*\* | 0.0134\* | 0.2542\*\*\* |
| lh\_frontal | 0.0133\* | 0.9031\*\* | 0.2422\*\*\* | 0.0120\* | 0.2542\*\*\* |
| rh\_parietal | 0.0161\*\* | 0.7245. | 0.2425\*\*\* | 0.0117. | 0.2542\*\*\* |
| lh\_subcortical | 0.0149\* | 0.4149 | 0.2480\*\*\* | 0.0062 | 0.2542\*\*\* |
| rh\_subcortical | 0.0152\* | 0.3645 | 0.2487\*\*\* | 0.0056 | 0.2542\*\*\* |

RAVLT

model0 = lm(RAVLT\_tot ~ X2\_min + Age\_yrs + Gender + BMI

+ walk\_pace + Education\_yrs + EstimatedTotalIntraCranialVol, data)

modelm = lm(mean\_greymatter ~ X2\_min + Age\_yrs + Gender + BMI

+ walk\_pace + Education\_yrs + EstimatedTotalIntraCranialVol, data)

modely = lm(RAVLT\_tot ~ X2\_min + mean\_greymatter + Age\_yrs + Gender + BMI

+ walk\_pace + Education\_yrs + EstimatedTotalIntraCranialVol, data)

No filter (look at the data directly)

| ROI\_lvl2 | r1 | r2 | direct | indirect | total |
| --- | --- | --- | --- | --- | --- |
| rh\_temporal | 0.0197\*\*\* | 1.0937\*\* | 0.1055\* | 0.0215\*\*\* | 0.1270\*\* |
| lh\_temporal | 0.0186\*\*\* | 1.0836\*\* | 0.1069. | 0.0201\*\* | 0.1270\*\* |
| rh\_occipital | 0.0229\*\*\* | 0.8398\* | 0.1078\* | 0.0192\*\*\* | 0.1270\* |
| rh\_parietal | 0.0167\*\*\* | 0.6678. | 0.1158\* | 0.0112. | 0.1270\* |
| lh\_occipital | 0.0200\*\*\* | 0.5125 | 0.1168\* | 0.0102 | 0.1270\* |
| lh\_parietal | 0.0165\*\* | 0.3789 | 0.1208\* | 0.0063 | 0.1270\* |
| lh\_subcortical | 0.0054 | 1.0895\* | 0.1211\* | 0.0059 | 0.1270\* |
| rh\_subcortical | 0.0041 | 0.9265. | 0.1232. | 0.0038 | 0.1270\* |
| rh\_frontal | 0.0058 | 0.4005 | 0.1247\* | 0.0023 | 0.1270\* |
| lh\_frontal | 0.0072 | 0.3118 | 0.1248\* | 0.0022 | 0.1270\* |

Level 1 only filter@0.95

| ROI\_lvl2 | r1 | r2 | direct | indirect | total |
| --- | --- | --- | --- | --- | --- |
| rh\_temporal | 0.0199\*\*\* | 1.1971\*\* | 0.1032. | 0.0238\* | 0.1270\* |
| lh\_temporal | 0.0177\*\*\* | 1.3017\*\* | 0.1040. | 0.0230\*\* | 0.1270\* |
| rh\_occipital | 0.0229\*\*\* | 0.8398\* | 0.1078\* | 0.0192\*\* | 0.1270\* |
| lh\_occipital | 0.0207\*\*\* | 0.6803\* | 0.1129\* | 0.0141\* | 0.1270\* |
| lh\_subcortical | 0.0141\* | 0.9103\*\* | 0.1141\* | 0.0129\* | 0.1270\* |
| rh\_frontal | 0.0138\* | 0.7290\* | 0.1169\* | 0.0101\* | 0.1270\* |
| lh\_frontal | 0.0130\* | 0.7181. | 0.1177\* | 0.0094. | 0.1270\* |
| rh\_subcortical | 0.0094. | 1.2382\*\*\* | 0.1154\* | 0.0116 | 0.1270\* |
| rh\_parietal | 0.0174\*\* | 0.3974 | 0.1201\* | 0.0069 | 0.1270\* |
| lh\_parietal | 0.0209\*\* | 0.3092 | 0.1205\* | 0.0065 | 0.1270\* |

Hierarchical level 2 filtered@0.95

| ROI\_lvl2 | r1 | r2 | direct | indirect | total |
| --- | --- | --- | --- | --- | --- |
| rh\_temporal | 0.0197\*\*\* | 1.0937\*\* | 0.1055. | 0.0215\*\*\* | 0.1270\* |
| lh\_temporal | 0.0186\*\*\* | 1.0836\*\* | 0.1069. | 0.0201\*\* | 0.1270\*\* |
| rh\_occipital | 0.0229\*\*\* | 0.8398\* | 0.1078\* | 0.0192\*\* | 0.1270\* |
| rh\_parietal | 0.0167\*\*\* | 0.6678. | 0.1158\* | 0.0112. | 0.1270\* |
| lh\_occipital | 0.0200\*\*\* | 0.5125 | 0.1168\* | 0.0102 | 0.1270\* |

