Supplemental Table 1. Top: Mean RMSE for localization and mean SRTs for S0N0 and SCINNH, and results from ANOVAs with CI (off, on) as the within-subject factor and group (UNRES, RES) as the between-subject factor. Middle: Mean scores for the SSQ sub-tests before and one year after cochlear implantation. Bottom: results from ANOVAs for SSQ data with CI (before, after surgery) as the within-subject factor and group (UNRES, RES) as the between-subject factor. The asterisks and italics indicate significant effects.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **CI on** | | **CI off** | |  | **ANOVA** | | |  | |
|  |  | **Mean** | **STDEV** | **Mean** | **STDEV** |  | **dF, res** | **F** | **p** | |
| **RMSE** | **UNRES** | 60.5 | 12.2 | 47.7 | 11.3 | **Group** | 1,16 | 1.1 | 0.301 | |
| **RES** | 64.9 | 9.9 | 49.9 | 10.9 | **CI** | 1,16 | 10.5 | *0.005\** | |
| **ALL** | 62.5 | 11.2 | 48.7 | 10.8 | **Group x CI** | 1,16 | 0.1 | 0.800 | |
| **S0N0** | **UNRES** | -3.1 | 3.0 | -2.9 | 2.1 | **Group** | 1,16 | 10.6 | *0.005\** | |
| **RES** | 2.3 | 4.1 | 2.9 | 5.6 | **CI** | 1,16 | 0.5 | 0.480 | |
| **ALL** | -0.7 | 4.4 | -0.3 | 4.9 | **Group x CI** | 1,16 | 0.1 | 0.761 | |
| **SCINNH** | **UNRES** | -4.2 | 6.2 | 0.2 | 6.6 | **Group** | 1,16 | 6.2 | *0.024\** | |
| **RES** | 0.1 | 3.3 | 7.4 | 4.8 | **CI** | 1,16 | 19.9 | *<0.001\** | |
| **ALL** | -2.6 | 5.1 | 3.5 | 6.9 | **Group x CI** | 1,16 | 1.9 | 0.190 | |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Speech** | | **Spatial** | | **Quality** | |  |  |
|  |  | **Before CI** | **After**  **CI** | **Before CI** | **After**  **CI** | **Before CI** | **After**  **CI** |  |  |
| **UNRES** | Mean | 3.9 | 5.5 | 3.2 | 5.6 | 5.6 | 7.0 |  |  |
| STDEV | 1.7 | 1.6 | 1.9 | 2.0 | 1.6 | 1.6 |  |  |
| **RES** | Mean | 3.0 | 6.1 | 2.3 | 5.6 | 4.7 | 7.0 |  |  |
| STDEV | 1.8 | 2.2 | 1.5 | 2.8 | 2.1 | 2.2 |  |  |
| **ALL** | Mean | 3.5 | 5.8 | 2.8 | 5.6 | 5.2 | 7.0 |  |  |
| STDEV | 1.7 | 1.8 | 1.8 | 2.3 | 1.8 | 1.0 |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  | **ANOVA** | | | | | | | | |
|  | **Speech** | | | **Spatial** | | | **Quality** | | |
|  | **dF, res** | **F** | **p** | **dF, res** | **F** | **p** | **dF, res** | **F** | **p** |
| **Group** | 1,16 | 0.1 | 0.842 | 1,16 | 0.2 | 0.627 | 1,16 | 0.3 | 0.589 |
| **CI** | 1,16 | 32.4 | *<0.001\** | 1,16 | 29.4 | *<0.001\** | 1,16 | 20.2 | *<0.001\** |
| **Group x CI** | 1,16 | 2.7 | 0.122 | 1,16 | 0.6 | 0.444 | 1,16 | 1.2 | 0.289 |

*STDEV=standard deviation; dF=degrees of freedom; res=residual error*

Supplemental Table 2. Top: Pearson correlations between behavioral measures with the CI off or on and demographic factors. Bottom: Pearson correlations between the Speech, Spatial, and Quality sub-tests of the SSQ before and 1 year after cochlear implantation and behavioral measures with the CI off or on. The asterisks and italics indicate significant relationships

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Age at testing** | | | | **Duration of deafness** | | | | **PTA** | | | |
