Supplemental Material

Phthalate and Bisphenol Exposure during Pregnancy and Offspring Nonverbal IQ

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Table of Contents

Table S9. Adjusted association between log10 transformed maternal urinary phthalate metabolite and bisphenol concentration in ug/g creatinine with additional adjustment for the maternal intake of fruit, vegetables and folic acid (n=1,282).

Figure S1. Directed acyclic graph of the prenatal phthalates and bisphenol exposure and child nonverbal IQ association.

Figure S2. Restricted cubic splines (and 95% confidence intervals) of adjusted child nonverbal IQ scores and (untransformed) grouped phthalate metabolite concentrations.

Table S1. Variables used in logistic regression model to calculate inverse probability of attrition weights.

Variables	Explored [a]	Included [b]
Maternal educational level	x	x
Maternal ethnicity	x	x
Maternal age	x	x
Maternal parity	x	x
Maternal alcohol use during pregnancy	x	x
Maternal tobacco use during pregnancy	x	x
Maternal body mass index	x	x
Household income during pregnancy	x	x
Marital status during pregnancy	x	
Child's sex	x	
Child's birth weight	x	
Gestational age at birth	x	x

a. Characteristics explored in logistic regression models to test whether they differ between included and not-included participants of the Generation R Study cohort.
b. Characteristics that were predictive (P<0.20) of being included in our study.

Table S2. Descriptive statistics of urinary phthalate metabolite concentrations in ng/ml [a] across pregnancy measured in 1,282 women

	N	LOD	%<LOD	min	P25	P50	P75	max
LMWP concentrations								
mMP <18 weeks	1274	0.06	0.2%	0	2.7	5.4	9.8	1231.8
mMP 18-25 weeks	1270	0.06	0.2%	0	1.9	3.5	6.4	2486.5
mMP >25 weeks	1269	0.06	0.5%	0	2.0	4.1	8.1	1660
mEP <18 weeks	1274	0.06	0.1%	0	40.5	139.2	484.5	27649.1
mEP 18-25 weeks	1270	0.06	0.0%	1.5	25.1	72.6	227.3	27602.6
mEP >25 weeks	1269	0.06	0.0%	1.4	44.7	127.8	410.9	17428.4
mBP <18 weeks	1274	0.14	0.7%	0.1	7.0	16.1	31.1	2715.6
mBP 18-25 weeks	1270	0.14	0.0%	0.2	5.5	9.7	19.1	23148.1
mBP >25 weeks	1269	0.14	0.2%	0.1	6.1	12.1	25.1	2573.4
mIBP <18 weeks	1274	0.09	0.2%	0.1	9.6	21.4	47.0	1826.6
mIBP 18-25 weeks	1270	0.09	0.0%	0.5	4.6	9.0	18.4	1773.7
mIBP >25 weeks	1269	0.09	0.2%	0.1	9.4	18.1	38.3	2057.1
HMWP concentrations								
DEHP								
mECPP <18 weeks	1274	0.29	0.2%	0.2	8.3	16.3	31.3	942.0
mECPP 18-25 weeks	1270	0.29	0.1%	0.2	5.9	10.7	20.7	93301.2
mECPP >25 weeks	1269	0.29	0.0%	0.7	9.4	18.2	34.3	578.5
mEHHP <18 weeks	1274	0.08	0.2%	0.1	5.8	11.8	22.7	548.8
mEHHP 18-25 weeks	1270	0.08	0.1%	0.1	3.0	5.6	11.0	273.1
mEHHP >25 weeks	1269	0.08	0.2%	0.1	5.2	10.3	19.7	336.9
mEOHP <18 weeks	1274	0.04	0.0%	0.1	3.5	7.7	15.1	416.5
mEOHP 18-25 weeks	1270	0.04	0.0%	0.2	3.7	7.5	16.6	11831
mEOHP >25 weeks	1269	0.04	0.0%	0.4	3.9	7.2	14.0	260.1
mCMHP <18 weeks	1274	0.04	0.1%	0	7.6	14.0	26.5	2729.6
mCMHP 18-25 weeks	1270	0.04	0.2%	0	2.3	4.2	7.5	5497.2
mCMHP >25 weeks	1269	0.04	1.1%	0	1.9	3.5	6.5	165.0
DINP								
mINP <18 weeks	1274	0.18	85.5%	0.1	0.1	0.1	0.1	16.1
mINP 18-25 weeks	1270	0.18	98.6%	0.1	0.1	0.1	0.1	0.6
mINP >25 weeks	1269	0.18	99.9%	0.1	0.1	0.1	0.1	16.9
DIDP								
mIDP <18 weeks	1274	0.89	92.6%	0.6	0.6	0.6	0.6	14.2
mIDP 18-25 weeks	1270	0.89	98.2%	0.6	0.6	0.6	0.6	4.7
mIDP >25 weeks	1269	0.89	96.7%	0.6	0.6	0.6	0.6	17.8
DNOP								
mCPP <18 weeks	1274	0.008	0.0%	0	0.8	1.4	2.8	120.2
mCPP 18-25 weeks	1270	0.008	0.0%	0	0.5	0.9	1.8	75.4
mCPP >25 weeks	1269	0.008	0.1%	0	0.9	1.8	3.2	60.4
mOP <18 weeks	1274	0.25	90.2%	0.2	0.2	0.2	0.2	9.3
mOP 18-25 weeks	1270	0.25	99.4%	0.2	0.2	0.2	0.2	0.8
mOP >25 weeks	1269	0.25	99.3%	0.2	0.2	0.2	0.2	1.7
mCHpP <18 weeks	1274	0.06	99.3%	0	0	0	0	0.2
mCHpP 18-25 weeks	1270	0.06	100.0%	0	0	0	0	0
mCHpP >25 weeks	1269	0.06	99.8%	0	0	0	0	3.7
Other HMWP								
mBzP <18 weeks	1274	0.15	8.2%	0.1	2.3	5.8	12.1	613.8
mBzP 18-25 weeks	1270	0.15	1.7%	0.1	2.2	5.3	11.0	522.9
mBzP >25 weeks	1269	0.15	3.5%	0.1	1.2	3.1	6.5	211.0
mHxP <18 weeks	1274	0.06	23.9%	0	0.1	0.2	0.5	59.9
mHxP 18-25 weeks	1270	0.06	98.8%	0	0	0	0	0.4
mHxP >25 weeks	1269	0.06	98.1%	0	0	0	0	2.4
mHpP <18 weeks	1274	0.30	35.4%	0.2	0.2	0.6	1.5	78.7
mHpP 18-25 weeks	1270	0.30	96.6%	0.2	0.2	0.2	0.2	1.3