Hierarchical level 1 filtered@0.95

| ROI\_lvl2 | r1 | r2 | direct | indirect | total |
| --- | --- | --- | --- | --- | --- |
| rh\_temporal | 0.0197\*\*\* | 1.0937\*\* | 0.1055\* | 0.0215\*\* | 0.1270\* |
| lh\_temporal | 0.0179\*\*\* | 1.1954\*\* | 0.1056. | 0.0214\*\* | 0.1270\* |
| rh\_occipital | 0.0229\*\*\* | 0.8398\* | 0.1078\* | 0.0192\* | 0.1270\* |
| lh\_occipital | 0.0207\*\*\* | 0.6803\* | 0.1129. | 0.0141\* | 0.1270\* |
| lh\_subcortical | 0.0141\* | 0.9103\*\* | 0.1141\* | 0.0129\* | 0.1270\* |
| rh\_subcortical | 0.0153\* | 0.7372\* | 0.1157\* | 0.0113. | 0.1270\* |
| rh\_parietal | 0.0162\*\* | 0.5623 | 0.1179\* | 0.0091 | 0.1270\* |

FLANKER

No filter (look at the data directly)

| ROI\_lvl2 | r1 | r2 | direct | indirect | total |
| --- | --- | --- | --- | --- | --- |
| rh\_temporal | 0.0191\*\*\* | 1.2570\*\* | 0.1860\*\*\* | 0.0240\*\*\* | 0.2100\*\*\* |
| lh\_temporal | 0.0178\*\*\* | 1.3037\*\* | 0.1868\*\*\* | 0.0232\*\*\* | 0.2100\*\*\* |
| lh\_occipital | 0.0187\*\*\* | 0.7536\* | 0.1959\*\* | 0.0141\* | 0.2100\*\*\* |
| rh\_parietal | 0.0155\*\* | 0.6720. | 0.1996\*\*\* | 0.0104. | 0.2100\*\*\* |
| rh\_occipital | 0.0216\*\*\* | 0.5108 | 0.1990\*\*\* | 0.011 | 0.2100\*\*\* |
| lh\_parietal | 0.0150\*\* | 0.4777 | 0.2028\*\*\* | 0.0072 | 0.2100\*\*\* |
| lh\_frontal | 0.0057 | 0.4775 | 0.2073\*\*\* | 0.0027 | 0.2100\*\*\* |
| rh\_frontal | 0.0046 | 0.3596 | 0.2083\*\*\* | 0.0017 | 0.2100\*\*\* |
| lh\_subcortical | 0.0053 | 0.3003 | 0.2084\*\*\* | 0.0016 | 0.2100\*\*\* |
| rh\_subcortical | 0.0036 | 0.3553 | 0.2087\*\*\* | 0.0013 | 0.2100\*\*\* |

Level 1 only filter@0.95

| ROI\_lvl2 | r1 | r2 | direct | indirect | total |
| --- | --- | --- | --- | --- | --- |
| rh\_temporal | 0.0191\*\*\* | 1.2570\*\* | 0.1860\*\*\* | 0.0240\*\*\* | 0.2100\*\*\* |
| lh\_temporal | 0.0178\*\*\* | 1.3037\*\* | 0.1868\*\*\* | 0.0232\* | 0.2100\*\*\* |
| lh\_occipital | 0.0187\*\*\* | 0.7536\* | 0.1959\*\*\* | 0.0141\* | 0.2100\*\*\* |
| rh\_parietal | 0.0155\*\* | 0.6720. | 0.1996\*\*\* | 0.0104. | 0.2100\*\*\* |
| rh\_occipital | 0.0216\*\*\* | 0.5108 | 0.1990\*\*\* | 0.011 | 0.2100\*\*\* |
| lh\_parietal | 0.0150\*\* | 0.4777 | 0.2028\*\*\* | 0.0072 | 0.2100\*\*\* |
| lh\_frontal | 0.0057 | 0.4775 | 0.2073\*\*\* | 0.0027 | 0.2100\*\*\* |
| rh\_frontal | 0.0046 | 0.3596 | 0.2083\*\*\* | 0.0017 | 0.2100\*\*\* |
| lh\_subcortical | 0.0053 | 0.3003 | 0.2084\*\*\* | 0.0016 | 0.2100\*\*\* |
| rh\_subcortical | 0.0036 | 0.3553 | 0.2087\*\*\* | 0.0013 | 0.2100\*\*\* |

