Supplementary materials for:

Assessing the Relation Between PCB Exposures During Pregnancy and Autistic Behaviour using Bayesian Predictive Odds Ratios

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Supplementary Methods. Bayesian Predictive Odds Ratios.

To illustrate our analytic approach let Y be the SRS Score, X be a single PCB exposure variable (e.g. PCB138), and C = {C_1, C_2, ..., C_K} be the vector of K confounders. Define Q_1, Q_2, Q_3, Q_4 to be zero-one quartile indicator variables (indicator variables) for inclusion in the multivariable model for SRS, such that

Q_1 = 1 if X ϵ (0, q_1], or 0 otherwise

Q_2 = 1 if X ϵ (q_1, q_2], or 0 otherwise

Q_3 = 1 if X ϵ (q_2, q_3], or 0 otherwise

Q_4 = 1 if X ϵ (q_3, ∞), or 0 otherwise.

where q_1, q_2, and q_3 are the 25th, 50th, and 75th percentiles of ng/g lipids for PCB138, respectively.

We modelled the outcome Y using multiple linear regression

$$Y = \beta_1 + \beta_2 Q_2 + \beta_3 Q_3 + \beta_4 Q_4 + \beta_{C_1} C_1 + \beta_{C_2} C_2 + \ldots + \beta_{C_K} C_K + \mathcal{E}, \qquad \text{[Equation 1]}$$

where ε ~ Normal(0, σ^2), which is a linear regression model for SRS with indicator variables for each of the quartiles, and that uses Q_1 as the reference category. Note that the model does not adjust for co-pollutant confounding from simultaneous exposure to multiple PCBs.

For the parameters β_2, β_3, β_4, which describe the association between PCB exposure quartile and mean SRS, adjusted for confounders, we assigned an autoregressive prior to smooth the dose-response curve, where

$$\beta_{i+1} \sim N(\beta_i, \tau^2) \text{ for i=1,2,3}$$

and we assigned

$$\tau^2 \sim N(0, 10000), \tau^2 > 0.$$

The parameter τ^2 induces a shrinkage factor that pulls the segments of the dose-response curve together. Statistical theory has previously demonstrated that this approach gives a more realistic dose-response curve, including smaller 95% intervals, better prediction of Y, and that is

less susceptible to random errors in the data. Additionally, we assigned uninformative priors to the parameters $\beta_1, \beta_{C_1}, \beta_{C_2}, \ldots, \beta_{C_K}, \delta^2$

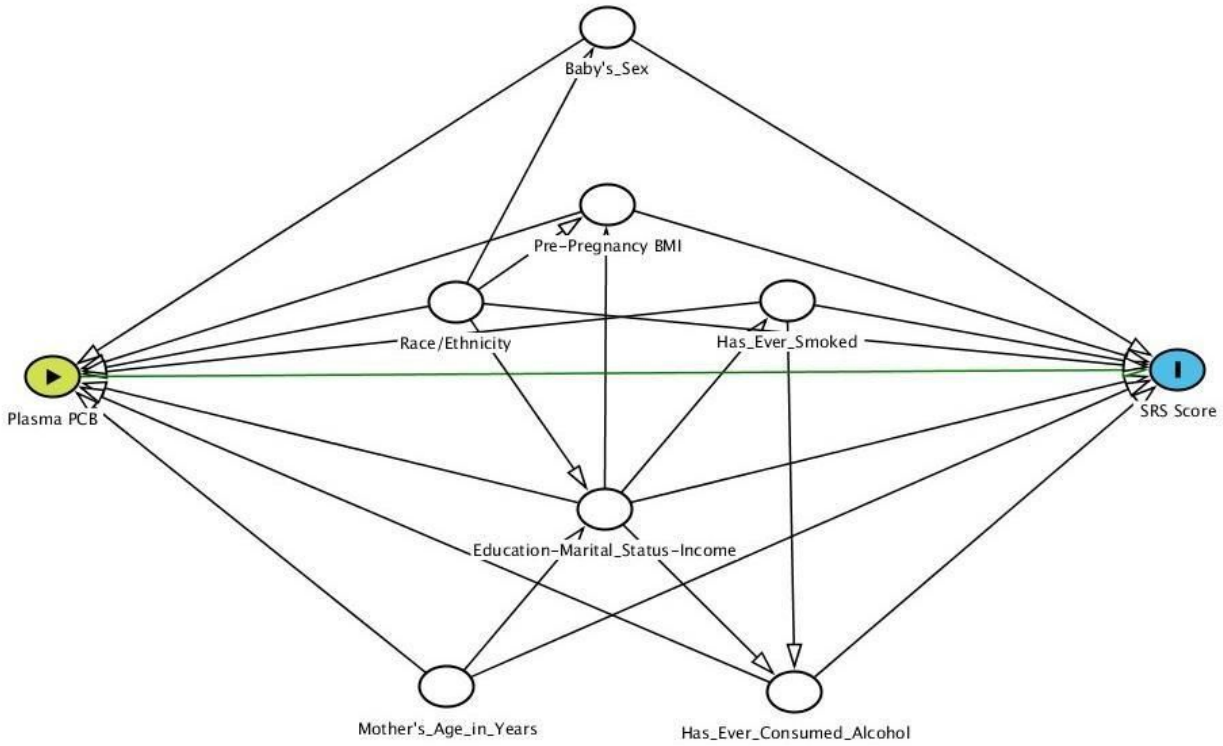
$$\beta_1, \beta_{C_1}, \beta_{C_2}, \ldots, \beta_{C_K} \sim N(0, 10000); \delta^2 \sim N(0, 10000), \delta^2 > 0.$$