mHpP >25 weeks	1269	0.30	98.5%	0.2	0.2	0.2	0.2	24.5
mCHP <18 weeks	1274	0.04	80.3%	0	0	0	0	22.9
mCHP 18-25 weeks	1270	0.04	94.4%	0	0	0	0	1.4
mCHP >25 weeks	1269	0.04	99.3%	0	0	0	0	2.2
PA								
PA <18 weeks	1274	1.11	0.2%	0.8	30.0	56.9	120.3	9450.0
PA 18-25 weeks	1270	1.11	0.1%	0.8	62.5	157.4	288.6	5367.5
PA >25 weeks	1269	1.11	0.4%	0.8	34.3	69.2	132.0	3580.0

Abbreviations: n=number, LOD=limit of detection, min=minimum, P=percentile, max=maximum. LMWP= Low molecular weight phthalates (Mono methyl phthalate (mMP), Mono ethyl phthalate (mEP), Mono-n-butyl phthalate (mBP), Mono-isobutyl phthalate (mIBP)), HMWP= High molecular weight phthalates (Di-2-ethylhexyl phthalates (DEHP) [Mono-(2-ethyl-5-carboxypentyl) phthalate (mECPP), Mono-(2-ethyl-5-hydroxyhexyl) phthalate (mEHHP), Mono-(2-ethyl-5-oxohexyl) phthalate (mEOHP), Mono-[(2-carboxymethyl)hexyl] phthalate (mCMHP)], Di-isononyl phthalate (DINP) [Mono isononyl phthalate (mINP)], Di-isodecylphthalate (DIDP) [Mono-(8-methyl-1-nonyl) phthalate (MIDP)], Di-n-octylphthalate (DNOP) [Mono(3-carboxypropyl) phthalate (mCPP), Monooctyl phthalate (mOP), Mono-(7-carboxy-n-heptyl) phthalate (mCHpP)], other HMWP [Monobenzyl phthalate (mBzP), Mono-hexyl phthalate (mHxP), Mono-2-heptylphthalate (mHpP), Monocyclohexyl phthalate (mCHP)]), PA= Phthalic acid.
a. Values below the LOD are imputed by LOD/$\sqrt{2}$.

Table S3. Descriptive statistics of urinary bisphenol concentrations in ng/ml [a] across pregnancy measured in 1,282 women

	N	LOD	%<LOD	min	P25	P50	P75	max
Bisphenol A <18 weeks	1274	0.15	20.6%	0.1	0.3	1.1	2.8	524.8
Bisphenol A 18-25 weeks	1270	0.15	6.9%	0.1	0.6	1.3	3.0	365
Bisphenol A >25 weeks	1269	0.15	10.1%	0.1	0.6	1.5	3.0	72.9
Bisphenol S <18 weeks	1274	0.05	32.2%	0	0	0.2	0.6	28.4
Bisphenol S 18-25 weeks	1270	0.05	70.2%	0	0	0	0.1	20.0
Bisphenol S >25 weeks	1269	0.05	81.0%	0	0	0	0	46.7
Bisphenol Z <18 weeks	1274	0.12	88.0%	0.1	0.1	0.1	0.1	2.3
Bisphenol Z 18-25 weeks	1270	0.12	96.2%	0.1	0.1	0.1	0.1	0.4
Bisphenol Z >25 weeks	1269	0.12	99.8%	0.1	0.1	0.1	0.1	1.3
Bisphenol B <18 weeks	1274	0.03	90.2%	0	0	0	0	1.6
Bisphenol B 18-25 weeks	1270	0.03	97.6%	0	0	0	0	0.5
Bisphenol B >25 weeks	1269	0.03	100%	0	0	0	0	0
Bisphenol F <18 weeks	1274	0.18	59.7%	0.1	0.1	0.1	0.4	82.7
Bisphenol F 18-25 weeks	1270	0.18	88.8%	0.1	0.1	0.1	0.1	14.3
Bisphenol F >25 weeks	1269	0.18	71.2%	0.1	0.1	0.1	0.5	42.7
Bisphenol AF <18 weeks	1274	0.79	100%	0.6	0.6	0.6	0.6	0.6
Bisphenol AF 18-25 weeks	1270	0.79	100%	0.6	0.6	0.6	0.6	0.6
Bisphenol AF >25 weeks	1269	0.79	100%	0.6	0.6	0.6	0.6	0.6
Bisphenol AP <18 weeks	1274	0.07	92.4%	0.1	0.1	0.1	0.1	6.3
Bisphenol AP 18-25 weeks	1270	0.07	100%	0.1	0.1	0.1	0.1	0.1
Bisphenol AP >25 weeks	1269	0.07	99.9%	0.1	0.1	0.1	0.1	0.2
Bisphenol P <18 weeks	1274	0.11	98.7%	0.1	0.1	0.1	0.1	0.5
Bisphenol P 18-25 weeks	1270	0.11	100%	0.1	0.1	0.1	0.1	0.1
Bisphenol P >25 weeks	1269	0.11	99.3%	0.1	0.1	0.1	0.1	0.2

Abbreviations: n=number, LOD=limit of detection, min=minimum, P=percentile, max=maximum.
a. Values below the LOD are imputed by LOD/$\sqrt{2}$.