Hierarchical level 2 filtered@0.95

| ROI\_lvl2 | r1 | r2 | direct | indirect | total |
| --- | --- | --- | --- | --- | --- |
| rh\_temporal | 0.0191\*\*\* | 1.2570\*\* | 0.1860\*\*\* | 0.0240\*\*\* | 0.2100\*\*\* |
| lh\_temporal | 0.0178\*\*\* | 1.3037\*\* | 0.1868\*\*\* | 0.0232\*\*\* | 0.2100\*\*\* |
| lh\_occipital | 0.0187\*\*\* | 0.7536\* | 0.1959\*\* | 0.0141\* | 0.2100\*\*\* |
| rh\_parietal | 0.0155\*\* | 0.6720. | 0.1996\*\*\* | 0.0104. | 0.2100\*\*\* |
| rh\_occipital | 0.0216\*\*\* | 0.5108 | 0.1990\*\*\* | 0.011 | 0.2100\*\*\* |
| lh\_parietal | 0.0150\*\* | 0.4777 | 0.2028\*\*\* | 0.0072 | 0.2100\*\*\* |
| lh\_frontal | 0.0057 | 0.4775 | 0.2073\*\*\* | 0.0027 | 0.2100\*\*\* |
| rh\_frontal | 0.0046 | 0.3596 | 0.2083\*\*\* | 0.0017 | 0.2100\*\*\* |
| lh\_subcortical | 0.0053 | 0.3003 | 0.2084\*\*\* | 0.0016 | 0.2100\*\*\* |
| rh\_subcortical | 0.0036 | 0.3553 | 0.2087\*\*\* | 0.0013 | 0.2100\*\*\* |

Hierarchical level 1 filtered@0.95

| ROI\_lvl2 | r1 | r2 | direct | indirect | total |
| --- | --- | --- | --- | --- | --- |
| rh\_temporal | 0.0191\*\*\* | 1.2570\*\* | 0.1860\*\*\* | 0.0240\*\*\* | 0.2100\*\*\* |
| lh\_temporal | 0.0178\*\*\* | 1.3037\*\* | 0.1868\*\*\* | 0.0232\*\* | 0.2100\*\*\* |
| lh\_occipital | 0.0187\*\*\* | 0.7536\* | 0.1959\*\*\* | 0.0141. | 0.2100\*\*\* |
| rh\_parietal | 0.0159\*\* | 0.7418. | 0.1982\*\*\* | 0.0118\* | 0.2100\*\*\* |
| lh\_frontal | 0.0133\* | 0.7933\* | 0.1994\*\*\* | 0.0106\* | 0.2100\*\*\* |
| rh\_occipital | 0.0216\*\*\* | 0.5108 | 0.1990\*\* | 0.011 | 0.2100\*\*\* |
| lh\_parietal | 0.0146\*\* | 0.5808 | 0.2015\*\*\* | 0.0085 | 0.2100\*\*\* |

Appendix

Level 2 p+ table

| ROI | p\_2min2 | p\_totcog2 | p\_ravlt2 | p\_flanker2 |
| --- | --- | --- | --- | --- |
| lh\_temporal | 1 | 1 | 0.98475 | 0.99966667 |
| rh\_occipital | 1 | 0.99925 | 0.99066667 | 0.98541667 |
| rh\_temporal | 1 | 1 | 0.99108333 | 0.99958333 |
| lh\_occipital | 0.99991667 | 0.99975 | 0.95858333 | 0.99516667 |
| rh\_parietal | 0.99975 | 0.99016667 | 0.9645 | 0.98458333 |
| lh\_parietal | 0.99941667 | 0.99641667 | 0.91775 | 0.962 |
| lh\_frontal | 0.952 | 0.93041667 | 0.873 | 0.94583333 |
| lh\_subcortical | 0.93358333 | 0.8365 | 0.96525 | 0.63741667 |
| rh\_frontal | 0.92858333 | 0.853 | 0.90375 | 0.8625 |
| rh\_subcortical | 0.88325 | 0.83983333 | 0.96533333 | 0.64441667 |