Bayesian inference has the advantage that it allows us to compute posterior distributions of any function of the model parameters (e.g. the probability that SRS >60). To make comparisons with the odds ratios for ASD observed in the literature (e.g. Lyall [21] and Cheslack-Postava [20]), we calculated BPORs for more autistic behaviour based on a latent variable model that defines autism based on a SRS threshold >60, while accounting for uncertainty in model parameter estimates. To illustrate the approach, let D be a latent variable for autism, such that D = 1 if Y > 60 and D = 0 if $Y \leq 60$. Additionally, suppose that the error term in Equation (1) follows a logistic distribution with ε ~ Logistic(0, λ) with non-informative prior distribution for λ. Then it the quantity logit[P(D = 1 | Q_1, Q_2, Q_3, C_1, ..., C_K)] follow a logistic regression model in the sense that the log odds of P(D = 1 | Q_1, Q_2, Q_3, C_1, ..., C_K) is a linear function of the covariates.

We sample from the posterior distribution in Equation (1) using the software STAN, and then we compute BPORs as follows: To compute the odds of more autistic behaviour (SRS>60) for participants in the uppermost PCB quartile divided by the odds of more autistic behavior in the lowest quartile, we compute

$$BPOR = \frac{odds(Q4=1)}{odds(Q1=1)} = \frac{1-plogis(60,\beta_1+\beta_4,\lambda)}{1-plogis(60,\beta_1,\lambda)}$$

where the values of $\beta_1, \beta_4, \lambda$ are MCMC sample iterations from the posterior distribution in Equation (1) with logistic errors given by ε ~ Logistic(0, λ). In the calculation above, the quantity 1 - plogis(60, β, λ) is the probability that SRS>60, and plogis(.) is the probability distribution function of a logistic random variable. Because of the properties of the logistic distribution, the value of the BPOR does not depend on the threshold that is used to define more autistic behaviour (e.g. 60, 75 or any other value) [27,29,30].



Supplementary Figure 1. Directed Acyclic Graph (DAG) for the relation between plasma PCB exposure during pregnancy, socio-demographic factors, and the SRS score.

Supplementary Table 1. Regression coefficients for the relation between participant covariates and mean SRS score in MIREC study participants, Canada, 2008-2011 using Multiple Linear Regression (n=546).

	n (%)	SRS Unadjusted mean scores (95% CI)	SRS Adjusted[1] mean scores (95% CI)
Child Sex			
Intercept		44.2 (43.5, 44.9)	45.5 (41.7, 49.4)
Female	285 (52.2)	0.0 (referent)	0.0
Male	261 (47.8)	2.4 (1.4, 3.4)	2.3 (1.3, 3.3)
Mother's Age			
Intercept		46.7 (45.6, 47.8)	45.5 (41.7, 49.4)
19-29	122 (22.3)	0.0	0.0
30-34	205 (37.5)	-1.3 (-2.7, 0.0)	-0.2 (-1.6, 1.2)
35+	219 (40.0)	-2.2 (-3.5, -0.8)	-1.1 (-2.5, 0.3)
Race			
Intercept		45.2 (44.6, 45.7)	45.5 (41.7, 49.4)
White	491 (89.9)	0.0	0.0
Other	55 (10.1)	1.7 (0.0, 3.4)	1.4 (-0.4, 3.1)
Marital Status			
Intercept		44.7 (44.1, 45.3)	45.5 (41.7, 49.4)
Married	241 (89.9)	0.0	0.0
Other	154 (28.2)	2.2 (1.1, 3.3)	1.5 (0.3, 2.7)
Education Level			
Intercept		47.8 (45.6, 50.0)	45.5 (41.7, 49.4)
High School Diploma or less	29 (5.3)	0.0	0.0
College or Trade School Diploma	154 (28.2)	-1.6 (-4.0, 0.8)	-0.9 (-3.3, 1.5)
Undergraduate University Degree	213 (39.0)	-2.3 (-4.7, 0.0)	-1.1 (-3.5, 1.3)