Table S4. Intra-class correlations between log10 transformed phthalate
and bisphenol concentrations across gestational urinary collection phases

	ICC [a]	ICC [b]
Phthalate metabolite concentrations in ng/ml [c]		
LMWP	0.36	0.63
HMWP	0.21	0.44
DEHP	0.19	0.41
DNOP	0.23	0.47
PA	0.20	0.43
phthalate metabolite concentrations in ug/g creatinine		
LMWP	0.27	0.53
HMWP	0.10	0.26
DEHP	0.10	0.25
DNOP	0.12	0.29
PA	0.12	0.29
Bisphenol metabolite concentrations in ng/ml		
Total bisphenols [d]	0.05	0.14
Bisphenol concentrations in ug/g creatinine		
Total bisphenols [d]	0.00	0.00

a. ICC = Intraclass Correlation Coefficients calculated using a single-measurement, absolute-agreement, and 2-way mixed-effects model

b. ICC = Intraclass Correlation Coefficients calculated using a mean of three measurements, absolute-agreement, and 2-way mixed-effects model

c. Phthalate metabolites are grouped into: low molecular weight phthalate metabolites (**LMWP**) = sum of Mono methyl phthalate, Mono ethyl phthalate, Mono-isobutyl phthalate, and Mono-n-butyl phthalate, high molecular weight phthalate metabolites (**HMWP**) = sum of mono-(2-ethyl-5-carboxypentyl) phthalate, mono-(2-ethyl-5-hydroxyhexyl) phthalate, mono-(2-ethyl-5-ox-ohexyl) phthalate, mono-[(2-carboxymethyl)hexyl] phthalate, mono(3-carboxypropyl) phthalate, monobenzyl phthalate, mono-hexyl phthalate, and mono-2-hep-tylphthalate, Di-2-ethylhexyl phthalate metabolites (**DEHP**) = sum of Mono-(2-ethyl-5-carboxypentyl) phthalate, Mono-(2-ethyl-5-hydroxyhexyl) phthalate, Mono-(2-ethyl-5-oxohexyl) phthalate, and Mono-[(2-carboxymethyl)hexyl] phthalate, Di-n-octyl phthalate metabolites (**DNOP**) = Mono(3-carboxypropyl) phthalate, Phthalic acid (**PA**) = a proxy for total phthalate exposure measured in ug/g creatinine.

d. Total bisphenol =-sum of Bisphenol A, bisphenol F, and Bisphenol S.

Table S5. Adjusted [a] associations between maternal urine phthalate metabolite and bisphenol concentrations in ug/g creatinine, by timing of pregnancy and sex (n=1,282).

	Boys (N=647)		Girls (N=635)			
	B	95%CI	B	95%CI	P-interaction	P-interaction [b]
Phthalate metabolite concentrations [c]						
LMWP <18 weeks	-1.02	-3.05, 1.00	-2.38	-4.24, -0.52	0.34	0.40
LMWP 18-25 weeks	0.05	-2.20, 2.29	0.53	-1.53, 2.59	0.74	0.70
LMWP >25 weeks	-2.28	-4.67, 0.11	-0.25	-2.38, 1.87	0.31	0.19
LMWP Averaged	-2.07	-5.19, 1.06	-1.50	-4.21, 1.20	0.85	0.69
HMWP <18 weeks	-1.94	-4.63, 0.75	-1.68	-4.19, 0.83	0.87	0.82
HMWP 18-25 weeks [d]	1.06	-1.74, 3.86	0.90	-1.53, 3.34	0.73	0.95
HMWP >25 weeks [d]	1.59	-2.28, 5.47	0.19	-3.13, 3.50	0.34	0.57
Averaged HMWP	-0.19	-4.95, 4.58	-0.57	-4.80, 3.66	0.69	0.95
DEHP <18 weeks	-1.95	-4.59, 0.69	-1.55	-4.00, 0.89	0.79	0.78
DEHP 18-25 weeks	0.93	-1.81, 3.66	0.78	-1.61, 3.18	0.79	0.95
DEHP >25 weeks	1.58	-2.14, 5.31	0.05	-3.14, 3.24	0.32	0.51
Averaged DEHP	-0.13	-3.68, 3.41	0.03	-3.03, 3.09	0.95	0.91
DNOP <18 weeks	-1.88	-4.47, 0.70	-2.31	-4.71, 0.08	0.77	0.90
DNOP 18-25 weeks	0.86	-1.99, 3.70	-0.41	-3.16, 2.33	0.44	0.55
DNOP >25 weeks	-2.91	-6.49, 0.68	-1.47	-4.67, 1.74	0.82	0.54
Averaged DNOP	-2.62	-7.06, 1.82	-3.63	-7.90, 0.63	0.55	0.81
PA <18 weeks	-1.92	-4.35, 0.51	-1.91	-4.09, 0.27	0.81	0.86
PA 18-25 weeks	2.17	-0.35, 4.68	-0.26	-2.64, 2.12	0.15	0.16
PA >25 weeks	-2.19	-5.34, 0.96	0.07	-2.90, 3.04	0.32	0.28
Averaged PA	-1.15	-5.26, 2.95	-2.15	-6.01, 1.70	0.79	0.80
Bisphenol concentrations						
TB <18 weeks [e]	0.95	-1.15, 3.05	-0.15	-1.99, 1.70	0.68	0.45
TB 18-25 weeks [f]	0.56	-1.68, 2.81	-0.25	-2.48, 1.99	0.54	0.56
TB >25 weeks [g]	1.36	-1.06, 3.78	-1.72	-4.06, 0.63	0.08	0.07
Averaged TB	2.83	-1.06, 6.72	-1.81	-5.48, 1.85	0.13	0.08