0.99

0.95

0.90

Level 1 p+ table

| ROI1 | p\_2min1 | pvalue | p\_ravlt1 | p\_flanker1 |
| --- | --- | --- | --- | --- |
| lh\_occipital\_lh\_lateraloccipital | 1 | 1 | 0.97883333 | 0.99733333 |
| lh\_occipital\_lh\_lingual | 1 | 0.99991667 | 0.97908333 | 0.99658333 |
| lh\_occipital\_lh\_pericalcarine | 1 | 0.99991667 | 0.93016667 | 0.99308333 |
| lh\_temporal\_lh\_inferiortemporal | 1 | 0.98983333 | 0.96891667 | 0.99883333 |
| lh\_temporal\_lh\_middletemporal | 1 | 0.99816667 | 0.98333333 | 0.99866667 |
| lh\_temporal\_lh\_superiortemporal | 1 | 0.99966667 | 0.98591667 | 0.99941667 |
| rh\_occipital\_rh\_cuneus | 1 | 0.99808333 | 0.99166667 | 0.97133333 |
| rh\_occipital\_rh\_lateraloccipital | 1 | 0.99991667 | 0.99625 | 0.98658333 |
| rh\_occipital\_rh\_lingual | 1 | 0.99983333 | 0.99516667 | 0.99058333 |
| rh\_occipital\_rh\_pericalcarine | 1 | 0.9965 | 0.97325 | 0.9605 |
| rh\_occipital\_rh\_precuneus\_parietal | 1 | 0.99475 | 0.99008333 | 0.96658333 |
| rh\_temporal\_rh\_bankssts | 1 | 0.99741667 | 0.97616667 | 0.99816667 |
| rh\_temporal\_rh\_entorhinal | 1 | 0.99816667 | 0.98608333 | 0.99975 |
| rh\_temporal\_rh\_fusiform | 1 | 0.999 | 0.98516667 | 0.99975 |
| rh\_temporal\_rh\_inferiortemporal | 1 | 0.99866667 | 0.98791667 | 0.999 |
| rh\_temporal\_rh\_middletemporal | 1 | 0.98541667 | 0.97033333 | 0.99758333 |
| rh\_temporal\_rh\_temporalpole | 1 | 1 | 0.99616667 | 1 |
| lh\_temporal\_lh\_bankssts | 0.99991667 | 0.9965 | 0.95425 | 0.99875 |
| lh\_temporal\_lh\_temporalpole | 0.99991667 | 1 | 0.99366667 | 0.99983333 |
| rh\_temporal\_rh\_superiortemporal | 0.99991667 | 0.99966667 | 0.97508333 | 0.999 |
| rh\_temporal\_rh\_transversetemporal | 0.99991667 | 1 | 0.99083333 | 0.99808333 |
| lh\_occipital\_lh\_precuneus\_parietal | 0.99983333 | 0.99825 | 0.9355 | 0.98916667 |
| lh\_parietal\_lh\_postcentral | 0.99983333 | 1 | 0.93758333 | 0.93091667 |
| lh\_temporal\_lh\_entorhinal | 0.99983333 | 0.98358333 | 0.97491667 | 0.99891667 |
| lh\_temporal\_lh\_fusiform | 0.99983333 | 0.99925 | 0.94483333 | 0.9975 |
| lh\_temporal\_lh\_transversetemporal | 0.99983333 | 1 | 0.98441667 | 0.99991667 |
| rh\_parietal\_rh\_inferiorparietal | 0.99975 | 0.98958333 | 0.95908333 | 0.972 |
| rh\_parietal\_rh\_supramarginal | 0.99975 | 0.99608333 | 0.96475 | 0.97508333 |
| rh\_parietal\_rh\_isthmuscingulate | 0.99966667 | 0.97966667 | 0.946 | 0.98741667 |
| lh\_parietal\_lh\_inferiorparietal | 0.99958333 | 0.98916667 | 0.91566667 | 0.94433333 |
| rh\_temporal\_rh\_parahippocampal | 0.9995 | 0.99983333 | 0.99541667 | 0.99941667 |
| rh\_parietal\_rh\_superiorparietal | 0.99941667 | 0.95116667 | 0.9505 | 0.94833333 |
| lh\_occipital\_lh\_cuneus | 0.99933333 | 0.99766667 | 0.90625 | 0.98625 |
| lh\_parietal\_lh\_supramarginal | 0.99933333 | 0.99816667 | 0.9065 | 0.95391667 |
| rh\_parietal\_rh\_posteriorcingulate | 0.99916667 | 0.8325 | 0.96283333 | 0.97841667 |
| lh\_parietal\_lh\_posteriorcingulate | 0.99883333 | 0.85575 | 0.85391667 | 0.93258333 |
| lh\_parietal\_lh\_superiorparietal | 0.99875 | 0.97216667 | 0.88383333 | 0.90933333 |
| lh\_temporal\_lh\_parahippocampal | 0.99875 | 1 | 0.99066667 | 0.99975 |
| lh\_parietal\_lh\_isthmuscingulate | 0.99758333 | 0.97558333 | 0.82683333 | 0.96083333 |
| lh\_subcortical\_lh\_Amygdala | 0.99708333 | 0.80533333 | 0.97791667 | 0.6755 |
| lh\_frontal\_lh\_insula | 0.996 | 0.98866667 | 0.92683333 | 0.96708333 |
| rh\_parietal\_rh\_postcentral | 0.99575 | 0.9885 | 0.89641667 | 0.93316667 |
| lh\_frontal\_lh\_precentral | 0.99441667 | 0.82975 | 0.884 | 0.83641667 |