Graduate University Degree	150 (27.5)	-4.0 (-6.4, -1.6)	-2.3 (-4.8, 0.2)
Annual Income			
Intercept		47.2 (45.8, 48.6)	45.5 (41.7, 49.4)
<= $40,000	73 (13.4)	0.0	0.0
$40,001-$80,000	151 (27.7)	-1.0 (-2.7, 0.7)	-0.3 (-2.1, 1.4)
$80,001-$100,000	105 (19.2)	-2.1 (-3.9, -0.3)	-1.1 (-3.0, 0.7)
> $100,000	217 (39.7)	-3.0 (-4.6, -1.4)	-1.5 (-3.3, 0.3)
Has Ever Smoked During Pregnancy			
Intercept		45.2 (44.5, 44.5)	45.5 (41.7, 49.4)
No	357 (65.4)	0.0	0.0
Yes	189 (34.6)	0.4 (-0.6, 1.5)	0.3 (-0.8, 1.4)
Has Ever Consumed Alcohol During Pregnancy			
Intercept		45.4 (44.9, 46.0)	45.5 (41.7, 49.4)
No	455 (83.3)	0.0	0.0
Yes	91 (16.7)	-0.7 (-2.1, 0.7)	-0.8 (-2.2, 0.6)
Pre-Pregnancy BMI			
Intercept		45.2 (42, 48.5)	45.5 (41.7, 49.4)
Underweight	14 (2.6)	0.0	0.0
Normal	332 (60.8)	0.2 (-3.1, 3.5)	1.2 (-2.1, 4.4)
Overweight	112 (20.5)	-0.5 (-3.9, 2.9)	-0.1 (-3.4, 3.3)
Obese	88 (16.1)	0.7 (-2.8, 4.2)	0.9 (-2.6, 4.3)

[1] Adjusted for child's sex, mother's age, race, marital status, education level, annual income, whether the mother has ever smoked during pregnancy, has ever consumed alcohol during pregnancy, and pre-pregnancy BMI.

Supplementary Table 2. Plasma PCB levels (quartiles) in relation to Social Awareness score of MIREC study participants using Multiple Linear Quantile Regression (n=546).

PCB/quartile	Value (ng/g lipid)	n	SRS Unadjusted mean scores (95% CI)	SRS Adjusted* mean scores (95% CI)
PCB118				
Q1	< 1.63	136	0.0 (referent)	0.0
Q2	1.63-< 2.45	137	-1.71 (-3.23, -0.19)	-1.67 (-3.55, 0.21)
Q3	2.45-< 3.41	136	-1.4 (-2.92, 0.12)	-0.97 (-2.88, 0.94)
Q4	>= 3.41	137	-2.08 (-3.59, -0.57)	-1.62 (-3.55, 0.31)
PCB138				
Q1	< 2.86	136	0.0	0.0
Q2	2.86-< 4.23	137	-2.26 (-3.77, -0.75)	-1.9 (-3.77, -0.03)
Q3	4.23-< 6.32	136	-1.65 (-3.17, -0.13)	-1.26 (-3.22, 0.69)
Q4	>= 6.32	137	-0.97 (-2.49, 0.55)	-0.27 (-2.26, 1.73)
PCB153				
Q1	< 4.93	136	0.0	0.0
Q2	4.93-< 7.5	137	-2.31 (-3.82, -0.80)	-2.07 (-3.94, -0.19)
Q3	7.5-< 11.77	136	-2.33 (-3.85, -0.81)	-2.04 (-4.05, -0.04)
Q4	>= 11.77	137	-1.47 (-2.99, 0.05)	-0.77 (-2.82, 1.27)
PCB170				
Q1	< 1.22	136	0.0	0.0
Q2	1.22-< 1.85	137	-2.18 (-3.69, -0.67)	-2.17 (-4.05, -0.28)
Q3	1.85-< 3.09	136	-1.92 (-3.44, -0.40)	-1.29 (-3.26, 0.69)
Q4	>= 3.09	137	-1.68 (-3.20, -0.16)	-0.82 (-2.85, 1.21)
PCB180				
Q1	< 3.2	136	0.0	0.0

Q2	3.2-< 5.15	137	-2.96 (-4.47, -1.45)	-2.87 (-4.83, -0.90)
Q3	5.15-< 8.24	136	-2.47 (-3.99, -0.95)	-1.97 (-4.05, 0.12)
Q4	>= 8.24	137	-1.88 (-3.40, -0.36)	-1.10 (-3.26, 1.05)
PCB187				
Q1	< 1.18	136	0.0	0.0
Q2	1.18-< 1.46	137	-0.71 (-2.23, 0.81)	-0.52 (-2.40, 1.36)
Q3	1.46-< 2.5	136	-1.30 (-2.82, 0.22)	-0.87 (-2.79, 1.04)
Q4	>= 2.5	137	-0.72 (-2.24, 0.80)	0.11 (-1.91, 2.13)
Sum of above PCBs				
Q1	< 15.41	136	0.0	0.0
Q2	15.41-< 22.94	137	-1.89 (-3.41, -0.37)	-1.68 (-3.58, 0.21)
Q3	22.94-< 36.42	136	-2.26 (-3.78, -0.74)	-2.07 (-4.09, -0.05)
Q4	>= 36.42	137	-1.08 (-2.60, 0.44)	-0.40 (-2.45, 1.64)

* Adjusted for child's sex, mother's age, race, marital status, education level, annual income, whether the mother has ever smoked during pregnancy, has ever consumed alcohol during pregnancy, and pre-pregnancy BMI.