a. Adjusted for maternal age, maternal non-verbal IQ, age of the child at assessment, ethnicity categories (Dutch, other-western and non-western), education (low, intermediate and high), income (low, middle and high), marital status, maternal alcohol consumption (no alcohol consumption during pregnancy, alcohol consumption until pregnancy was known, occasionally alcohol consumption during pregnancy and frequently alcohol consumption during pregnancy), BMI, parity categories (0, 1, 2+), and smoking categories (no smoking during pregnancy, smoked until pregnancy was known, smoked during pregnancy).
b. Estimated with the use of the augmented product terms (Buckley et al. 2017).
c Phthalate metabolites are grouped into: low molecular weight phthalate metabolites (**LMWP**) = sum of Mono methyl phthalate, Mono ethyl phthalate, Mono-isobutyl phthalate, and Mono-n-butyl phthalate, high molecular weight phthalate metabolites (**HMWP**) = sum of mono-(2-ethyl-5-carboxypentyl) phthalate, mono-(2-ethyl-5-hydroxyhexyl) phthalate, mono-(2-ethyl-5-ox-ohexyl) phthalate, mono-[(2-carboxymethyl)hexyl] phthalate, mono-(3-carboxypropyl) phthalate, monobenzyl phthalate, mono-hexyl phthalate, and mono-2-hep-tylphthalate, Di-2-ethylhexyl phthalate metabolites (**DEHP**) = sum of Mono-(2-ethyl-5-carboxypentyl) phthalate, Mono-(2-ethyl-5-hydroxyhexyl) phthalate, Mono-(2-ethyl-5-oxohexyl) phthalate, and Mono-[(2-carboxymethyl)hexyl] phthalate, Di-n-octyl phthalate metabolites (**DNOP**) = Mono(3-carboxypropyl) phthalate, Phthalic acid (**PA**) = a proxy for total phthalate exposure measured in ug/g creatinine.
d. with the exclusion of mono-hexyl phthalate, and mono-2-hep-tyl phthalate metabolite concentrations
e. Total bisphenol =-sum of Bisphenol A, bisphenol F, and Bisphenol S.
f. Total bisphenol =-sum of Bisphenol A, and Bisphenol S.
g. Total bisphenol =-sum of Bisphenol A and bisphenol F

Table S6. Difference in child non-verbal IQ score at age six years per log10 increase in maternal urinary phthalate and bisphenol concentrations in ng/ml with creatinine added as a separate covariate (n=1,282).

Phthalate metabolites [b]		Adjusted [a] B	95%CI
Σ LMWP metabolites			
	<18 weeks	-1.65	-3.02, -0.27
	18-25 weeks	0.16	-1.37, 1.69
	>25 weeks	-1.31	-2.86, 0.24
	Averaged	-1.82	-3.83, 0.19
Σ HMWP metabolites			
	<18 weeks	-1.92	-3.88, 0.04
	18-25 weeks [c]	0.95	-0.98, 2.88
	>25 weeks [c]	0.01	-2.48, 2.50
	Averaged	-0.86	-4.08, 2.35
Σ DEHP metabolites			
	<18 weeks	-1.80	-3.69, 0.09
	18-25 weeks	0.82	-1.05, 2.70
	>25 weeks	-0.02	-2.40, 2.36
	Averaged	-0.91	-4.00, 2.19
Σ DNOP metabolites			
	<18 weeks	-2.03	-3.86, -0.21
	18-25 weeks	0.28	-1.66, 2.22
	>25 weeks	-2.82	-5.10, -0.54
	Averaged	-3.32	-6.31, -0.34
PA metabolites			
	<18 weeks	-1.99	-3.68, -0.30
	18-25 weeks	0.79	-1.05, 2.64
	>25 weeks	-1.48	-3.54, 0.57
	Averaged	-2.20	-5.03, 0.64
Bisphenol metabolites		Adjusted [a] B	95%CI
	<18 weeks [d]	0.65	-0.85, 2.15
	18-25 weeks [e]	0.02	-1.56, 1.59
	>25 weeks [f]	-0.28	-2.00, 1.44
	Averaged	0.47	-2.27, 3.21

a. Adjusted for creatinine, maternal age, maternal non-verbal IQ, sex of child, age of the child at assessment, ethnicity, education, income, marital status, maternal alcohol consumption, BMI, parity categories, and smoking.
b Phthalate metabolites are grouped into: low molecular weight phthalate metabolites (**LMWP**) = sum of Mono methyl phthalate, Mono ethyl phthalate, Mono-isobutyl phthalate, and Mono-n-butyl phthalate, high molecular weight phthalate metabolites (**HMWP**) = sum of mono-(2-ethyl-5-carboxypentyl) phthalate, mono-(2-ethyl-5-hydroxyhexyl) phthalate, mono-(2-ethyl-5-ox-ohexyl) phthalate, mono-[(2-carboxymethyl)hexyl] phthalate, mono(3-carboxypropyl) phthalate, monobenzyl phthalate, mono-hexyl phthalate, and mono-2-hep-tylphthalate, Di-2-ethylhexyl phthalate metabolites (**DEHP**) = sum of Mono-(2-ethyl-5-carboxypentyl) phthalate, Mono-(2-ethyl-5-hydroxyhexyl) phthalate, Mono-(2-ethyl-5-oxohexyl) phthalate, and Mono-[(2-carboxymethyl)hexyl] phthalate, Di-n-octyl phthalate metabolites (**DNOP**) = Mono(3-carboxypropyl) phthalate, Phthalic acid (**PA**) = a proxy for total phthalate exposure measured in ug/g creatinine.
c. with the exclusion of mono-hexyl phthalate, and mono-2-hep-tyl phthalate metabolite concentrations
d Total bisphenol =-sum of Bisphenol A, bisphenol F, and Bisphenol S.
e Total bisphenol =-sum of Bisphenol A, and Bisphenol S.
f. Total bisphenol =-sum of Bisphenol A and bisphenol F

Table S7. Difference in child non-verbal IQ score at age six years per log10 increase in individual urinary biomarkers (ug/g creatinine) of phthalate and bisphenol exposure (n=1,282).