| rh\_frontal\_rh\_insula | 0.99408333 | 0.98316667 | 0.94516667 | 0.92075 |
| lh\_subcortical\_lh\_Hippocampus | 0.99366667 | 0.97141667 | 0.98716667 | 0.74008333 |
| rh\_subcortical\_rh\_Hippocampus | 0.99058333 | 0.96533333 | 0.98675 | 0.76025 |
| lh\_frontal\_lh\_lateralorbitofrontal | 0.98808333 | 0.97691667 | 0.885 | 0.9705 |
| lh\_subcortical\_lh\_VentralDC | 0.98775 | 0.88666667 | 0.9405 | 0.67058333 |
| lh\_frontal\_lh\_caudalmiddlefrontal | 0.98025 | 0.75708333 | 0.79358333 | 0.84125 |
| rh\_frontal\_rh\_parsopercularis | 0.97816667 | 0.75308333 | 0.82675 | 0.74375 |
| rh\_frontal\_rh\_precentral | 0.97433333 | 0.54883333 | 0.88375 | 0.75791667 |
| rh\_subcortical\_rh\_VentralDC | 0.96716667 | 0.83833333 | 0.93575 | 0.65291667 |
| rh\_subcortical\_rh\_Thalamus.Proper | 0.96625 | 0.92258333 | 0.92383333 | 0.61075 |
| lh\_frontal\_lh\_paracentral | 0.96325 | 0.91 | 0.84725 | 0.83616667 |
| rh\_frontal\_rh\_caudalmiddlefrontal | 0.96325 | 0.61091667 | 0.85333333 | 0.703 |
| rh\_subcortical\_rh\_Amygdala | 0.96308333 | 0.54416667 | 0.93125 | 0.67066667 |
| rh\_frontal\_rh\_parstriangularis | 0.95366667 | 0.89116667 | 0.85383333 | 0.83133333 |
| lh\_subcortical\_lh\_Pallidum | 0.94733333 | 0.42416667 | 0.94641667 | 0.52225 |
| lh\_frontal\_lh\_rostralmiddlefrontal | 0.94658333 | 0.81116667 | 0.82175 | 0.9035 |
| lh\_frontal\_lh\_parsopercularis | 0.936 | 0.7195 | 0.76866667 | 0.84075 |
| rh\_subcortical\_rh\_Pallidum | 0.93216667 | 0.364 | 0.95841667 | 0.54491667 |
| rh\_frontal\_rh\_paracentral | 0.9295 | 0.65408333 | 0.897 | 0.70191667 |
| lh\_frontal\_lh\_parsorbitalis | 0.92325 | 0.99658333 | 0.93141667 | 0.96591667 |
| lh\_frontal\_lh\_parstriangularis | 0.92125 | 0.76483333 | 0.77741667 | 0.92166667 |
| rh\_frontal\_rh\_lateralorbitofrontal | 0.91616667 | 0.98858333 | 0.93591667 | 0.94033333 |
| lh\_frontal\_lh\_caudalanteriorcingulate | 0.90725 | 0.93966667 | 0.92116667 | 0.96075 |
| rh\_frontal\_rh\_rostralmiddlefrontal | 0.90525 | 0.53308333 | 0.80925 | 0.82916667 |
| lh\_subcortical\_lh\_Thalamus.Proper | 0.90358333 | 0.85875 | 0.91658333 | 0.58691667 |
| rh\_frontal\_rh\_superiorfrontal | 0.86 | 0.59733333 | 0.90975 | 0.79675 |
| rh\_frontal\_rh\_frontalpole | 0.82075 | 0.73291667 | 0.88941667 | 0.83008333 |
| lh\_frontal\_lh\_superiorfrontal | 0.81675 | 0.61566667 | 0.80275 | 0.85591667 |
| lh\_subcortical\_lh\_Putamen | 0.79075 | 0.3875 | 0.90225 | 0.63775 |
| rh\_subcortical\_rh\_Accumbens.area | 0.78966667 | 0.89358333 | 0.98733333 | 0.67158333 |
| lh\_frontal\_lh\_frontalpole | 0.749 | 0.52591667 | 0.72183333 | 0.9065 |
| lh\_subcortical\_lh\_Accumbens.area | 0.71541667 | 0.79358333 | 0.9615 | 0.60591667 |
| rh\_frontal\_rh\_parsorbitalis | 0.71141667 | 0.96058333 | 0.83891667 | 0.81683333 |
| lh\_frontal\_lh\_rostralanteriorcingulate | 0.67016667 | 0.89675 | 0.78866667 | 0.95225 |
| rh\_frontal\_rh\_rostralanteriorcingulate | 0.60341667 | 0.54558333 | 0.87433333 | 0.88891667 |
| rh\_frontal\_rh\_caudalanteriorcingulate | 0.60141667 | 0.308 | 0.86066667 | 0.83766667 |
| lh\_frontal\_lh\_medialorbitofrontal | 0.53683333 | 0.23633333 | 0.57083333 | 0.93858333 |
| rh\_subcortical\_rh\_Putamen | 0.30708333 | 0.47116667 | 0.83825 | 0.60716667 |
| rh\_frontal\_rh\_medialorbitofrontal | 0.24266667 | 0.3275 | 0.6465 | 0.842 |
| lh\_subcortical\_lh\_Caudate | 0.05175 | 0.60633333 | 0.83591667 | 0.51016667 |
| rh\_subcortical\_rh\_Caudate | 0.0265 | 0.67291667 | 0.79733333 | 0.52958333 |
|  |  |  |  |  |
|  |  |  |  |  |

