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| --- | --- | --- | --- | --- | --- | --- |
| **Congener Biomarker Concentrations (ng/g)** | **Mean** | **Median** | **GM** | **GSD** | **Minimum** | **Maximum** |
| Lipid unadjusted |  |  |  |  |  |  |
| PCB 138/163 | 0.03 | 0.02 | 0.02 | 2.33 | 0.004 | 0.33 |
| PCB 153 | 0.04 | 0.02 | 0.02 | 2.31 | 0.004 | 0.39 |
| PCB 180 | 0.02 | 0.01 | 0.01 | 2.62 | 0.002 | 0.23 |
| PBDE 47 | 0.13 | 0.07 | 0.07 | 2.98 | 0.005 | 1.01 |
| PBDE 153 | 0.03 | 0.02 | 0.02 | 3.42 | 0.001 | 0.19 |
| Lipid adjusted |  |  |  |  |  |  |
| PCB 138/163 | 6.90 | 4.20 | 4.60 | 2.39 | 0.49 | 69.18 |
| PCB 153 | 8.00 | 5.22 | 5.43 | 2.37 | 0.80 | 80.71 |
| PCB 180 | 4.54 | 2.59 | 1.01 | 2.71 | 0.39 | 48.85 |
| PBDE 47 | 28.24 | 16.35 | 16.64 | 2.94 | 1.17 | 150.89 |
| PBDE 153 | 6.72 | 4.31 | 3.95 | 3.43 | 0.10 | 44.83 |

**Supplemental Table 1.** Distribution of chemical congener exposure biomarker concentrations measured in the serum of adolescent participants (n=115). GM = geometric mean, GSD = geometric standard deviation.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Lipid unadjusted** | **Total PCBs** | **Total PBDEs** | **PCB 138/163** | **PCB 153** | **PCB 180** | **PBDE 47** | **PBDE 153** |
| **Total PCBs** | 1.00 | - | - | - | - | - | - |
| **Total PBDEs** | 0.36\*\* | 1.00 | - | - | - | - | - |
| **PCB 138/163** | 0.82\*\* | 0.27\*\* | 1.00 | - | - | - | - |
| **PCB 153** | 0.86\*\* | 0.25\* | 0.93\*\* | 1.00 | - | - | - |
| **PCB 180** | 0.74\*\* | 0.18✝ | 0.85\*\* | 0.86\*\* | 1.00 | - | - |
| **PBDE 47** | 0.34\*\* | 0.96\*\* | 0.24\* | 0.22\* | 0.14 | 1.00 | - |
| **PBDE 153** | 0.32\*\* | 0.55\*\* | 0.31\*\* | 0.33\*\* | 0.30\*\* | 0.38\*\* | 1.00 |
| **Lipid adjusted** | **Total PCBs** | **Total PBDEs** | **PCB 138/163** | **PCB 153** | **PCB 180** | **PBDE 47** | **PBDE 153** |
| **Total PCBs** | 1.00 | - | - | - | - | - | - |
| **Total PBDEs** | 0.35\*\* | 1.00 | - | - | - | - | - |
| **PCB 138/163** | 0.82\*\* | 0.27\*\* | 1.00 | - | - | - | - |
| **PCB 153** | 0.86\*\* | 0.25\* | 0.93\*\* | 1.00 | - | - | - |
| **PCB 180** | 0.76\*\* | 0.19\* | 0.86\*\* | 0.87\*\* | 1.00 | - | - |
| **PBDE 47** | 0.33\*\* | 0.95\*\* | 0.24\* | 0.22\* | 0.16✝ | 1.00 | - |
| **PBDE 153** | 0.36\*\* | 0.56\*\* | 0.34\*\* | 0.37\*\* | 0.34\*\* | 0.39\*\* | 1.00 |

**Supplementary Table 2.** Spearman correlations among lipid unadjusted (top) and lipid adjusted (bottom) chemical biomarker concentrations measured in the serum of adolescent participants. ✝*p* < 0.10, \**p* < 0.05, \*\**p* < 0.01