Unadjusted	<18 weeks B	95%CI	18-25 weeks B	95%CI	>25 weeks B	95%CI	Averaged B	95%CI
mMP	-2.70	-4.42, -0.99	-0.90	-2.75, 0.94	-0.43	-2.26, 1.40	-2.80	-5.33, -0.27
mEP	-2.26	-3.42, -1.09	-1.06	-2.34, 0.23	-1.90	-3.23, -0.56	-3.02	-4.66, -1.39
mIBP	-3.85	-5.38, -2.31	-2.35	-4.06, -0.64	-2.85	-4.68, -1.01	-6.11	-8.46, -3.75
mBP	-2.31	-3.89, -0.72	-1.35	-3.28, 0.58	-1.77	-3.73, 0.18	-4.26	-6.96, -1.56
mECPP	-3.30	-5.14, -1.47	-1.61	-3.54, 0.32	-0.66	-3.19, 1.87	-4.53	-7.52, -1.54
mEHHP	-2.22	-3.86, -0.58	0.10	-1.72, 1.93	0.71	-1.23, 2.66	-1.59	-4.41, 1.22
mEOHP	-2.05	-3.65, -0.46	-0.63	-2.33, 1.08	0.41	-1.65, 2.47	-2.49	-5.33, 0.36
mCMHP	-3.74	-5.71, -1.77	0.31	-1.63, 2.24	0.67	-1.54, 2.87	-2.51	-5.70, 0.68
mCPP	-2.61	-4.46, -0.76	-0.13	-2.20, 1.94	-1.10	-3.64, 1.43	-3.28	-6.47, -0.09
mBzBP	-2.52	-3.74, -1.30	-1.49	-2.96, -0.03	-1.27	-2.81, 0.26	-4.07	-6.10, -2.04
mHxP	0.69	-0.68, 2.07	-	-	-	-	-	-
mHpP	-2.29	-3.84, -0.73	-	-	-	-	-	-
PA	-2.59	-4.32, -0.87	-0.90	-2.72, 0.91	-2.46	-4.75, -0.17	-4.64	-7.57, -1.71
BPA	-0.44	-1.69, 0.82	0.59	-0.99, 2.18	0.25	-1.38, 1.88	-0.44	-1.69, 0.82
BPS	0.99	-0.08, 2.06	0.10	-1.57, 1.76	-	-	1.43	-0.35, 3.22
PBF	2.34	0.85, 3.82	-	-	2.10	0.71, 3.50	4.36	2.35, 6.36

Adjusted [a]	<18 weeks B	95%CI	18-25 weeks B	95%CI	>25 weeks B	95%CI	Averaged B	95%CI
mMP	-1.56	-3.17, 0.05	-0.08	-1.81, 1.65	-0.67	-2.39, 1.06	-1.62	-4.00, 0.76
mEP	-1.30	-2.41, -0.19	0.17	-1.05, 1.39	-0.97	-2.24, 0.29	-1.28	-2.85, 0.29
mIBP	-1.47	-2.97, 0.04	0.49	-1.17, 2.14	0.48	-1.31, 2.27	-0.61	-3.00, 1.78
mBP	-1.03	-2.53, 0.47	1.05	-0.80, 2.90	-0.01	-1.87, 1.86	-0.34	-2.96, 2.28
mECPP	-1.74	-3.48, 0.00	0.12	-1.70, 1.95	0.05	-2.33, 2.42	-1.43	-4.30, 1.43
mEHHP	-1.32	-2.87, 0.22	0.87	-0.85, 2.58	0.64	-1.20, 2.48	-0.16	-2.83, 2.52
mEOHP	-1.23	-2.73, 0.28	0.21	-1.39, 1.82	0.85	-1.09, 2.79	-0.57	-3.27, 2.14
mCMHP	-1.98	-3.84, -0.12	1.44	-0.37, 3.25	0.72	-1.35, 2.79	0.11	-2.91, 3.12
mCPP	-1.98	-3.72, -0.23	0.38	-1.57, 2.32	-2.39	-4.76, -0.02	-2.97	-6.00, 0.06
mBzBP	-0.67	-1.84, 0.50	0.97	-0.46, 2.39	0.21	-1.24, 1.66	0.13	-1.88, 2.13
mHxP	0.55	-0.74, 1.83	-	-	-	-	-	-
mHpP	-0.20	-1.70, 1.29	-	-	-	-	-	-
PA	-1.93	-3.55, -0.31	0.85	-0.87, 2.57	-1.09	-3.25, 1.07	-1.77	-4.57, 1.04
BPA	0.22	-0.95, 1.40	0.26	-1.22, 1.75	-0.18	-1.70, 1.34	0.22	-0.95, 1.40
BPS	0.50	-0.50, 1.50	-0.54	-2.09, 1.01	-	-	0.39	-1.29, 2.06
PBF	1.25	-0.15, 2.65	-	-	0.64	-0.68, 1.96	1.85	-0.07, 3.78

Abbreviations: mMP= mono-methyl phthalate, mEP= mono-ethyl phthalate, mIBP= mono-isobutyl phthalate, mBP= mono-n-butyl phthalate, mECPP= mono- (2-ethyl-5-carboxypentyl) phthalate, mEHHP= mono- (2-ethyl-5-hydroxyhexyl) phthalate, mEOHP= mono-(2-ethyl-5-oxohexyl) phthalate, mCMHP= mono-[(2-carboxymethyl)hexyl] phthalate, mCPP= mono(3-carboxypropyl) phthalate, mBzP= monobenzyl phthalate, mHxP= mono-hexyl phthalate, mHpP= mono-2-heptyl phthalate, PA= phthalic acid, BPA= bisphenol A, BPS= bisphenol S, BPF= bisphenol F.
a. Adjusted for maternal age, maternal non-verbal IQ, sex of child, age of the child at assessment, ethnicity, education, income, marital status, maternal alcohol consumption, BMI, parity categories, and smoking.