model0 = lm(Total\_cog ~ X2\_min + Age\_yrs + Gender + BMI

+ walk\_pace + Education\_yrs + EstimatedTotalIntraCranialVol, data)

modelm = lm(mean\_greymatter ~ X2\_min + Age\_yrs + Gender + BMI

+ walk\_pace + Education\_yrs + EstimatedTotalIntraCranialVol, data)

modely = lm(Total\_cog ~ X2\_min + mean\_greymatter + Age\_yrs + Gender + BMI

+ walk\_pace + Education\_yrs + EstimatedTotalIntraCranialVol, data)

| 2min total cog (level 2 only) | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ROI | p\_2min2 | p\_totcog2 | r1 | r2 | direct | indirect | total |
| lh\_temporal | 1 | 1 | 0.0181\*\*\* | 1.4543\*\*\* | 0.2279\*\*\* | 0.0263\*\* | 0.2542\*\*\* |
| rh\_occipital | 1 | 0.99925 | 0.0216\*\*\* | 0.7994\* | 0.2370\*\*\* | 0.0173\*\* | 0.2542\*\*\* |
| rh\_temporal | 1 | 1 | 0.0193\*\*\* | 1.3268\*\*\* | 0.2286\*\*\* | 0.0256\*\*\* | 0.2542\*\*\* |
| lh\_occipital | 0.99991667 | 0.99975 | 0.0186\*\*\* | 1.0367\*\* | 0.2349\*\*\* | 0.0193\* | 0.2542\*\*\* |
| rh\_parietal | 0.99975 | 0.99016667 | 0.0153\*\* | 0.6066 | 0.2449\*\*\* | 0.0093. | 0.2542\*\*\* |
| lh\_parietal | 0.99941667 | 0.99641667 | 0.0150\*\* | 0.7393\* | 0.2431\*\*\* | 0.0111\* | 0.2542\*\*\* |
| lh\_frontal | 0.952 | 0.93041667 | 0.0057 | 0.2987 | 0.2525\*\*\* | 0.0017 | 0.2542\*\*\* |
| lh\_subcortical | 0.93358333 | 0.8365 | 0.0056 | 0.3137 | 0.2525\*\*\* | 0.0017 | 0.2542\*\*\* |
| rh\_frontal | 0.92858333 | 0.853 | 0.0045 | 0.1742 | 0.2534\*\*\* | 0.0008 | 0.2542\*\*\* |
| rh\_subcortical | 0.88325 | 0.83983333 | 0.0038 | 0.3368 | 0.2529\*\*\* | 0.0013 | 0.2542\*\*\* |

0.99

0.95

0.90

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

| 2min total cog (level 1 0.95) | | | | | |
| --- | --- | --- | --- | --- | --- |
| ROI\_lvl2 | r1 | r2 | direct | indirect | total |
| lh\_occipital | 0.0186\*\*\* | 1.0367\*\* | 0.2349\*\*\* | 0.0193\* | 0.2542\*\*\* |
| lh\_temporal | 0.0181\*\*\* | 1.4543\*\*\* | 0.2279\*\*\* | 0.0263\*\*\* | 0.2542\*\*\* |
| rh\_occipital | 0.0216\*\*\* | 0.7994\* | 0.2370\*\*\* | 0.0173\*\*\* | 0.2542\*\*\* |
| rh\_temporal | 0.0193\*\*\* | 1.3268\*\*\* | 0.2286\*\*\* | 0.0256\*\*\* | 0.2542\*\*\* |
| lh\_parietal | 0.0151\*\* | 0.8864\* | 0.2408\*\*\* | 0.0134\* | 0.2542\*\*\* |
| rh\_parietal | 0.0161\*\* | 0.7245. | 0.2425\*\*\* | 0.0117. | 0.2542\*\*\* |
| lh\_frontal | 0.0133\* | 0.9031\*\* | 0.2422\*\*\* | 0.0120\* | 0.2542\*\*\* |
| rh\_frontal | 0.0159\*\* | 0.8558\*\* | 0.2406\*\*\* | 0.0136\*\* | 0.2542\*\*\* |
| lh\_subcortical | 0.0149\* | 0.4149 | 0.2480\*\*\* | 0.0062 | 0.2542\*\*\* |
| rh\_subcortical | 0.0152\* | 0.3645 | 0.2487\*\*\* | 0.0056 | 0.2542\*\*\* |