Supplementary Table 3. Plasma PCB levels (quartiles) in relation to Social Cognition score of MIREC study participants using Multiple Linear Quantile Regression (n=546).

PCB/quartile	Value (ng/g lipid)	n	SRS Unadjusted mean scores (95% CI)	SRS Adjusted* mean scores (95% CI)
PCB118				
Q1	< 1.63	136	0.0 (referent)	0.0
Q2	1.63-< 2.45	137	-0.96 (-2.18, 0.26)	-1.01 (-2.53, 0.50)
Q3	2.45-< 3.41	136	-1.24 (-2.47, -0.01)	-0.81 (-2.35, 0.73)
Q4	>= 3.41	137	-1.42 (-2.64, -0.20)	-0.96 (-2.51, 0.60)
PCB138				
Q1	< 2.86	136	0.0	0.0
Q2	2.86-< 4.23	137	-1.01 (-2.23, 0.21)	-0.56 (-2.07, 0.95)
Q3	4.23-< 6.32	136	-1.66 (-2.88, -0.44)	-0.88 (-2.46, 0.69)
Q4	>= 6.32	137	-0.41 (-1.63, 0.81)	0.52 (-1.08, 2.13)
PCB153				
Q1	< 4.93	136	0.0	0.0
Q2	4.93-< 7.5	137	-1.15 (-2.37, 0.07)	-0.57 (-2.08, 0.94)
Q3	7.5-< 11.77	136	-2.18 (-3.40, -0.96)	-1.45 (-3.07, 0.16)
Q4	>= 11.77	137	-0.79 (-2.01, 0.43)	0.27 (-1.38, 1.92)
PCB170				
Q1	< 1.22	136	0.0	0.0
Q2	1.22-< 1.85	137	-0.77 (-1.99, 0.45)	-0.65 (-2.17, 0.87)
Q3	1.85-< 3.09	136	-1.27 (-2.49, -0.05)	-0.53 (-2.12, 1.07)
Q4	>= 3.09	137	-1.20 (-2.42, 0.02)	-0.36 (-2.00, 1.28)
PCB180				
Q1	< 3.2	136	0.0	0.0

Q2	3.2-< 5.15	137	-2.22 (-3.44, -1.00)	-1.44 (-3.03, 0.15)
Q3	5.15-< 8.24	136	-1.87 (-3.09, -0.65)	-0.90 (-2.59, 0.78)
Q4	>= 8.24	137	-1.46 (-2.68, -0.24)	-0.25 (-1.99, 1.48)
PCB187				
Q1	< 1.18	136	0.0	0.0
Q2	1.18-< 1.46	137	-0.38 (-1.60, 0.84)	-0.54 (-2.05, 0.97)
Q3	1.46-< 2.5	136	-0.87 (-2.09, 0.35)	-0.58 (-2.12, 0.96)
Q4	>= 2.5	137	-0.32 (-1.54, 0.90)	0.34 (-1.29, 1.96)
Sum of above PCBs				
Q1	< 15.41	136	0.0	0.0
Q2	15.41-< 22.94	137	-0.93 (-2.15, 0.29)	-0.42 (-1.94, 1.11)
Q3	22.94-< 36.42	136	-2.02 (-3.24, -0.80)	-1.46 (-3.08, 0.16)
Q4	>= 36.42	137	-0.63 (-1.85, 0.59)	0.38 (-1.27, 2.02)

* Adjusted for child's sex, mother's age, race, marital status, education level, annual income, whether the mother has ever smoked during pregnancy, has ever consumed alcohol during pregnancy, and pre-pregnancy BMI.

Supplementary Table 4. Plasma PCB levels (quartiles) in relation to Social Communication score of MIREC study participants using Multiple Linear Quantile Regression (n=546).

PCB/quartile	Value (ng/g lipid)	n	SRS Unadjusted mean scores (95% CI)	SRS Adjusted* mean scores (95% CI)
PCB118				
Q1	< 1.63	136	0.0 (referent)	0.0
Q2	1.63-< 2.45	137	-0.48 (-1.69, 0.73)	-0.31 (-1.79, 1.17)
Q3	2.45-< 3.41	136	-0.32 (-1.53, 0.89)	0.33 (-1.17, 1.84)
Q4	>= 3.41	137	-0.46 (-1.67, 0.75)	0.28 (-1.24, 1.79)
PCB138				
Q1	< 2.86	136	0.0	0.0
Q2	2.86-< 4.23	137	-0.10 (-1.31, 1.11)	0.40 (-1.07, 1.86)
Q3	4.23-< 6.32	136	-0.60 (-1.81, 0.61)	0.22 (-1.31, 1.75)
Q4	>= 6.32	137	0.23 (-0.98, 1.44)	1.32 (-0.25, 2.88)
PCB153				
Q1	< 4.93	136	0.0	0.0
Q2	4.93-< 7.5	137	-1.21 (-2.42, 0.00)	-0.73 (-2.20, 0.74)
Q3	7.5-< 11.77	136	-1.24 (-2.45, -0.03)	-0.44 (-2.01, 1.13)
Q4	>= 11.77	137	-0.26 (-1.47, 0.95)	0.94 (-0.66, 2.54)
PCB170				
Q1	< 1.22	136	0.0	0.0
Q2	1.22-< 1.85	137	-0.54 (-1.75, 0.67)	-0.69 (-2.16, 0.79)
Q3	1.85-< 3.09	136	-1.40 (-2.61, -0.19)	-0.71 (-2.26, 0.83)
Q4	>= 3.09	137	-0.50 (-1.71, 0.71)	0.34 (-1.25, 1.93)
PCB180				
Q1	< 3.2	136	0.0	0.0