Table S8. inverse probability weighted association between log10 transformed maternal urine phthalate and bisphenol metabolite concentrations in ug/g creatinine and child non-verbal IQ score at age six years (n=1,282).

Phthalate metabolites [c]		Adjusted B	95%CI
Σ LMWP metabolites			
	<18 weeks	-1.70	-3.06, -0.34
	18-25 weeks	0.25	-1.27, 1.76
	>25 weeks	-1.15	-2.73, 0.42
	Averaged	-1.74	-3.75, 0.28
Σ HMWP metabolites			
	<18 weeks	-1.53	-3.36, 0.29
	18-25 weeks [e]	1.23	-0.63, 3.08
	>25 weeks [e]	0.53	-1.98, 3.05
	Averaged	-0.05	-3.23, 3.12
Σ DEHP metabolites			
	<18 weeks	-1.49	-3.27, 0.30
	18-25 weeks	1.14	-0.67, 2.95
	>25 weeks	0.49	-1.93, 2.92
	Averaged	0.41	-1.92, 2.75
Σ DNOP metabolites			
	<18 weeks	-2.00	-3.73, -0.27
	18-25 weeks	0.28	-1.66, 2.22
	>25 weeks	-2.81	-5.16, -0.46
	Averaged	-3.38	-6.41, -0.34
PA metabolites			
	<18 weeks	-1.93	-3.53, -0.32
	18-25 weeks	1.02	-0.70, 2.75
	>25 weeks	-1.33	-3.47, 0.81
	Averaged	-1.77	-4.56, 1.02
Bisphenol metabolites		Adjusted B	95%CI
	<18 weeks [f]	0.72	-0.66, 2.11
	18-25 weeks [g]	0.22	-1.35, 1.79
	>25 weeks [h]	-0.04	-1.72, 1.64
	Averaged	1.07	-1.59, 3.73

a. Adjusted for maternal age, maternal non-verbal IQ, sex of child, age of the child at assessment, ethnicity, education, income, marital status, maternal alcohol consumption, BMI, parity categories, and smoking.
b. Adjusted model with the inclusion of the three exposures in one model.
c Phthalate metabolites are grouped into: low molecular weight phthalate metabolites (**LMWP**) = sum of Mono methyl phthalate, Mono ethyl phthalate, Mono-isobutyl phthalate, and Mono-n-butyl phthalate, high molecular weight phthalate metabolites (**HMWP**) = sum of mono-(2-ethyl-5-carboxypentyl) phthalate, mono-(2-ethyl-5-hydroxyhexyl) phthalate, mono-(2-ethyl-5-ox-ohexyl) phthalate, mono-[(2-carboxymethyl)hexyl] phthalate, mono(3-carboxypropyl) phthalate, monobenzyl phthalate, mono-hexyl phthalate, and mono-2-hep-tylphthalate, Di-2-ethylhexyl phthalate metabolites (**DEHP**) = sum of Mono-(2-ethyl-5-carboxypentyl) phthalate, Mono-(2-ethyl-5-hydroxyhexyl) phthalate, Mono-(2-ethyl-5-oxohexyl) phthalate, and Mono-[(2-carboxymethyl)hexyl] phthalate, Di-n-octyl phthalate metabolites (**DNOP**) = Mono(3-carboxypropyl) phthalate, Phthalic acid (**PA**) = a proxy for total phthalate exposure measured in ug/g creatinine.
d. Tests whether exposure from different time points relates in the same manner to non-verbal IQ scores using the multiple informant method (Sanchez et al. 2011).
e. with the exclusion of mono-hexyl phthalate, and mono-2-hep-tyl phthalate metabolite concentrations
f. Total bisphenol =-sum of Bisphenol A, bisphenol F, and Bisphenol S.
g Total bisphenol =-sum of Bisphenol A, and Bisphenol S.
h. Total bisphenol =-sum of Bisphenol A and bisphenol F

Table S9. Adjusted [a] association between log10 transformed maternal urinary phthalate metabolite and bisphenol concentration in ug/g creatinine with additional adjustment for the maternal intake of fruit [b], vegetables [b] and folic acid (n=1,282).

Phthalate metabolites [c]		B	95%CI
Σ LMWP			
	<18 weeks	-1.64	-3.01, -0.28
	18-25 weeks	0.29	-1.23, 1.81
	>25 weeks	-1.05	-2.64, 0.54
	Averaged	-1.63	-3.67, 0.41
Σ HMWP			
	<18 weeks	-1.72	-3.55, 0.11
	18-25 weeks [d]	1.04	-0.80, 2.88
	>25 weeks [d]	0.65	-1.88, 3.18
	Averaged	-0.33	-3.49, 2.82
Σ DEHP			
	<18 weeks	-1.66	-3.45, 0.13
	18-25 weeks	0.91	-0.89, 2.71
	>25 weeks	0.59	-1.85, 3.02
	Averaged	0.08	-2.23, 2.39
Σ DNOP			
	<18 weeks	-1.93	-3.68, -0.18
	18-25 weeks	0.40	-1.55, 2.34
	>25 weeks	-2.41	-4.79, -0.03
	Averaged	-2.92	-5.95, 0.12
PA			
	<18 weeks	-1.85	-3.47, -0.22
	18-25 weeks	0.84	-0.88, 2.56
	>25 weeks	-1.01	-3.18, 1.16
	Averaged	-1.65	-4.45, 1.16
Bisphenol concentrations			
	<18 weeks [e]	0.51	-0.87, 1.90
	18-25 weeks [f]	0.16	-1.40, 1.73
	>25 weeks [g]	0.00	-1.68, 1.68
	Averaged	0.79	-1.87, 3.46