| 2min total cog (level 1 0.99) | | | | | |
| --- | --- | --- | --- | --- | --- |
| ROI\_lvl2 | r1 | r2 | direct | indirect | total |
| lh\_occipital | 0.0186\*\*\* | 1.0367\*\* | 0.2349\*\*\* | 0.0193\*\* | 0.2542\*\*\* |
| lh\_temporal | 0.0179\*\*\* | 1.5871\*\*\* | 0.2258\*\*\* | 0.0284\*\*\* | 0.2542\*\*\* |
| rh\_occipital | 0.0216\*\*\* | 0.7994\* | 0.2370\*\*\* | 0.0173\* | 0.2542\*\*\* |
| rh\_temporal | 0.0200\*\*\* | 1.4769\*\*\* | 0.2247\*\*\* | 0.0295\*\*\* | 0.2542\*\*\* |
| lh\_parietal | 0.0173\*\* | 0.9553\*\* | 0.2377\*\*\* | 0.0165\*\* | 0.2542\*\*\* |
| rh\_parietal | 0.0166\*\* | 0.6708\* | 0.2431\*\*\* | 0.0111\* | 0.2542\*\*\* |

model0 = lm(RAVLT\_tot ~ X2\_min + Age\_yrs + Gender + BMI

+ walk\_pace + Education\_yrs + EstimatedTotalIntraCranialVol, data)

modelm = lm(mean\_greymatter ~ X2\_min + Age\_yrs + Gender + BMI

+ walk\_pace + Education\_yrs + EstimatedTotalIntraCranialVol, data)

modely = lm(RAVLT\_tot ~ X2\_min + mean\_greymatter + Age\_yrs + Gender + BMI

+ walk\_pace + Education\_yrs + EstimatedTotalIntraCranialVol, data)

| 2min RAVLT (level 2 only) | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ROI | p\_2min2 | p\_ravlt2 | r1 | r2 | direct | indirect | total |
| lh\_temporal | 1 | 0.98475 | 0.0186\*\*\* | 1.0836\*\* | 0.1069. | 0.0201\*\*\* | 0.1270\* |
| rh\_occipital | 1 | 0.99066667 | 0.0229\*\*\* | 0.8398\* | 0.1078\* | 0.0192\*\* | 0.1270\*\* |
| rh\_temporal | 1 | 0.99108333 | 0.0197\*\*\* | 1.0937\*\* | 0.1055. | 0.0215\*\*\* | 0.1270\* |
| lh\_occipital | 0.99991667 | 0.95858333 | 0.0200\*\*\* | 0.5125 | 0.1168\* | 0.0102 | 0.1270\* |
| rh\_parietal | 0.99975 | 0.9645 | 0.0167\*\*\* | 0.6678. | 0.1158\* | 0.0112\* | 0.1270\* |
| lh\_parietal | 0.99941667 | 0.91775 | 0.0165\*\* | 0.3789 | 0.1208. | 0.0063 | 0.1270\* |
| lh\_frontal | 0.952 | 0.873 | 0.0072 | 0.3118 | 0.1248\* | 0.0022 | 0.1270\* |
| lh\_subcortical | 0.93358333 | 0.96525 | 0.0054 | 1.0895\* | 0.1211\* | 0.0059 | 0.1270\* |
| rh\_frontal | 0.92858333 | 0.90375 | 0.0058 | 0.4005 | 0.1247\* | 0.0023 | 0.1270\* |
| rh\_subcortical | 0.88325 | 0.96533333 | 0.0041 | 0.9265. | 0.1232\* | 0.0038 | 0.1270\* |

0.99

0.95

0.90

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

| 2min RAVLT (level 1 0.95) | | | | | |
| --- | --- | --- | --- | --- | --- |
| ROI\_lvl2 | r1 | r2 | direct | indirect | total |
| lh\_occipital | 0.0207\*\*\* | 0.6803\* | 0.1129\* | 0.0141\* | 0.1270\* |
| lh\_temporal | 0.0179\*\*\* | 1.1954\*\* | 0.1056. | 0.0214\*\*\* | 0.1270\* |
| rh\_occipital | 0.0229\*\*\* | 0.8398\* | 0.1078. | 0.0192\*\* | 0.1270\* |
| rh\_temporal | 0.0197\*\*\* | 1.0937\*\* | 0.1055. | 0.0215\*\* | 0.1270\* |
| rh\_parietal | 0.0162\*\* | 0.5623 | 0.1179\* | 0.0091 | 0.1270\* |
| lh\_subcortical | 0.0141\* | 0.9103\*\* | 0.1141\* | 0.0129\* | 0.1270\* |
| rh\_subcortical | 0.0153\* | 0.7372\* | 0.1157\* | 0.0113\* | 0.1270\* |

| 2min RAVLT (level 1 0.99) | | | | | |
| --- | --- | --- | --- | --- | --- |
| ROI\_lvl2 | r1 | r2 | direct | indirect | total |
| rh\_occipital | 0.0221\*\*\* | 0.8867\*\* | 0.1074. | 0.0196\*\* | 0.1270\* |
| rh\_temporal | 0.0174\*\*\* | 1.3080\*\*\* | 0.1042. | 0.0228\*\*\* | 0.1270\* |
| lh\_temporal | 0.0093 | 1.1797\*\*\* | 0.1161. | 0.0110. | 0.1270\* |
|  |  |  |  |  |  |