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| **CANTAB test** | **Outcome** | **Exposure** | **N** | **Estimate, means ratio**1**,**  **or odds ratio**2 | **Standard error**  **or 95% CL**3 | **p-value** |
| DMS | a Total wrong | PBDEs | 106 | 11.09 | 3 0.10, 1.23 | 0.18 |
| SWM | b Errors | PCBs | 108 | -0.07 | 0.08 | 0.41 |
| PBDEs | 0.02 | 0.06 | 0.76 |
| b Total responses | PCBs | 108 | -0.002 | 0.01 | 0.76 |
| PBDEs | 0.01 | 0.01 | 0.13 |
| b Time to complete set | PCBs | 108 | -0.004 | 0.02 | 0.79 |
| PBDEs | 0.01 | 0.01 | 0.39 |
| SOC | b Thinking time | PCBs | 110 | 0.05 | 0.07 | 0.45 |
| PBDEs | 0.002 | 0.05 | 0.98 |
| c Number of moves to complete set | PCBs | 107 | 21.30 | 3 0.79, 2.14 | 0.30 |
| PBDEs | 21.05 | 3 0.74, 1.50 | 0.79 |

**Supplemental Table 3.** Relation (parameter estimate, means ratio or odds ratio, standard error or 95% CL, and p-value) of adolescent total PCB and total PBDE serum concentrations with CANTAB test outcomes. aNegative binomial regression was used to analyze the relation of this outcome with exposure concentrations. bMultivariable linear regression was used to analyze the relation of this outcome with exposure concentrations. cLogistic regression was used to analyze the relation of this outcome with exposure concentrations. All models were adjusted for age, sex, and IQ score. CL: confidence limit.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ID/ED outcome** | **PCB congener** | **N** | **Sex** | **Means ratio**1  **or odds ratio** | **95% CL** | **p-value** |
| a Total trials to complete task | PCB 138/163 |  | - | 1 0.92 | 0.65, 1.31 | 0.66 |
| PCB 153 | 104 | - | 10.91 | 0.63, 1.30 | 0.59 |
| PCB 180 |  | - | 10.95 | 0.68, 1.34 | 0.78 |
| b SD | PCB 138/163 | 104 | - | 1.50 | 0.86, 2.60 | 0.15 |
| PCB 153 | 105 | - | 1.72 | 0.98, 3.02 | 0.06 |
| PCB 180 | 105 | - | 1.55 | 0.95, 2.53 | 0.08 |
| b SR | PCB 138/163 |  | **-** | 0.93 | 0.54, 1.61 | 0.79 |
| PCB 153 | 106 | **-** | 1.05 | 0.60, 1.85 | 0.85 |
| PCB 180 |  | **-** | 1.12 | 0.69, 1.80 | 0.66 |
| b CD1 | PCB 138/163 | 106 | - | 1.34 | 0.83, 2.17 | 0.23 |
| PCB 153 | 105 | - | 1.31 | 0.78, 2.19 | 0.31 |
| PCB 180 | 106 | **-** | 1.35 | 0.89, 2.06 | 0.16 |
| b CD2 | PCB 138/163 | 103 | - | 1.44 | 0.80, 2.59 | 0.22 |
| PCB 153 | 102 | - | 1.16 | 0.63, 2.14 | 0.63 |
| PCB 180 | 104 | Males | 0.82 | 0.41, 1.65 | 0.58 |
| Females | 2.13 | 1.01, 4.52 | 0.05 |
| b CR | PCB 138/163 |  | **-** | 0.80 | 0.46, 1.40 | 0.43 |
| PCB 153 | 105 | **-** | 0.93 | 0.52, 1.65 | 0.81 |
| PCB 180 |  | **-** | 0.95 | 0.60, 1.51 | 0.83 |
| b ID | PCB 138/163 |  | **-** | 1.07 | 0.56, 2.02 | 0.85 |
| PCB 153 | 105 | **-** | 1.29 | 0.66, 2.53 | 0.45 |
| PCB 180 |  | **-** | 0.86 | 0.50, 1.47 | 0.58 |
| b IR | PCB 138/163 |  | **-** | 1.26 | 0.61, 2.64 | 0.53 |
| PCB 153 | 105 | **-** | 1.32 | 0.61, 2.84 | 0.48 |
| PCB 180 |  | **-** | 1.27 | 0.70, 2.3 | 0.43 |
| b ED | PCB 138/163 | 103 | **-** | 0.55 | 0.32, 0.96 | 0.03 |
| PCB 153 | 104 | **-** | 0.52 | 0.30, 0.92 | 0.02 |
| PCB 180 | 103 | **-** | 0.65 | 0.41, 1.03 | 0.06 |
| b ER | PCB 138/163 | 98 | Males | 0.77 | 0.32, 1.87 | 0.56 |
| Females | 3.50 | 1.27, 9.58 | 0.02 |
| PCB 153 | Males | 0.70 | 0.27, 1.81 | 0.47 |
| Females | 4.10 | 1.37, 12.34 | 0.01 |
| PCB 180 | Males | 0.50 | 0.24, 1.02 | 0.06 |
| Females | 3.87 | 1.38, 10.85 | 0.01 |