Q2	3.2-< 5.15	137	-1.96 (-3.17, -0.75)	-1.45 (-2.98, 0.09)
Q3	5.15-< 8.24	136	-1.79 (-3.00, -0.58)	-0.88 (-2.51, 0.75)
Q4	>= 8.24	137	-0.75 (-1.96, 0.46)	0.47 (-1.21, 2.15)
PCB187				
Q1	< 1.18	136	0.0	0.0
Q2	1.18-< 1.46	137	-0.36 (-1.57, 0.85)	-0.66 (-2.13, 0.80)
Q3	1.46-< 2.5	136	-0.72 (-1.93, 0.49)	-0.54 (-2.03, 0.96)
Q4	>= 2.5	137	0.02 (-1.19, 1.23)	0.68 (-0.90, 2.26)
Sum of above PCBs				
Q1	< 15.41	136	0.0	0.0
Q2	15.41-< 22.94	137	-0.72 (-1.93, 0.49)	-0.42 (-1.90, 1.06)
Q3	22.94-< 36.42	136	-1.18 (-2.39, 0.03)	-0.58 (-2.16, 1.00)
Q4	>= 36.42	137	0.04 (-1.17, 1.25)	1.10 (-0.50, 2.70)

* Adjusted for child's sex, mother's age, race, marital status, education level, annual income, whether the mother has ever smoked during pregnancy, has ever consumed alcohol during pregnancy, and pre-pregnancy BMI.

Supplementary Table 5. Plasma PCB levels (quartiles) in relation to Social Motivation score of MIREC study participants using Multiple Linear Quantile Regression (n=546).

PCB/quartile	Value (ng/g lipid)	n	SRS Unadjusted mean scores (95% CI)	SRS Adjusted* mean scores (95% CI)
PCB118				
Q1	< 1.63	136	0.0 (referent)	0.0
Q2	1.63-< 2.45	137	0.12 (-1.30, 1.54)	0.32 (-1.46, 2.09)
Q3	2.45-< 3.41	136	-1.01 (-2.43, 0.41)	-0.46 (-2.26, 1.34)
Q4	>= 3.41	137	-0.66 (-2.08, 0.76)	-0.03 (-1.85, 1.78)
PCB138				
Q1	< 2.86	136	0.0	0.0
Q2	2.86-< 4.23	137	-1.25 (-2.67, 0.17)	-1.03 (-2.80, 0.74)
Q3	4.23-< 6.32	136	-1.10 (-2.52, 0.32)	-0.55 (-2.40, 1.29)
Q4	>= 6.32	137	-1.05 (-2.47, 0.37)	-0.37 (-2.26, 1.51)
PCB153				
Q1	< 4.93	136	0.0	0.0
Q2	4.93-< 7.5	137	-1.02 (-2.44, 0.40)	-0.84 (-2.61, 0.93)
Q3	7.5-< 11.77	136	-1.30 (-2.72, 0.12)	-0.84 (-2.73, 1.06)
Q4	>= 11.77	137	-1.25 (-2.67, 0.17)	-0.67 (-2.60, 1.27)
PCB170				
Q1	< 1.22	136	0.0	0.0
Q2	1.22-< 1.85	137	-0.07 (-1.49, 1.35)	-0.61 (-2.38, 1.16)
Q3	1.85-< 3.09	136	-2.15 (-3.56, -0.74)	-2.10 (-3.95, -0.24)
Q4	>= 3.09	137	-0.88 (-2.30, 0.54)	-0.89 (-2.80, 1.02)
PCB180				
Q1	< 3.2	136	0.0	0.0

Q2	3.2-< 5.15	137	-0.44 (-1.86, 0.98)	-0.29 (-2.15, 1.58)
Q3	5.15-< 8.24	136	-1.41 (-2.83, 0.01)	-1.06 (-3.03, 0.91)
Q4	>= 8.24	137	-0.82 (-2.24, 0.60)	-0.34 (-2.37, 1.70)
PCB187				
Q1	< 1.18	136	0.0	0.0
Q2	1.18-< 1.46	137	0.19 (-1.23, 1.61)	-0.50 (-2.27, 1.26)
Q3	1.46-< 2.5	136	-1.43 (-2.85, -0.01)	-1.76 (-3.56, 0.03)
Q4	>= 2.5	137	-0.76 (-2.18, 0.66)	-0.79 (-2.68, 1.11)
Sum of above PCBs				
Q1	< 15.41	136	0.0	0.0
Q2	15.41-< 22.94	137	-0.09 (-1.51, 1.33)	0.01 (-1.78, 1.79)
Q3	22.94-< 36.42	136	-1.35 (-2.77, 0.07)	-0.96 (-2.86, 0.95)
Q4	>= 36.42	137	-0.76 (-2.18, 0.66)	-0.22 (-2.15, 1.71)

* Adjusted for child's sex, mother's age, race, marital status, education level, annual income, whether the mother has ever smoked during pregnancy, has ever consumed alcohol during pregnancy, and pre-pregnancy BMI.

