**Supplemental Material**

Pediatric Traumatic Brain Injury Affects Multisensory Integration

Marsh Königs, Wouter D Weeda, LW Ernest van Heurn, R Jeroen Vermeulen, J Carel Goslings, Jan SK Luitse, Bwee Tien Poll-Thé, Anita Beelen, Marleen van der Wees, Rachèl JJK Kemps, Coriene E Catsman-Berrevoets, Jaap Oosterlaan

Additional Content:

 **Results**

Simple visual and auditory processing speed Page 2

Group matching for SES Page 3

Influence of intracranial pathology (Table S3) Page 4

*Simple visual and auditory processing speed*

Table S1. Analysis exploring the potential confounding influence of selective effects of TBI on simple visual or auditory processing speed.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Group |  | Conditiona |  | Condition x Groupa |  | Groupa |  | Contrasts |
|  | TBI | TC |  | *F* | *p* | p*η*2 |  | *F* | *p* | p*η*2 |  | *F* | *p* | p*η*2 |  | *p* | Cohen’s *d* |
| *n* | 94 | 39 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Simple Processing* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  *MRT*  |  |  |  | 48.9 | **<.001** | .27 |  | 0.4 | .53 | .00 |  | 7.1 | **.009** | .05 |  |  |  |
|  Visual | 581 (137) | 525 (132) |  |  |  |  |  |  |  |  |  |  |  |  |  | - | - |
| Auditory | 520 (138) | 452 (100) |  |  |  |  |  |  |  |  |  |  |  |  |  | - | - |
|  *Accuracy* |  |  |  | 0.1 | .77 | .00 |  | 0.4 | .54 | .00 |  | 6.2 | **.014** | .05 |  |  |  |
|  Visual | 0.98 (0.03) | 0.99 (0.01) |  |  |  |  |  |  |  |  |  |  |  |  |  | - | - |
| Auditory | 0.98 (0.03) | 0.99 (0.01) |  |  |  |  |  |  |  |  |  |  |  |  |  | - | - |

*Note.* TBI = traumatic brain injury; TC = trauma control, MRT = mean reaction time.

*Group matching for SES*

To investigate whether lower SES in the moderate/severe TBI group could account for the observed effects of moderate/severe TBI on FSIQ and task performance, we matched children from the TC group 1:1 to every child in the moderate/severe TBI group on SES with a bandwidth of 1 (on a scale ranging from 1-8). The matched TC group did not differ from the moderate/severe TBI on age, gender and SES (Table S2), while the reported results on FSIQ as well as accuracy and *drift rate* in the multisensory integration condition were replicated using the matched groups (Table S2). These findings indicate that SES did not confound the reported results.

Table S2. Replication analyses after matching for SES.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Group |  | Group differencea |
|  | Moderate/Severe TBI | Matched TC |  | *F* | *p* | Cohen’s *d* |
| *n* | 30 | 30 |  |  |  |  |
| *Demographics* |  | 50% |  |  |  |  |
|  Males, n (%) | 17 (57) | 15 (50) |  | - | .60 | - |
|  Age at testing in y, M (SD) | 9.0 (2.1) | 9.5 (2.1) |  | .71 | .61 | -0.24 |
|  SES, M (SD) | 5.3 (1.3) | 5.7 (0.9) |  | 1.9 | .18 | -0.36 |
| *Intelligence* |  |  |  |  |  |  |
|  FSIQ | 98.1 (15.7) | 106.5 (13.9) |  | 4.8 | **.032** | -0.57 |
| *Multisensory Integration* |  |  |  |  |  |  |
| Audiovisual shift  |  |  |  |  |  |  |
|  *Accuracy* | 0.65 (0.21) | 0.74 (0.14) |  | 4.3 | **.042** | -0.50 |
|  *Drift rate* | 0.89 (0.79) | 1.29 (0.62) |  | 4.7 | **.035** | -0.56 |

 *Note.* TBI = traumatic brain injury; TC = trauma control, SES = socio-economic status, FSIQ = full-scale IQ.

aF-statistic (degrees of freedom: 1, 59) and associated *p* value and Cohen’s *d* from the ANOVA assessing the main effect of group.

*Influence of intracranial pathology*

Table S3. Effects of mildRF+ TBI without evidence for intracranial pathology.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Group |  | Group difference |
|  | MildRF+ TBI\* | TC |  | *F* | *p* | Cohen’s *d* |
| *n* | 30 | 39 |  |  |  |  |
| *Intelligence* |  |  |  |  |  |  |
|  FSIQ | 98.6 (15.3) | 106.7 (14.3) |  |  | **.027** | -0.55 |
| *Multisensory Integration* |  |  |  |  |  |  |
| Audiovisual shift  |  |  |  |  |  |  |
|  *Accuracy* | 0.67 (0.20) | 0.75 (0.14) |  |  | **.046** | -0.46 |
|  *Drift rate* | 1.09 (0.62) | 1.32 (0.60) |  |  | .087 | -0.38 |

*Note.* TBI = traumatic brain injury; TC = trauma control; FSIQ = full-scale intelligence.

\*Cases with clinical evidence for intracranial pathology were excluded from this analysis.

aF-statistic (degrees of freedom: 1, 68) and associated *p* value and Cohen’s *d* from the ANOVA assessing the main effect of group.