a. Adjusted for maternal age, maternal non-verbal IQ, sex of child, age of the child at assessment, ethnicity, maternal education, income, marital status, maternal alcohol consumption, maternal BMI, parity categories, maternal smoking, maternal fruit intake, maternal vegetable intake, and maternal folic acid intake.

b. maternal fruit and vegetable intake were adjusted for energy intake.

c Phthalate metabolites are grouped into: low molecular weight phthalate metabolites (**LMWP**) = sum of Mono methyl phthalate, Mono ethyl phthalate, Mono-isobutyl phthalate, and Mono-n-butyl phthalate, high molecular weight phthalate metabolites (**HMWP**) = sum of mono-(2-ethyl-5-carboxypentyl) phthalate, mono-(2-ethyl-5-hydroxyhexyl) phthalate, mono-(2-ethyl-5-ox-ohexyl) phthalate, mono-[(2-carboxymethyl)hexyl] phthalate, mono(3-carboxypropyl) phthalate, monobenzyl phthalate, mono-hexyl phthalate, and mono-2-hep-tylphthalate, Di-2-ethylhexyl phthalate metabolites (**DEHP**) = sum of Mono-(2-ethyl-5-carboxypentyl) phthalate, Mono-(2-ethyl-5-hydroxyhexyl) phthalate, Mono-(2-ethyl-5-oxohexyl) phthalate, and Mono-[(2-carboxymethyl)hexyl] phthalate, Di-n-octyl phthalate metabolites (**DNOP**) = Mono(3-carboxypropyl) phthalate, Phthalic acid (**PA**) = a proxy for total phthalate exposure measured in ug/g creatinine.

d. with the exclusion of mono-hexyl phthalate, and mono-2-hep-tyl phthalate metabolite concentrations

e. Total bisphenol =-sum of Bisphenol A, bisphenol F, and Bisphenol S.

f. Total bisphenol =-sum of Bisphenol A, and Bisphenol S.

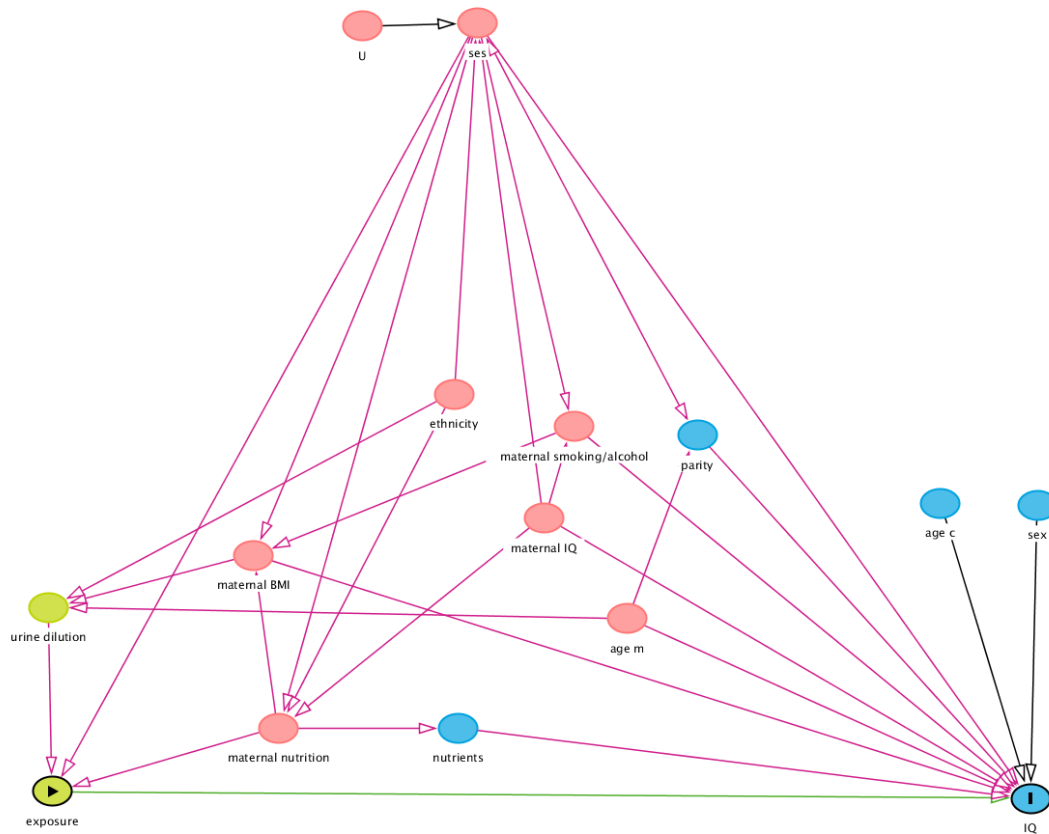g. Total bisphenol =-sum of Bisphenol A and bisphenol F

Figure S1. Directed Acyclic Graph of the prenatal phthalates and bisphenol exposure and child non-verbal IQ association.