**Supplemental Table 4.** Relation (means ratio or odds ratio, 95% CL, and p-value) of adolescent PCB congener serum concentrations with ID/ED total trials and trials to criterion for each ID/ED stage. aNegative binomial regression was used to analyze the relation of total trials with exposure concentrations. bLogistic regression was used to analyze the relation of trials to criterion at each stage with exposure concentrations. All models were adjusted for age, sex, and IQ score. CL: confidence limit.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ID/ED outcome** | **PBDE congener** | **N** | **Sex** | **Means ratio**1  **or odds ratio** | **95% CL** | **p-value** |
| a Total trials to complete task | PBDE 47 | 104 | - | 1 1.85 | 1.30, 2.62 | 0.001 |
| PBDE 153 | 103 | - | 11.58 | 1.13, 2.20 | 0.01 |
| b SD | PBDE 47 | 105 | Males | 3.35 | 1.53, 7.33 | 0.002 |
| Females | 0.97 | 0.54, 1.74 | 0.91 |
| PBDE 153 | 103 | - | 1.95 | 1.13, 3.37 | 0.02 |
| b SR | PBDE 47 | 106 | **-** | 1.16 | 0.75, 1.78 | 0.50 |
| PBDE 153 | **-** | 1.33 | 0.85, 2.08 | 0.21 |
| b CD1 | PBDE 47 | 105 | - | 0.97 | 0.67, 1.40 | 0.85 |
| PBDE 153 | 104 | - | 0.99 | 0.71, 1.39 | 0.97 |
| b CD2 | PBDE 47 | 105 | - | 1.16 | 0.78, 1.75 | 0.46 |
| PBDE 153 | - | 1.08 | 0.75, 1.56 | 0.68 |
| b CR | PBDE 47 | 105 | **-** | 1.41 | 0.91, 2.17 | 0.13 |
| PBDE 153 | **-** | 1.59 | 0.98, 2.59 | 0.06 |
| b ID | PBDE 47 | 101 | Males | 5.82 | 1.76, 19.30 | 0.004 |
| Females | 0.95 | 0.405, 2.23 | 0.91 |
| PBDE 153 | **-** | 1.48 | 0.796, 2.77 | 0.21 |
| b IR | PBDE 47 | 101 | Males | 2.74 | 1.06, 7.07 | 0.04 |
| Females | 0.65 | 0.18, 2.37 | 0.52 |
| PBDE 153 | **-** | 3.61 | 1.22, 10.67 | 0.02 |
| b ED | PBDE 47 | 105 | **-** | 0.89 | 0.62, 1.23 | 0.54 |
| PBDE 153 | **-** | 0.81 | 0.57, 1.14 | 0.22 |
| b ER | PBDE 47 | 99 | **-** | 1.19 | 0.78, 1.83 | 0.43 |
| PBDE 153 | **-** | 0.92 | 0.63, 1.33 | 0.65 |