|  |  | **CI off** | | **CI on** | | **CI off** | | **CI on** | | **CI off** | | **CI on** | |
|  |  | **r** | **p** | **r** | **p** | **r** | **p** | **r** | **p** | **r** | **p** | **r** | **p** |
| **UNRES (n=10)** | **RMSE** | 0.19 | 0.602 | 0.05 | 0.893 | -0.53 | 0.113 | 0.14 | 0.706 | -0.59 | 0.073 | 0.19 | 0.601 |
| **SRT S0N0** | 0.28 | 0.441 | 0.17 | 0.641 | 0.58 | 0.076 | 0.56 | 0.090 | 0.47 | 0.174 | 0.55 | 0.102 |
| **SRT SCINNH** | -0.21 | 0.936 | -0.09 | 0.802 | 0.46 | 0.183 | 0.86 | *0.001\** | 0.52 | 0.127 | 0.59 | 0.073 |
| **RES (n=8)** | **RMSE** | -0.38 | 0.350 | 0.33 | 0.429 | -0.01 | 0.987 | -0.61 | 0.106 | 0.63 | 0.095 | -0.54 | 0.167 |
| **SRT S0N0** | 0.23 | 0.583 | 0.08 | 0.854 | -0.08 | 0.849 | -0.14 | 0.740 | 0.76 | *0.028\** | 0.47 | 0.235 |
| **SRT SCINNH** | 0.36 | 0.376 | -0.52 | 0.192 | -0.09 | 0.825 | 0.40 | 0.330 | 0.61 | 0.108 | 0.14 | 0.741 |
| **ALL (n=18)** | **RMSE** | 0.16 | 0.537 | 0.16 | 0.515 | -0.29 | 0.247 | -0.17 | 0.512 | 0.23 | 0.369 | -0.05 | 0.842 |
| **SRT S0N0** | 0.52 | *0.027\** | 0.49 | *0.040\** | 0.20 | 0.423 | 0.26 | 0.298 | 0.82 | *<0.001\** | 0.73 | *<0.001\** |
| **SRT SCINNH** | 0.41 | 0.093 | 0.12 | 0.633 | 0.30 | 0.281 | 0.71 | *0.001\** | 0.69 | *0.001\** | 0.45 | 0.059 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | **RMSE** | | | | **SRT S0N0** | | | | **SRT SCINNH** | | | |
|  |  |  | **CI off** | | **CI on** | | **CI off** | | **CI on** | | **CI off** | | **CI on** | |
|  |  |  | **r** | **p** | **r** | **p** | **r** | **p** | **r** | **p** | **r** | **p** | **r** | **p** |
| **UNRES (n=10)** | **Speech** | **Before** | -0.47 | 0.168 | 0.02 | 0.956 | -0.03 | 0.944 | -0.03 | 0.924 | 0.13 | 0.729 | 0.42 | 0.234 |
| **After** | -0.22 | 0.551 | -0.11 | 0.756 | 0.07 | 0.853 | 0.18 | 0.610 | -0.30 | 0.405 | 0.10 | 0.786 |
| **Spatial** | **Before** | 0.13 | 0.718 | -0.15 | 0.670 | -0.34 | 0.332 | -0.52 | 0.121 | 0.37 | 0.297 | -0.05 | 0.892 |
| **After** | 0.03 | 0.931 | -0.12 | 0.747 | 0.22 | 0.541 | 0.05 | 0.901 | 0.10 | 0.775 | -0.06 | 0.861 |
| **Quality** | **Before** | -0.53 | 0.119 | -0.09 | 0.806 | 0.22 | 0.540 | 0.24 | 0.503 | 0.48 | 0.163 | 0.68 | *0.031\** |
| **After** | -0.35 | 0.327 | -0.35 | 0.326 | 0.38 | 0.274 | 0.42 | 0.231 | -0.07 | 0.855 | 0.41 | 0.242 |
| **RES (n=8)** | **Speech** | **Before** | -0.26 | 0.537 | 0.73 | *0.038\** | -0.31 | 0.450 | -0.29 | 0.485 | -0.49 | 0.219 | -0.26 | 0.537 |
| **After** | -0.27 | 0.521 | 0.30 | 0.465 | -0.77 | *0.026\** | -0.41 | 0.320 | -0.76 | *0.030\** | 0.11 | 0.792 |
| **Spatial** | **Before** | -0.72 | *0.045\** | 0.57 | 0.139 | -0.69 | 0.060 | -0.62 | 0.100 | -0.60 | 0.117 | -0.26 | 0.532 |
| **After** | -0.28 | 0.505 | 0.24 | 0.573 | -0.82 | *0.013\** | -0.53 | 0.180 | -0.80 | *0.018\** | 0.13 | 0.762 |
| **Quality** | **Before** | -0.68 | 0.061 | 0.93 | *<0.001\** | -0.14 | 0.740 | 0.03 | 0.944 | -0.13 | 0.756 | -0.11 | 0.805 |
| **After** | -0.44 | 0.276 | 0.60 | 0.114 | -0.71 | *0.049\** | -0.40 | 0.327 | -0.73 | *0.040\** | 0.11 | 0.795 |
| **All (n=18)** | **Speech** | **Before** | -0.41 | 0.089 | 0.31 | 0.219 | -0.31 | 0.218 | -0.28 | 0.261 | -0.23 | 0.366 | 0.11 | 0.652 |