Potential adjustment variables were selected a priori defined with a Directed Acyclic Graph (DAG) using the Dagitty software (Textor et al. 2017). The DAG was based on previous studies of phthalates and bisphenol exposure and child neurodevelopment and on biologically plausible covariate–exposure and covariate–outcome associations observed in our data. Green circles represent ancestors of the exposure, blue circles ancestors of the outcome, pink circles ancestors of both exposure and outcome. **Maternal BMI**= Maternal body mass index, **ses**= socioeconomic status (maternal education, household income and marital status), age c= child age at assessment, age m= age mother, IQ= nonverbal intelligent quotient, U=unobserved ancestor of socioeconomic status.
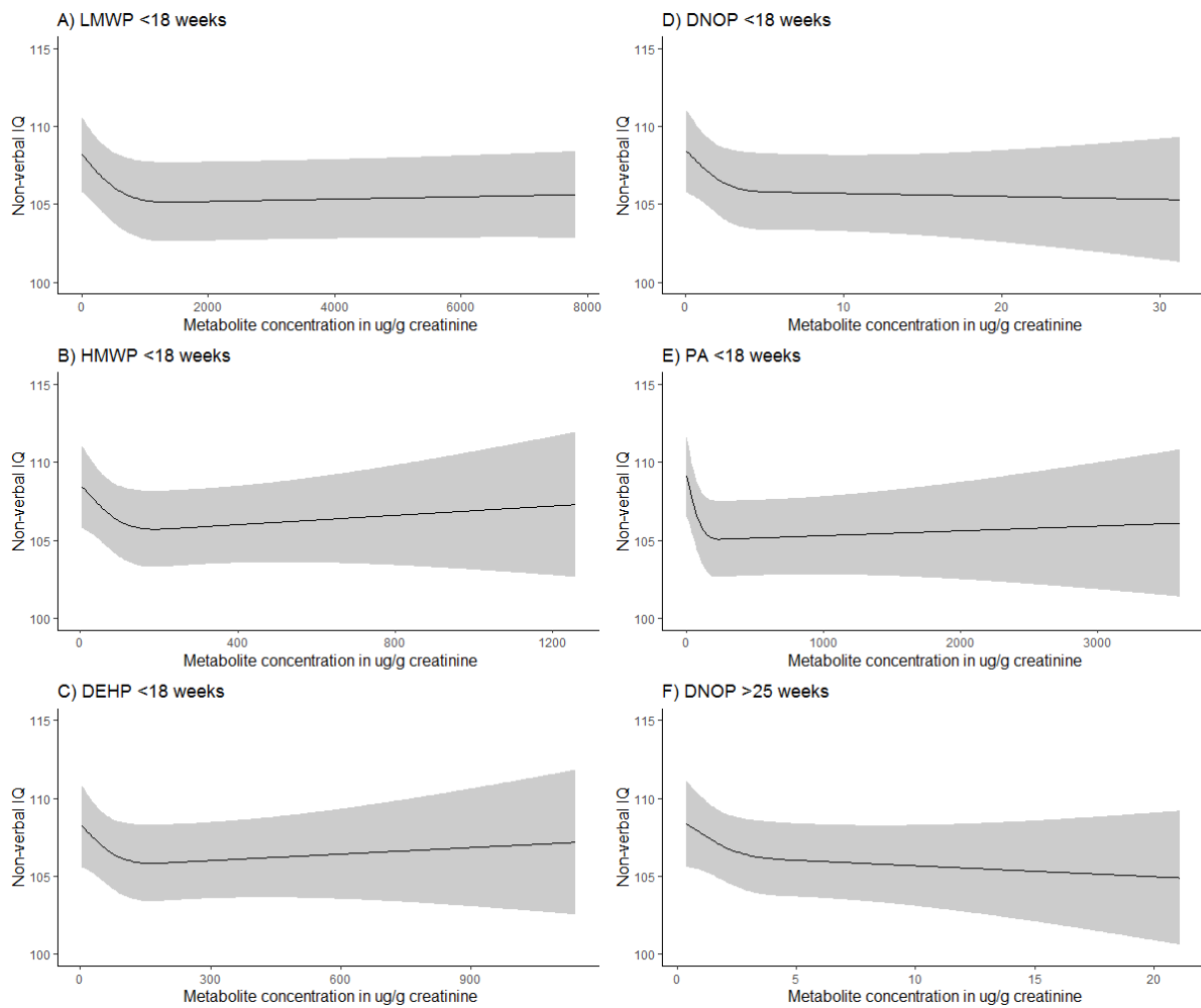
Figure S2. Restricted cubic splines (and 95% confidence intervals) of adjusted child non-verbal IQ scores and (untransformed) grouped phthalate metabolite concentrations. A) LMWP= Low molecular weight phthalates (sum of mono methyl phthalate, mono ethyl phthalate, mono-n-butyl phthalate, mono-isobutyl phthalate) metabolites measured at <18 weeks of gestation. **B)** HMWP= High molecular weight phthalates (sum of mono-(2-ethyl-5-carboxypentyl) phthalate (mECPP), mono-(2-ethyl-5-hydroxyhexyl) phthalate (mEHHP), mono(2-ethyl-5-oxohexyl) phthalate (mEOHP), mono-[(2-carboxymethyl) hexyl] phthalate (mCMHP), Mono(3-carboxypropyl) phthalate (mCPP), monobenzyl phthalate, mono-hexyl phthalate, Mono-2-heptyl phthalate) metabolites measured at <18 weeks of gestation. **C)** DEHP= Di-2-ethylhexyl phthalates (sum of mECPP, mEHHP, mEOHP, and mCMHP) metabolites measured at <18 weeks of gestation. **D)** DNOP= Di-n-octyl phthalate (mCPP) metabolites measured at <18 weeks of gestation. **E)** PA=phthalic acid measured at <18 weeks of gestation. **F)** DNOP metabolites measured at >25 weeks of gestation.