model0 = lm(Flanker ~ X2\_min + Age\_yrs + Gender + BMI

+ walk\_pace + Education\_yrs + EstimatedTotalIntraCranialVol, data)

modelm = lm(mean\_greymatter ~ X2\_min + Age\_yrs + Gender + BMI

+ walk\_pace + Education\_yrs + EstimatedTotalIntraCranialVol, data)

modely = lm(Flanker ~ X2\_min + mean\_greymatter + Age\_yrs + Gender + BMI

+ walk\_pace + Education\_yrs + EstimatedTotalIntraCranialVol, data)

| 2min Flanker | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ROI | p\_2min2 | p\_flanker2 | r1 | r2 | direct | indirect | total |
| lh\_temporal | 1 | 0.99966667 | 0.0178\*\*\* | 1.3037\*\* | 0.1868\*\*\* | 0.0232\*\* | 0.2100\*\*\* |
| rh\_occipital | 1 | 0.98541667 | 0.0216\*\*\* | 0.5108 | 0.1990\*\*\* | 0.011 | 0.2100\*\*\* |
| rh\_temporal | 1 | 0.99958333 | 0.0191\*\*\* | 1.2570\*\* | 0.1860\*\*\* | 0.0240\*\*\* | 0.2100\*\*\* |
| lh\_occipital | 0.99991667 | 0.99516667 | 0.0187\*\*\* | 0.7536\* | 0.1959\*\*\* | 0.0141. | 0.2100\*\*\* |
| rh\_parietal | 0.99975 | 0.98458333 | 0.0155\*\* | 0.6720. | 0.1996\*\*\* | 0.0104. | 0.2100\*\*\* |
| lh\_parietal | 0.99941667 | 0.962 | 0.0150\*\* | 0.4777 | 0.2028\*\*\* | 0.0072 | 0.2100\*\*\* |
| lh\_frontal | 0.952 | 0.94583333 | 0.0057 | 0.4775 | 0.2073\*\*\* | 0.0027 | 0.2100\*\*\* |
| lh\_subcortical | 0.93358333 | 0.63741667 | 0.0053 | 0.3003 | 0.2084\*\*\* | 0.0016 | 0.2100\*\*\* |
| rh\_frontal | 0.92858333 | 0.8625 | 0.0046 | 0.3596 | 0.2083\*\*\* | 0.0017 | 0.2100\*\*\* |
| rh\_subcortical | 0.88325 | 0.64441667 | 0.0036 | 0.3553 | 0.2087\*\*\* | 0.0013 | 0.2100\*\*\* |

0.99

0.95

0.90

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

| 2min Flanker (level 1 0.99) | | | | | |
| --- | --- | --- | --- | --- | --- |
| ROI\_lvl2 | r1 | r2 | direct | indirect | total |
| lh\_occipital | 0.0216\*\*\* | 0.8220\* | 0.1922\*\*\* | 0.0178\*\* | 0.2100\*\*\* |
| lh\_temporal | 0.0178\*\*\* | 1.3037\*\* | 0.1868\*\*\* | 0.0232\*\* | 0.2100\*\*\* |
| rh\_occipital | 0.0277\*\*\* | 0.5059. | 0.1960\*\*\* | 0.0140. | 0.2100\*\*\* |
| rh\_temporal | 0.0191\*\*\* | 1.2570\*\* | 0.1860\*\*\* | 0.0240\*\* | 0.2100\*\*\* |
|  |  |  |  |  |  |

| 2min Flanker (level 1 0.95) | | | | | |
| --- | --- | --- | --- | --- | --- |
| ROI\_lvl2 | r1 | r2 | direct | indirect | total |
| lh\_occipital | 0.0187\*\*\* | 0.7536\* | 0.1959\*\*\* | 0.0141. | 0.2100\*\*\* |
| lh\_temporal | 0.0178\*\*\* | 1.3037\*\* | 0.1868\*\*\* | 0.0232\*\* | 0.2100\*\*\* |
| rh\_occipital | 0.0216\*\*\* | 0.5108 | 0.1990\*\* | 0.011 | 0.2100\*\*\* |
| rh\_temporal | 0.0191\*\*\* | 1.2570\*\* | 0.1860\*\*\* | 0.0240\*\*\* | 0.2100\*\*\* |
| rh\_parietal | 0.0159\*\* | 0.7418. | 0.1982\*\*\* | 0.0118\* | 0.2100\*\*\* |
| lh\_parietal | 0.0146\*\* | 0.5808 | 0.2015\*\*\* | 0.0085 | 0.2100\*\*\* |
| lh\_frontal | 0.0133\* | 0.7933\* | 0.1994\*\*\* | 0.0106\* | 0.2100\*\*\* |

Appendix