**Supplemental Table 5.** Relation (means ratio or odds ratio, 95% CL, and p-value) of adolescent PBDE congener serum concentrations with ID/ED total trials and trials to criterion for each ID/ED stage. aNegative binomial regression was used to analyze the relation of total trials with exposure concentrations. bLogistic regression was used to analyze the relation of trials to criterion at each stage with exposure concentrations. All models were adjusted for age, sex, and IQ score. CL: confidence limit.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **CANTAB test** | **Outcome** | **PCB congener** | **N** | **Sex** | **Estimate, means ratio**1**,**  **or odds ratio**2 | **Standard error**  **or 95% CL**3 | **p-value** |
| DMS | a Total wrong | PCB 138/163 | 103 | - | 1 1.06 | 3 0.93, 1.21 | 0.37 |
| PCB 153 | 106 | - | 11.01 | 3 0.89, 1.16 | 0.83 |
| PCB 180 | 105 | Males | 10.87 | 3 0.73, 1.03 | 0.11 |
| Females | 1 1.20 | 3 1.00, 1.43 | 0.05 |
| SWM | b Errors | PCB 138/163 |  | **-** | -0.09 | 0.08 | 0.23 |
| PCB 153 | 108 | **-** | -0.09 | 0.08 | 0.24 |
| PCB 180 |  | **-** | -0.14 | 0.06 | 0.03 |
| b Total responses | PCB 138/163 |  | **-** | -0.01 | 0.01 | 0.03 |
| PCB 153 | 108 | **-** | -0.01 | 0.01 | 0.03 |
| PCB 180 |  | **-** | -0.01 | 0.01 | 0.03 |
| b Time to complete set | PCB 138/163 |  | - | -0.01 | 0.02 | 0.44 |
| PCB 153 | 108 | - | -0.02 | 0.02 | 0.20 |
| PCB 180 |  | **-** | -0.04 | 0.01 | 0.01 |
| SOC | b Thinking time | PCB 138/163 |  | - | 0.09 | 0.07 | 0.24 |
| PCB 153 | 107 | - | 0.07 | 0.08 | 0.34 |
| PCB 180 |  | - | 0.07 | 0.06 | 0.25 |
| c Number of moves to complete set | PCB 138/163 |  | **-** | 21.25 | 3 0.76, 2.05 | 0.38 |
| PCB 153 | 107 | **-** | 21.40 | 3 0.83, 2.35 | 0.20 |
| PCB 180 |  | **-** | 21.32 | 3 0.86, 2.02 | 0.20 |

**Supplemental Table 6.** Relation (parameter estimate, means ratio or odds ratio, standard error or 95% CL, and p-value) of adolescent PCB congener serum concentrations with CANTAB test outcomes. aNegative binomial regression was used to analyze the relation of this outcome with exposure concentrations. bMultivariable linear regression was used to analyze the relation of this outcome with exposure concentrations. cLogistic regression was used to analyze the relation of this outcome with exposure concentrations. All models were adjusted for age, sex, and IQ score. CL: confidence limit.

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| --- | --- | --- | --- | --- | --- | --- |
| **CANTAB test** | **Outcome** | **PBDE Congener** | **N** | **Estimate, means ratio**1**,**  **or odds ratio**2 | **Standard error**  **or 95% CL**3 | **p-value** |
| DMS | a Total wrong | PBDE 47 | 106 | 1 1.12 | 3 0.99, 1.26 | 0.08 |
| PBDE 153 | 10.95 | 3 0.83, 1.08 | 0.43 |
| SWM | b Errors | PBDE 47 | 108 | 0.04 | 0.06 | 0.58 |
| PBDE 153 | -0.07 | 0.05 | 0.12 |
| b Total responses | PBDE 47 | 108 | 0.01 | 0.01 | 0.03 |
| PBDE 153 | -0.01 | 0.01 | 0.11 |
| b Time to complete set | PBDE 47 | 108 | 0.02 | 0.01 | 0.18 |
| PBDE 153 | -0.03 | 0.01 | 0.01 |
| SOC | b Thinking time | PBDE 47 | 107 | -0.01 | 0.06 | 0.85 |
| PBDE 153 | -0.03 | 0.05 | 0.61 |
| c Number of moves to complete set | PBDE 47 | 107 | 21.04 | 3 0.70, 1.53 | 0.86 |
| PBDE 153 | 20.97 | 3 0.69, 1.38 | 0.87 |

**Supplemental Table 7.** Relation (parameter estimate, means ratio or odds ratio, standard error or 95% CL, and p-value) of adolescent PBDE congener serum concentrations with CANTAB test outcomes. aNegative binomial regression was used to analyze the relation of this outcome with exposure concentrations. bMultivariable linear regression was used to analyze the relation of this outcome with exposure concentrations. cLogistic regression was used to analyze the relation of this outcome with exposure concentrations. All models were adjusted for age, sex, and IQ score. CL: confidence limit.