Supplementary Table 6. Plasma PCB levels (quartiles) in relation to Restricted Interests and Repetitive Behaviour score of MIREC study participants using Multiple Linear Quantile Regression (n=546).

PCB/quartile	Value (ng/g lipid)	n	SRS Unadjusted mean scores (95% CI)	SRS Adjusted* mean scores (95% CI)
PCB118				
Q1	< 1.63	136	0.0 (referent)	0.0
Q2	1.63-< 2.45	137	-0.63 (-1.99, 0.73)	-0.35 (-2.03, 1.33)
Q3	2.45-< 3.41	136	-0.35 (-1.71, 1.01)	0.22 (-1.48, 1.93)
Q4	>= 3.41	137	-0.57 (-1.93, 0.79)	0.12 (-1.60, 1.84)
PCB138				
Q1	< 2.86	136	0.0	0.0
Q2	2.86-< 4.23	137	0.56 (-0.80, 1.92)	1.05 (-0.61, 2.72)
Q3	4.23-< 6.32	136	-0.63 (-1.99, 0.73)	0.13 (-1.60, 1.87)
Q4	>= 6.32	137	0.69 (-0.67, 2.05)	1.65 (-0.12, 3.42)
PCB153				
Q1	< 4.93	136	0.0	0.0
Q2	4.93-< 7.5	137	-0.57 (-1.93, 0.79)	-0.12 (-1.79, 1.55)
Q3	7.5-< 11.77	136	-1.50 (-2.86, -0.14)	-0.89 (-2.68, 0.89)
Q4	>= 11.77	137	-0.02 (-1.38, 1.34)	0.94 (-0.88, 2.76)
PCB170				
Q1	< 1.22	136	0.0	0.0
Q2	1.22-< 1.85	137	-0.81 (-2.17, 0.55)	-1.00 (-2.67, 0.67)
Q3	1.85-< 3.09	136	-2.15 (-3.50, -0.80)	-1.70 (-3.46, 0.05)
Q4	>= 3.09	137	-0.49 (-1.85, 0.87)	0.05 (-1.75, 1.85)
PCB180				
Q1	< 3.2	136	0.0	0.0

Q2	3.2-< 5.15	137	-1.51 (-2.87, -0.15)	-1.10 (-2.85, 0.65)
Q3	5.15-< 8.24	136	-2.07 (-3.43, -0.71)	-1.47 (-3.33, 0.39)
Q4	>= 8.24	137	-0.74 (-2.10, 0.62)	0.12 (-1.79, 2.04)
PCB187				
Q1	< 1.18	136	0.0	0.0
Q2	1.18-< 1.46	137	-0.91 (-2.27, 0.45)	-1.32 (-2.98, 0.34)
Q3	1.46-< 2.5	136	-1.74 (-3.09, -0.39)	-1.65 (-3.34, 0.03)
Q4	>= 2.5	137	0.03 (-1.32, 1.38)	0.47 (-1.31, 2.25)
Sum of above PCBs				
Q1	< 15.41	136	0.0	0.0
Q2	15.41-< 22.94	137	0.01 (-1.35, 1.37)	0.37 (-1.32, 2.05)
Q3	22.94-< 36.42	136	-1.26 (-2.62, 0.10)	-0.80 (-2.59, 0.99)
Q4	>= 36.42	137	0.45 (-0.91, 1.81)	1.34 (-0.47, 3.16)

* Adjusted for child's sex, mother's age, race, marital status, education level, annual income, whether the mother has ever smoked during pregnancy, has ever consumed alcohol during pregnancy, and pre-pregnancy BMI.

Supplementary Table 7. Plasma PCB levels (quartiles) in relation to SRS score of MIREC study participants with male babies using Multiple Linear Quantile Regression (n=261).