| **After** | -0.19 | 0.441 | 0.11 | 0.665 | -0.33 | 0.188 | -0.03 | 0.898 | -0.32 | 0.190 | 0.13 | 0.598 |
| **Spatial** | **Before** | -0.20 | 0.439 | 0.09 | 0.732 | -0.51 | *0.032\** | -0.56 | *0.015\** | -0.08 | 0.743 | -0.16 | 0.515 |
| **After** | -0.11 | 0.667 | 0.06 | 0.799 | -0.43 | 0.079 | -0.23 | 0.355 | -0.25 | 0.317 | 0.00 | 0.991 |
| **Quality** | **Before** | -0.60 | *0.008\** | 0.37 | 0.132 | -0.18 | 0.480 | -0.06 | 0.806 | 0.03 | 0.898 | 0.27 | 0.276 |
| **After** | -0.37 | 0.133 | 0.13 | 0.599 | -0.32 | 0.200 | -0.05 | 0.859 | -0.29 | 0.240 | 0.26 | 0.299 |

Supplemental Table 3. Top: Pearson correlations between the change in SSQ scores (1 year after CI – before CI) for the Speech, Spatial, and Quality sub-tests of the SSQ and the change in scores (CI on – CI off) for behavioral measures. Middle: Pearson correlations between GBI scores collected 1 year after cochlear implantation and behavioral measures with the CI off and on. Bottom: Pearson correlations between GBI scores and the change in behavioral measures (CI on – CI off). The the asterisks and italics indicate significant relationships.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **RMSE** | | **SRT S0N0** | | **SRT SCINNH** | |
|  |  | **r** | **p** | **r** | **p** | **r** | **p** |
| **UNRES (n=10)** | **Speech** | -0.30 | 0.394 | 0.40 | 0.249 | 0.15 | 0.677 |
| **Spatial** | 0.08 | 0.833 | 0.40 | 0.248 | 0.28 | 0.426 |
| **Quality** | -0.31 | 0.380 | 0.16 | 0.661 | 0.36 | 0.304 |
| **RES (n=8)** | **Speech** | -0.18 | 0.663 | 0.71 | 0.051 | 0.44 | 0.275 |
| **Spatial** | -0.15 | 0.727 | 0.59 | 0.127 | 0.55 | 0.155 |
| **Quality** | -0.34 | 0.409 | 0.50 | 0.210 | 0.65 | 0.084 |
| **All (n=18)** | **Speech** | -0.24 | 0.331 | 0.53 | *0.023\** | 0.15 | 0.563 |
| **Spatial** | -0.04 | 0.867 | 0.48 | *0.043\** | 0.33 | 0.182 |
| **Quality** | -0.33 | 0.186 | 0.35 | 0.153 | 0.38 | 0.121 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **RMSE** | | | | **SRT S0N0** | | | | **SRT SCINNH** | | | | |
|  | **CI off** | | **CI on** | | **CI off** | | **CI on** | | **CI off** | | **CI on** | | |
|  | **r** | **p** | **r** | **p** | **r** | **p** | **r** | **p** | **r** | **p** | **r** | **p** |
| **GBI UNRES (n=10)** | -0.03 | 0.927 | -0.29 | 0.423 | -0.20 | 0.580 | -0.19 | 0.597 | -0.07 | 0.855 | -0.37 | 0.289 |
| **GBI RES (n=8)** | 0.27 | 0.524 | -0.90 | *0.002\** | -0.01 | 0.986 | -0.05 | 0.897 | 0.09 | 0.826 | 0.22 | 0.601 |
| **GBI**  **All (n=18)** | 0.11 | 0.657 | -0.59 | *0.011\** | -0.02 | 0.951 | -0.06 | 0.824 | 0.03 | 0.902 | -0.13 | 0.601 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | **Change** | |  |  | **Change** | |  |  | **Change** | |  |  |
|  | **r** | **p** |  |  | **r** | **p** |  |  | **r** | **p** |  |  |
| **GBI UNRES (n=10)** | -0.16 | 0.664 |  |  | -0.12 | 0.741 |  |  | -0.33 | 0.360 |  |  |
| **GBI RES (n=8)** | -0.70 | 0.053 |  |  | -0.06 | 0.893 |  |  | 0.02 | 0.972 |  |  |
| **GBI**  **All (n=18)** | -0.43 | 0.077 |  |  | -0.08 | 0.765 |  |  | -0.15 | 0.563 |  |  |