PCB/quartile	Value (ng/g lipid)	n	SRS Unadjusted mean scores (95% CI)	SRS Adjusted* mean scores (95% CI)
PCB118				
Q1	< 1.61	65	0.0 (referent)	0.0
Q2	1.61-< 2.5	65	-0.34 (-2.23, 1.55)	-0.32 (-2.83, 2.19)
Q3	2.5-< 3.43	65	-0.38 (-2.27, 1.51)	0.10 (-2.42, 2.62)
Q4	>= 3.43	66	-1.43 (-3.31, 0.45)	-0.71 (-3.18, 1.75)
PCB138				
Q1	< 2.99	65	0.0	0.0
Q2	2.99-< 4.49	65	-0.82 (-2.71, 1.07)	-0.62 (-3.06, 1.82)
Q3	4.49-< 6.38	65	-0.94 (-2.83, 0.95)	-0.33 (-2.87, 2.22)
Q4	>= 6.38	66	-0.41 (-2.29, 1.47)	0.32 (-2.25, 2.90)
PCB153				
Q1	< 5	65	0.0	0.0
Q2	5-< 7.59	65	-1.88 (-3.77, 0.01)	-1.67 (-4.06, 0.72)
Q3	7.59-< 11.46	65	-2.51 (-4.39, -0.63)	-2.08 (-4.69, 0.54)
Q4	>= 11.46	66	-0.44 (-2.32, 1.44)	0.11 (-2.50, 2.72)
PCB170				
Q1	< 1.26	65	0.0	0.0
Q2	1.26-< 1.83	65	-1.57 (-3.46, 0.32)	-1.68 (-4.07, 0.70)
Q3	1.83-< 3.06	65	-2.89 (-4.76, -1.02)	-2.40 (-4.94, 0.13)
Q4	>= 3.06	66	-0.91 (-2.79, 0.97)	-0.68 (-3.28, 1.91)
PCB180				
Q1	< 3.19	65	0.0	0.0

Q2	3.19-< 5.12	65	-3.02 (-4.90, -1.14)	-2.89 (-5.34, -0.43)
Q3	5.12-< 7.94	65	-3.17 (-5.05, -1.29)	-2.88 (-5.57, -0.19)
Q4	>= 7.94	66	-1.22 (-3.10, 0.66)	-0.89 (-3.64, 1.87)
PCB187				
Q1	< 1.2	65	0.0	0.0
Q2	1.2-< 1.47	65	-2.09 (-3.97, -0.21)	-1.92 (-4.29, 0.46)
Q3	1.47-< 2.5	65	-0.74 (-2.63, 1.15)	-0.60 (-3.01, 1.80)
Q4	>= 2.5	66	0.16 (-1.72, 2.04)	0.86 (-1.74, 3.45)
Sum of above PCBs				
Q1	< 15.69	65	0.0	0.0
Q2	15.69-< 24.2	65	-1.48 (-3.37, 0.41)	-1.18 (-3.62, 1.26)
Q3	24.2-< 35.64	65	-2.45 (-4.33, -0.57)	-1.90 (-4.50, 0.70)
Q4	>= 35.64	66	-0.04 (-1.92, 1.84)	0.60 (-2.00, 3.21)

* Adjusted for child's sex, mother's age, race, marital status, education level, annual income, whether the mother has ever smoked during pregnancy, has ever consumed alcohol during pregnancy, and pre-pregnancy BMI.

Supplementary Table 8. Plasma PCB levels (quartiles) in relation to SRS score of MIREC study participants with female babies using Multiple Linear Quantile Regression (n=285).

PCB/quartile	Value (ng/g lipid)	n	SRS Unadjusted mean scores (95% CI)	SRS Adjusted* mean scores (95% CI)
PCB118				
Q1	< 1.64	71	0.0 (referent)	0.0
Q2	1.64-< 2.42	71	-1.49 (-2.95, -0.03)	-1.16 (-2.97, 0.64)
Q3	2.42-< 3.38	71	-1.01 (-2.47, 0.45)	-0.35 (-2.20, 1.49)
Q4	>= 3.38	72	-0.55 (-2.00, 0.90)	0.26 (-1.67, 2.19)
PCB138				
Q1	< 2.76	71	0.0	0.0
Q2	2.76-< 4.18	71	-0.79 (-2.25, 0.67)	-0.42 (-2.22, 1.38)
Q3	4.18-< 6.25	71	-1.14 (-2.60, 0.32)	-0.09 (-1.99, 1.80)
Q4	>= 6.25	72	-0.34 (-1.79, 1.11)	0.76 (-1.22, 2.74)
PCB153				
Q1	< 4.84	71	0.0	0.0
Q2	4.84-< 7.33	71	-0.86 (-2.32, 0.60)	-0.20 (-2.03, 1.64)
Q3	7.33-< 11.82	71	-1.45 (-2.91, 0.01)	-0.12 (-2.08, 1.83)
Q4	>= 11.82	72	-0.86 (-2.32, 0.60)	0.61 (-1.45, 2.66)
PCB170				
Q1	< 1.22	71	0.0	0.0
Q2	1.22-< 1.86	71	0.34 (-1.12, 1.80)	0.31 (-1.51, 2.13)
Q3	1.86-< 3.1	71	-1.03 (-2.49, 0.43)	-0.16 (-2.10, 1.78)
Q4	>= 3.1	72	-0.51 (-1.96, 0.94)	0.53 (-1.53, 2.60)
PCB180				
Q1	< 3.21	71	0.0	0.0
Q2	3.21-< 5.25	71	-1.48 (-2.94, -0.02)	-0.68 (-2.65, 1.29)

Q3	5.25-< 8.45	71	-1.10 (-2.56, 0.36)	0.18 (-1.83, 2.19)
Q4	>= 8.45	72	-1.32 (-2.77, 0.13)	0.15 (-2.01, 2.31)
PCB187				
Q1	< 1.14	71	0.0	0.0
Q2	1.14-< 1.44	71	1.46 (0.02, 2.90)	1.33 (-0.46, 3.13)
Q3	1.44-< 2.5	71	-1.54 (-2.99, -0.09)	-1.02 (-2.90, 0.85)
Q4	>= 2.5	72	-0.50 (-1.95, 0.95)	0.23 (-1.77, 2.23)
Sum of above PCBs				
Q1	< 15.02	71	0.0	0.0
Q2	15.02-< 22.29	71	-1.10 (-2.56, 0.36)	-0.22 (-2.06, 1.63)
Q3	22.29-< 36.78	71	-1.17 (-2.63, 0.29)	0.24 (-1.73, 2.20)
Q4	>= 36.78	72	-1.07 (-2.52, 0.38)	0.47 (-1.57, 2.51)

* Adjusted for child's sex, mother's age, race, marital status, education level, annual income, whether the mother has ever smoked during pregnancy, has ever consumed alcohol during pregnancy, and pre-pregnancy BMI.

Supplementary Table 9. Sensitivity analysis using single imputation "fill-in" of PCB levels less than the LOD. Plasma PCB levels (quartiles) in relation to mean child SRS score in MIREC study participants, Canada, 2008-2011 using Multiple Linear Quantile Regression (n=546).

PCB/quartile	Value[1] (ng/g lipid)	n	SRS Unadjusted mean scores	SRS Adjusted[2] mean scores

			(95% CI)	(95% CI)
PCB118				
Q1	< 1.64	136	0.0 (referent)	0.0
Q2	1.64-< 2.43	137	-0.32 (-1.53, 0.89)	-0.15 (-1.64, 1.33)
Q3	2.43-< 3.4	136	-0.72 (-1.93, 0.49)	-0.17 (-1.68, 1.34)
Q4	>= 3.4	137	-0.80 (-2.01, 0.41)	-0.13 (-1.65, 1.40)
PCB138				
Q1	< 2.86	136	0.0	0.0
Q2	2.86-< 4.21	137	-0.72 (-1.93, 0.49)	-0.28 (-1.75, 1.19)
Q3	4.21-< 6.25	136	-1.01 (-2.22, 0.20)	-0.27 (-1.80, 1.27)
Q4	>= 6.25	137	-0.44 (-1.65, 0.77)	0.51 (-1.07, 2.08)
PCB153				
Q1	< 4.93	136	0.0	0.0
Q2	4.93-< 7.5	137	-1.35 (-2.56, -0.14)	-0.87 (-2.35, 0.60)
Q3	7.5-< 11.7	136	-1.84 (-3.05, -0.63)	-1.19 (-2.77, 0.38)
Q4	>= 11.7	137	-0.74 (-1.95, 0.47)	0.25 (-1.35, 1.86)
PCB170				
Q1	< 0.7	136	0.0	0.0
Q2	0.7-< 1.86	137	-1.05 (-2.26, 0.16)	-0.73 (-2.18, 0.73)
Q3	1.86-< 3.07	136	-1.72 (-2.93, -0.51)	-1.02 (-2.56, 0.51)
Q4	>= 3.07	137	-1.04 (-2.25, 0.17)	-0.13 (-1.73, 1.46)
PCB180				
Q1	< 3.2	136	0.0	0.0
Q2	3.2-< 5.14	137	-1.98 (-3.19, -0.77)	-1.49 (-3.04, 0.06)
Q3	5.14-< 8.22	136	-2.13 (-3.34, -0.92)	-1.35 (-2.99, 0.29)

Q4	>= 8.22	137	-1.20 (-2.41, 0.01)	-0.22 (-1.91, 1.47)
PCB187				
Q1	< 0.59	136	0.0	0.0
Q2	0.59-< 1.47	137	1.05 (-0.15, 2.25)	0.66 (-0.77, 2.10)
Q3	1.47-< 2.5	136	-0.64 (-1.85, 0.57)	-0.53 (-2.00, 0.94)
Q4	>= 2.5	137	0.36 (-0.85, 1.57)	0.92 (-0.63, 2.46)
Sum of above PCBs				
Q1	< 14.42	136	0.0	0.0
Q2	14.42-< 22.41	137	-0.80 (-2.01, 0.41)	-0.29 (-1.77, 1.18)
Q3	22.41-< 36.23	136	-1.45 (-2.66, -0.24)	-0.82 (-2.40, 0.76)
Q4	>= 36.23	137	-0.35 (-1.56, 0.86)	0.69 (-0.92, 2.29)

[1] Values from single imputation method in Lubin et al. [53].
[2] Adjusted for child's sex, mother's age, race, marital status, education level, annual income, whether the mother has ever smoked during pregnancy, has ever consumed alcohol during pregnancy, and pre-pregnancy BMI.